AIR QUALITY MONITORING AT MARSAXLOKK AND BIRŻEBBUĠA

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Quality Assurance

AIR QUALITY MONITORING AT MARSAXLOKK AND BIRŻEBBUĠA

Client: Enemalta

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1. Introduction

The main objective of this project is to assess the air quality in the two localities of Marsaxlokk and Birżebbuġa which are in close proximity to the Delimara power station operated by Enemalta.

The power station is subjected to an Integrated Pollution Prevention and Control (IPPC) permit issued by the Malta Environment and Planning Authority and as part of the IPPC conditions, air quality monitoring was requested. According to the MEPA specifications, the monitoring campaign will determine the daily concentration of PM_{10} and $PM_{2.5}$, near Delimara power station, in compliance with the standards specified in LN 478 of 2010 (*Ambient Air Quality Regulations).*

This monitoring programme has been ongoing since April 2012 at the two locations: Marsaxlokk and Birżebbuġa. MEPA also requested to monitor the concentrations of Arsenic, Cadmium, Nickel, Lead and Vanadium on a quarterly basis to evaluate the amount of these metals present in the PM_{10} filters. An extension to this study was approved by Enemalta from 4 September 2013 until March 2014. The same methodology as that applied for the air quality monitoring programme between April 2012 and June 2013, will be conducted in this extension.

L.N. 478/2010 transposes the Directive 2004/107/EC relating to Arsenic, Cadmium, Mercury and Nickel and Polycyclic Aromatic Hydrocarbons in ambient air and Directive 2008/50/EC on ambient air quality and cleaner air for Europe. L.N. 478/2010 specifies the limit values to be achieved and the reference methods for sampling and measuring all the monitoring parameters analyzed in this study.

Specifically, the monitoring parameters are derived through the standard gravimetric sampling method which consists of aspiring ambient air at a constant flow rate and force it to pass through a membrane filter that captures all the particulate matter with a diameter smaller than 10µm or 2.5µm, according to the sampling head used. The filter is changed automatically every 24 hours and because of this, the laboratory analysis give as result an average daily concentration in $\mu g/m^3$, derived by the division of the different filter weight (before and after the sampling) by the actual air sampling volume. The construction characteristics of the sampling instrument have to conform to the criteria determined in the reference methods EN12341 and EN14907 for the measurement of PM_{10} and $PM_{2.5}$ concentration, respectively.

Power stations are one of the major primary sources of PM_{10} and $PM_{2.5}$ emissions in the atmosphere. This monitoring is required to assess the direct influence of the Delimara power station on the air quality in the surrounding area.

1.1. Sampling Points

Delimara power station is located in the southern area of the island. An extension to the Power Station was built in 2012 having a capacity of 144MW within the boundary of the existing plant. The eight diesel engines could be operated using either 0.7% sulphur heavy fuel oil (HFO) or gasoil. The current operation of the extension is on HFO and thus the air quality monitoring results are required in order to assess the environmental impact of this fuel. The power block is made up of four trains. Each train contains two diesel engines, two silencers, two $DeNO_x$ units (SCR), two exhaust gas boilers (EGB) and one common $DeSO_x$ unit (FGD). Each FGD unit is made up of one reactor and one bag filter system.

Figure 1: Location of Delimara Power Station

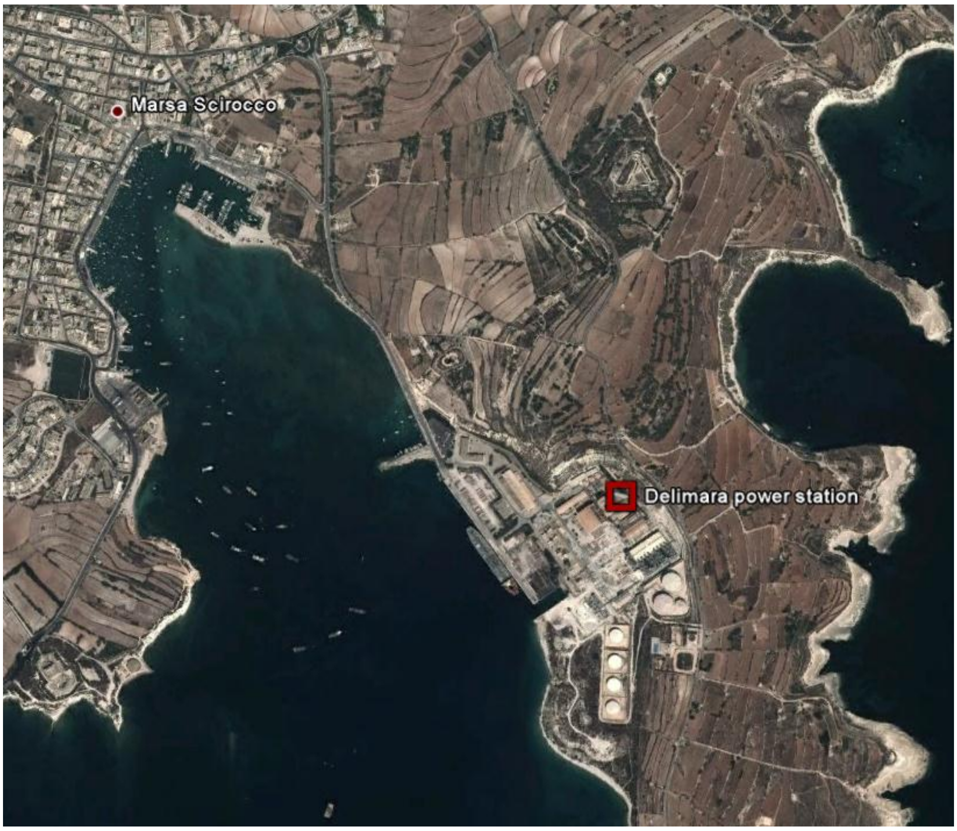

Figure 2: Delimara Power Station

Figures 3 and 4 show the position of the instrumentation in Marsaxlokk whereby the two samplers were placed in the balcony at the local council offices. In Birżebbuġa, the instrumentation was placed on the rooftop of the Enemalta fuel deposit. This respects the EN12341 method, which requires that the sampling height has to be between 1.5 to 8 m from the ground.

Figure 3: Location of the Monitoring Sites

Figure 4: Birżebbuġa

Figure 5: Marsaxlokk

1.2. Technical Specifications

1.2.1. Duration of Monitoring

The duration of this monitoring campaign is seven months. The campaign has started, for each station, on the 4th September 2013 at 00:05 and it will be ending on the 1th April 2014 at 23:55. The monitoring programme provides for continuous sampling without interruption.

The samples are analysed in an accredited laboratory: ambiente s.c. Results are presented every fortnight as requested by MEPA. The contribution of Saharan dust is also evaluated according to EU guidelines when an exceedance is recorded, as described in Section 1.4. This contribution is then deducted in order to correct for such natural aerosols.

1.2.2. Monitoring parameters and Time Schedule

A summary of the monitored pollutants is given in the following table. All these pollutants are detected daily in each monitoring site, through gravimetric (PM_{10} and $PM_{2.5}$) and chemical (metals) analysis conducted on the sample filter. The metals are analyzed in the PM_{10} fraction on a quarterly basis (four times in one calendar year). Each metals survey consists of 30 days of continuous monitoring every three months in order to cover the seasonal variation.

Pollutants	**Sampler**	**Filter type**	**Limit value (L.N. 478/2010)**		**Reference method for sampling and measurement**
PM_{10}	SKYPOST PM HV	Quartz fibers	One day	50 µm/m^3 not to be exceed more than 35 times a calendar year	EN 12341
			Calendar year	40 µm/m^3	
$PM_{2.5}$	SKYPOST PM HV	Quartz fibers	Calendar year	25 µm/m^3	EN 14907
Metals (As, Cd, Pb, Ni, V)	SKYPOST PM HV	Quartz fibers	**As**[1]	6 ng/ m^3	EN 14902:2005; EPA 6020A 2007; EPA 6010C 2007
			Cd[1]	5 ng/ m^3	
			Ni[1]	20 ng/ m^3	
			Pb	500 ng/ m^3	

Table 1: Monitored Pollutants

[1] Target value: level fixed with the aim of avoiding, preventing or reducing harmful effects on human health or the environment as a whole, to be attained where possible over a given period. It is determined for the total content in the PM10 fraction averaged over a calendar year.

1.3. Standards and Guidelines

L.N. 478/2010 determines the reference methods, known as European Norm (EN) that must be applied for sampling and measuring the pollutants in ambient air in Malta. These technical specifications are developed by the European Committee for Standardization, which is a European Institute that develops and uniforms norms and procedures in any technical field. To conduct this monitoring campaign, the following EN specifications have been applied:

- Reference method for the sampling and measurement of PM_{10}: EN 12341:1999 *"Determination of the PM_{10} fraction of suspended particulate matter"*
- Reference method for the sampling and measurement of $PM_{2.5}$: EN 14907:2005 *"Standard gravimetric measurement method for the determination of the $PM_{2.5}$ mass fraction of suspended particulate matter"*
- Reference method for measurement of Pb/Cd/As/Ni in the PM_{10} fraction of suspended matter: EN 14902:2005 *"Standard method for the measurement of Pb, Cd, As and Ni in the PM_{10} fraction of suspended particulate matter"*

These methods have to be fulfilled in order to carry out a certified air quality monitoring campaign that respects the common standard regulations for the European countries.

1.4. Methodology for the Identification of Saharan Dust

Desert aerosols are probably the most abundant and massive type of particles that are present in the atmosphere worldwide. The methodology for the identification and quantification of Saharan dust will follow the same procedure done in the previous reports based on EU guidelines.

The occurrence of Sahara dust (SD) events above Mediterranean has a marked seasonal cycle, mainly driven by the intense cyclones called Sharav, south of the Atlas Mountains (Morocco). In spring the Sharav cyclones carry desert dust towards Eastern Mediterranean, while in summer the most intense activity occurs in the central part; by the end of the summer a low-pressure system over the Balearic Islands drives the dust plumes towards the Western Mediterranean.

The identification of the contribution of natural sources to particulate matter concentration in air quality studies within the text of the Directive 2008/50/EC as an independent and not manageable cause of pollution allows that those days in which the contribution determines the exceedance of the air quality standard, it would not classified as such.

The reference standard identifies six main principles that should be followed in the method applied to identify the natural source event as follows:

1. the contributions must not be caused by direct or indirect human activities;
2. the quantification of the natural contribution must be sufficiently precise;
3. the quantification of the natural contribution must be consistent with the averaging period of the limit value;
4. the quantification of the natural sources must be spatially attributed;
5. the contributions must be demonstrated based on a systematic assessment process;
6. the quantification of the natural sources must be demonstrated for each pollutant separately.

Due to the above key principles, the proposed methodology for natural event in Malta, in particular for transport of natural particles from dry regions and wind-blown dust is developed by referring to the following assumptions:

- multiple sources/references/modeling applications contribute to the natural event identification;
- all the steps (measurement and calculation/modeling) for the natural event will be described in an operational procedure;
- The natural source contribution will be reported with uncertainties in the quantification.

European Commission published in 2011 the guidelines for demonstration and subtraction of exceedances attributable to natural sources (http://ec.europa.eu/environment/air/quality/legislation /pdf/sec_2011_0208.pdf).

The identification of Saharan Dust Events in this report involved the following steps:

1. Measurement correlations between the PM_{10} readings in all stations (Marsaxlokk and Birżebbuġa, Għarb, Kordin, Żejtun and Msida)
2. Satellite images, because the exceedances resulting from Marsaxlokk and Birżebbuġa have to be correlated with satellite imagery.
3. Application of the model: Hysplit.

Malta is significantly affected by the Saharan sandstorm events and this contribution shall be assessed and subtracted from the total PM concentration, as determined in the Directive 2008/50/EC. European Commission published in 2011 the guidelines for demonstration and subtraction of exceedances attributable to natural sources http://ec.europa.eu/environment/air/quality/legislation /pdf/sec_2011_0208.pdf).

In this document, a methodology to be followed in order to identify and quantify African dust contribution is described. The procedure is based on a method developed in Spain and Portugal for application in both countries and it was scientifically validated through chemical speciation analysis. In fact, since the PM from Saharan region is mainly constituted by quartz, calcite, dolomite and clay minerals, direct analysis of Ca, Al_2O_3, Fe_2O_3, K, Mg, and the indirect determination of Si ($3\times Al_2O_3 = SiO_2$) and CO_3^{2-}($1.5\times Ca + 2.5\times Mg = CO_3^{2-}$) allows the determination of the mineral load contributed by the Sahara. The identification of the occurrence and duration of the Saharan episodes is based on the interpretation of the meteorological data, atmospheric model outputs and also information on the levels of PM_{10} measured with real-time equipment. Further specific details on the identification process of the Saharan episodes can be found in the EC guidelines (see above link). Once the days affected by African dust have been identified, the quantitative contribution (µg/m^3) is determined as follows:

- Calculation of the monthly moving percentile 40 of the PM_{10} at the regional background site. The use of this indicator reproduces well the background concentration for PM_{10} in Iberian Peninsula but it has not been validated in other countries. Because of this, to determine the background concentration in Malta, a more conservative indicator was used in this report: the moving 50 percentile of 30 days for the PM_{10} concentrations was used.

- The net African dust load at this regional background station is determined subtracting the indicator from the PM_{10} bulk levels recorder during the 'Saharan' day.
- Then, the net African dust load is subtracted from the PM_{10} concentrations, measured in the other monitoring stations, resulted above the daily limit. If the concentration remains above the daily limit values it means that this exceedances can be attributed to human sources otherwise it can be attributed to natural sources.

In Malta, the Għarb station is used as regional background monitoring site. The Saharan dust episodes and their quantitative contributions throughout the monitoring period are reported in the result section.

1.5. Monitoring Procedure

The same instruments for PM_{10} and $PM_{2.5}$ monitoring used for the previous report are being used for this extension too, thus the section providing all the details of the instrumentation has not been included in this report. The field activities performed before the beginning of the sampling campaign, for both the PM_{10} and $PM_{2.5}$ measurements were the following:

- SKYPOSTs were located in the chosen monitoring sites, the technician set up the power connection between the sampler and the power supply available in situ.
- The clean filter reservoir was unsealed and screwed in the proper ring and connected to the pneumatic tube. The clean filter reservoir arrived directly from ambiente s.c. laboratory, where in an uncontaminated environment the clean filters were inserted in each cassette and then placed in the cylinder following an order that associated the position in the cylinder with the filter code (no mark was made on the filter to prevent possible alteration of the chemical analysis). These clean filter reservoirs were sealed and shipped from ambiente s.c. laboratory to Malta in protected and isolated boxes. The methodology of filter preparation, classification and handling in the lab is described in the next paragraph.
- Then, the technician set up the duration of the campaign (7 months – from the 4th September 2013 to the 1st April 2014) and the time interval between filter change (24h – from 0:05 to 23:55[2]).

During the whole duration of the monitoring campaign, the field activities are listed below:

- Every 15th day of monitoring, the exposed filter reservoir is collected and replaced with an empty one. Then, this cylinder is immediately sealed and inserted into a small container to protect it from possible damage during handling and transportation from the site to the laboratory.

2 The stop time of 10 minutes was set up to allow the machine to perform the filter change. It has to be noted that the monitoring time is largely within the daily minimum capture data (90%).

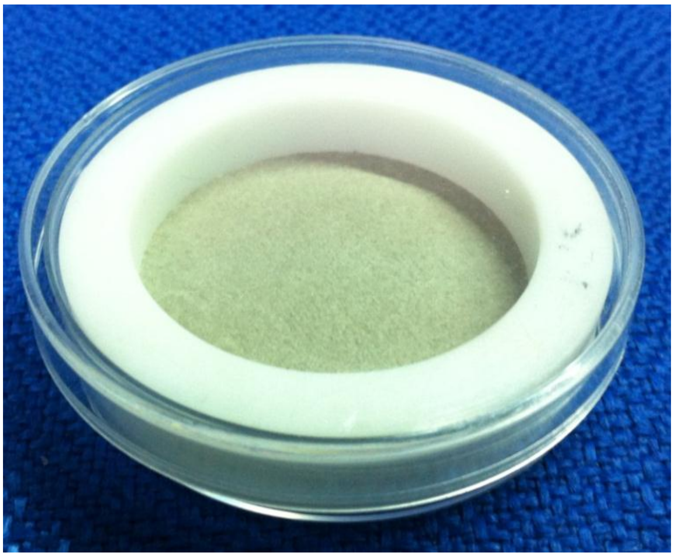

Figure 6: Petri Dish containing a filter cassette and an exposed filter

- Every 15th day of monitoring, before leaving the sites, the technician downloads the monitoring report details from the sampler (stop time, flow rate, air sample volume, atmospheric pressure and temperature) that are required to determine the validation of the monitored parameters. Besides, the instrument memory is reset to avoid loss of sampling data due to insufficient memory capacity.

1.6. Maintenance Operations

- Every 15th day of monitoring, the technician has to clean and grease the inlet impaction plate using a silicone gel, as requested by the EN 12341 and EN14907. During this process, it has to be assured that the suction tube is completely sealed and no air enters the tube because the 15th filter is present in the sampling position. The time interval, in which the sampling is stopped, cannot to exceed 10% of the day time, thus no more than 144 minutes. Otherwise, the 15th filter would not be valid. Finally, the technician dismounts and cleans the cap, the distributer-disk and the water container.
- Every month, the technician dismounts and cleans the nozzles.
- Every three months, the flow meter calibration and leak tests are performed for each sampler to assure the quality of the measurements.
- Every six months of monitoring (e.g. one time in this campaign), an intensive cleaning of the sampling head (sampler inlet, suction pipe, filter change mechanism, filter cassettes, nozzles) has to be performed, this has to be made in compliance with the EN 14902.

1.7. Laboratory Activities

The laboratory activity can be subdivided in two main phases:

1. Preparation of the clean filters
2. Analysis of the exposed filters

Both procedures were described in detail in the previous report and given that the same method shall be adopted, this section provides only a brief overview.

1.7.1. Preparation of the Clean Filters

For this monitoring campaign, filters made by quartz fibres are used, with an aerodynamic diameter of 0.22 µm. This type of filter is in compliance with the filter specifications stated in the reference methods. The filter characteristics are in compliance with the EN 12341, EN14907 and EN 14902.

1.7.2. Analysis of the Exposed Filters

The cylinder with the exposed filters is returned to the laboratory and is checked in terms of physical integrity and then stored in an uncontaminated weighing room to proceed with the laboratory analysis.

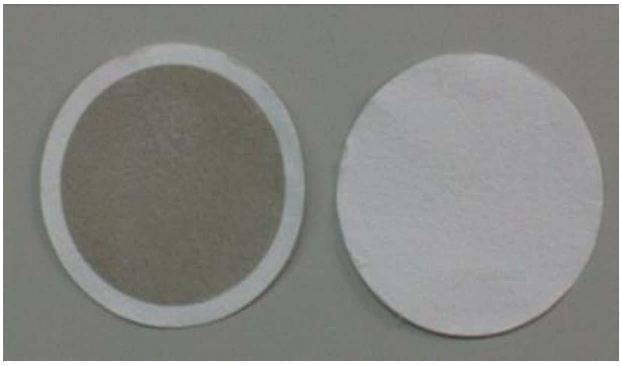

Figure 7: Exposed Filter (left) and Unexposed Filter (right)

The filters are analyzed to determine the PM_{10} and $PM_{2.5}$ concentrations by gravimetric method:

- *PM_{10} and $PM_{2.5}$ determination:* filters are exposed, as for the unexposed filters, in a conditioning room at a temperature of 20°C and relative humidity of 50% for 120 hours in order to reach the equilibrium. After that, these are weighed using the analytical balance.
  Finally, the PM concentration is determined by the following formula:

$C_{PM} = (W_{EF} - W_{UF}) / V$

Where:

C_{PM}= PM concentration in (µg/m^3)

W_{EF}= Weight of the exposed filter (µg)

W_{UF}= Weight of the unexposed filter (µg)

V= Actual sampling volume (m^3)

The concentration of the metals is determined in the following way:

Metals determination: the sample filter is taken in solution by closed vessel microwave digestion using nitric acid and hydrogen peroxide. The resultant solution is analyzed by Inductively Coupled Plasma – Mass Spectrometry (ICP-MS). The laboratory is equipped with ICP-MS Agilent Technologies S.p.A. – 7500cx

2. Results

The monitoring results of PM_{10} and $PM_{2.5}$ are reported every two weeks in tabular format, compatible with schedule 2 and schedule 4 of the IPPC permit IP/002/07/B, and plots are also drawn up to make a comparative study between the two different PM parameters and the monitoring sites (Marsaxlokk and Birżebbuġa). Results for the metal analysis are determined on a quarterly basis and these are also reported in tablular format for the months monitored (Oct ’13 and Feb ’14).

All the sampling details (start and stop time, flow rate, actual and standard volume, atmospheric temperature and pressure) are reported in Annex A for each monitoring station. Non valid measurements, due to monitoring problems (e.g. power interruption, daily sampling volume not correct, etc.), are classified with the abbreviation *NV* in the following tables. The daily meteorological conditions gathered from the Malta International Airport are shown in Annex B.

2.1. Report 1

The data period of this first report starts on the 4th September 2013 to 12th September 2013, for an effective duration of 8 sampling days. Non valid measurements, due to power interruption, were registered on the 4, 6, 7, 8 and 9 of September 2013 in Marsaxlokk.

During this sampling period no exceedances of the daily limit value of 50 µg/m^3 for PM_{10} were measured.

The average PM_{10} concentration was higher in Birżebbuġa when compared to Marsaxlokk on the 4, 5, 10 and 11 of September. Regarding $PM_{2.5}$ there are not enough data in Marsaxlokk to make a relevant comparison.

The results of this monitoring period are given in the next paragraphs, which are first presented in tabular format in the following order:

1. Marsaxlokk station: PM_{10} & $PM_{2.5}$;
2. Birżebbuġa station: PM_{10} & $PM_{2.5}$;

Then, a series of significant plot comparisons are reported:

- PM_{10} *vs* $PM_{2.5}$ at Marsaxlokk station;
- PM_{10} *vs* $PM_{2.5}$ at Birżebbuġa station;
- PM_{10} *vs* PM_{10};
- $PM_{2.5}$ *vs* $PM_{2.5}$;

2.1.1. Marsaxlokk – PM_{10} and $PM_{2.5}$

Day	**Date**	**PM_{10} ($\mu g/m^3$)**	**$PM_{2.5}$ ($\mu g/m^3$)**
Wednesday	13/09/04	*N.V.*[3]	*N.V*
Thursday	13/09/05	18.87	6.24
Friday	13/09/06	37.91	*N.V.*
Saturday	13/09/07	34.62	*N.V.*
Sunday	13/09/08	37.18	*N.V.*
Monday	13/09/09	*N.V.*	*N.V.*
Tuesday	13/09/10	20.88	13.57
Wednesday	13/09/11	19.60	11.55
Average during reporting period		28.18	10.45
Average during calendar year (to date)		28.18	10.45

Table 2: PM_{10} and $PM_{2.5}$ data for Marsaxlokk Station Report 1

[3] *Non valid* due to power interruption. Same reason applicable to the rest of the *N.V.* data

2.1.2. Birżebbuġa – PM_{10} and $PM_{2.5}$

Day	Date	PM_{10} (µg/m³)	$PM_{2.5}$ (µg/m³)
Wednesday	13/09/04	38.09	12.08
Thursday	13/09/05	28.76	9.34
Friday	13/09/06	44.33	13.00
Saturday	13/09/07	34.07	13.18
Sunday	13/09/08	34.25	17.94
Monday	13/09/09	33.88	1.83
Tuesday	13/09/10	23.07	13.18
Wednesday	13/09/11	21.24	10.98
Thursday	13/09/12	38.09	12.08
Average during reporting period		32.21	11.44
Average during calendar year (to date)		32.21	11.44

Table 3: PM_{10} and $PM_{2.5}$ data for Birżebbuġa Station Report 1

2.1.3. Marsaxlokk – PM_{10} and $PM_{2.5}$ histogram

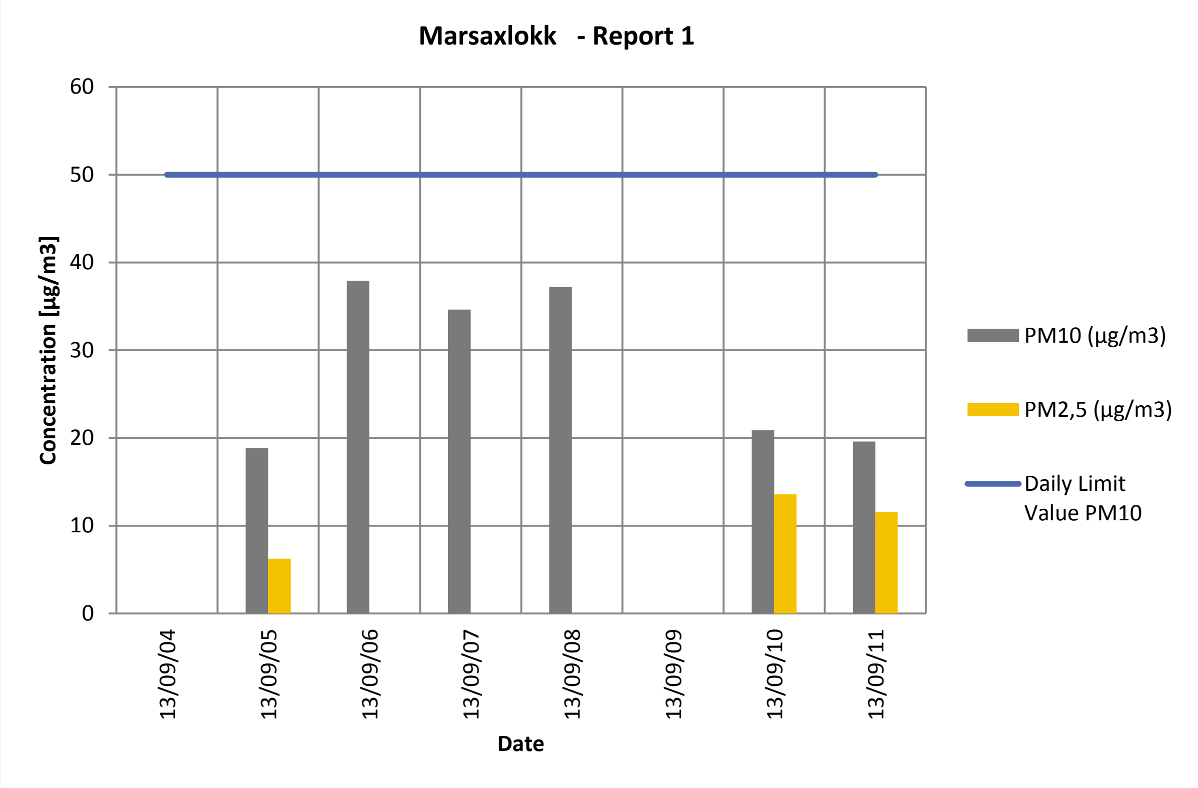

Figure 8: Marsaxlokk – PM_{10} vs $PM_{2.5}$ histogram plot Report 1

2.1.4. Birżebbuġa – PM_{10} and $PM_{2.5}$ histogram

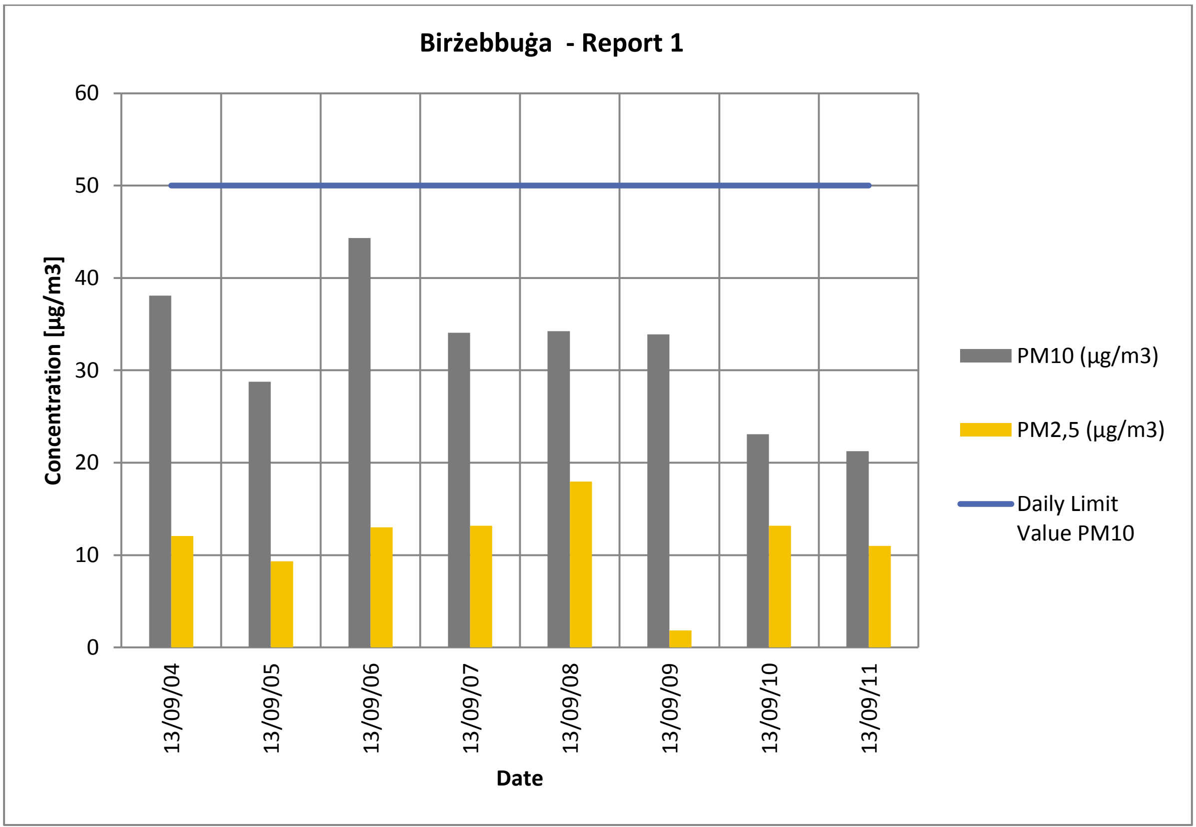

Figure 9: Birżebbuġa – PM_{10} vs $PM_{2.5}$ histogram plot Report 1

2.1.5. PM_{10} Comparison

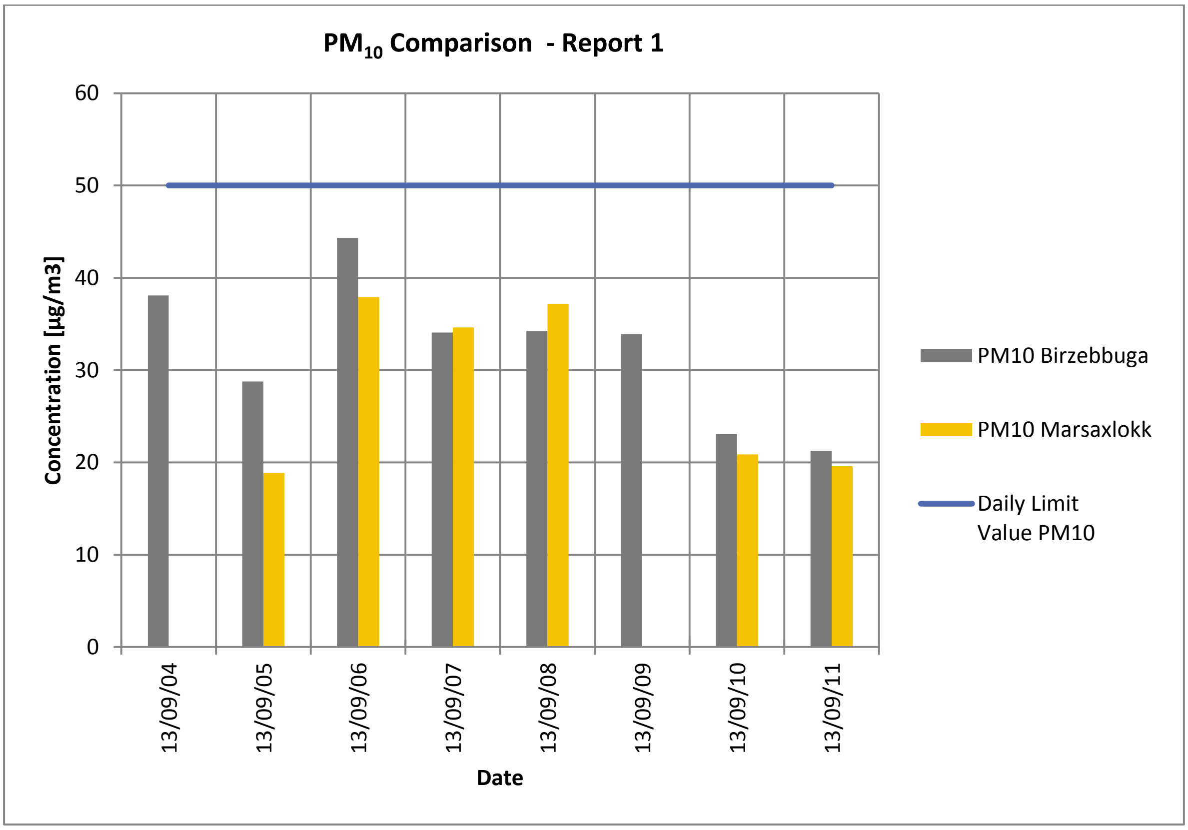

Figure 10: PM_{10} Comparison Histogram plot Report 1

2.1.6. $PM_{2.5}$ Comparison

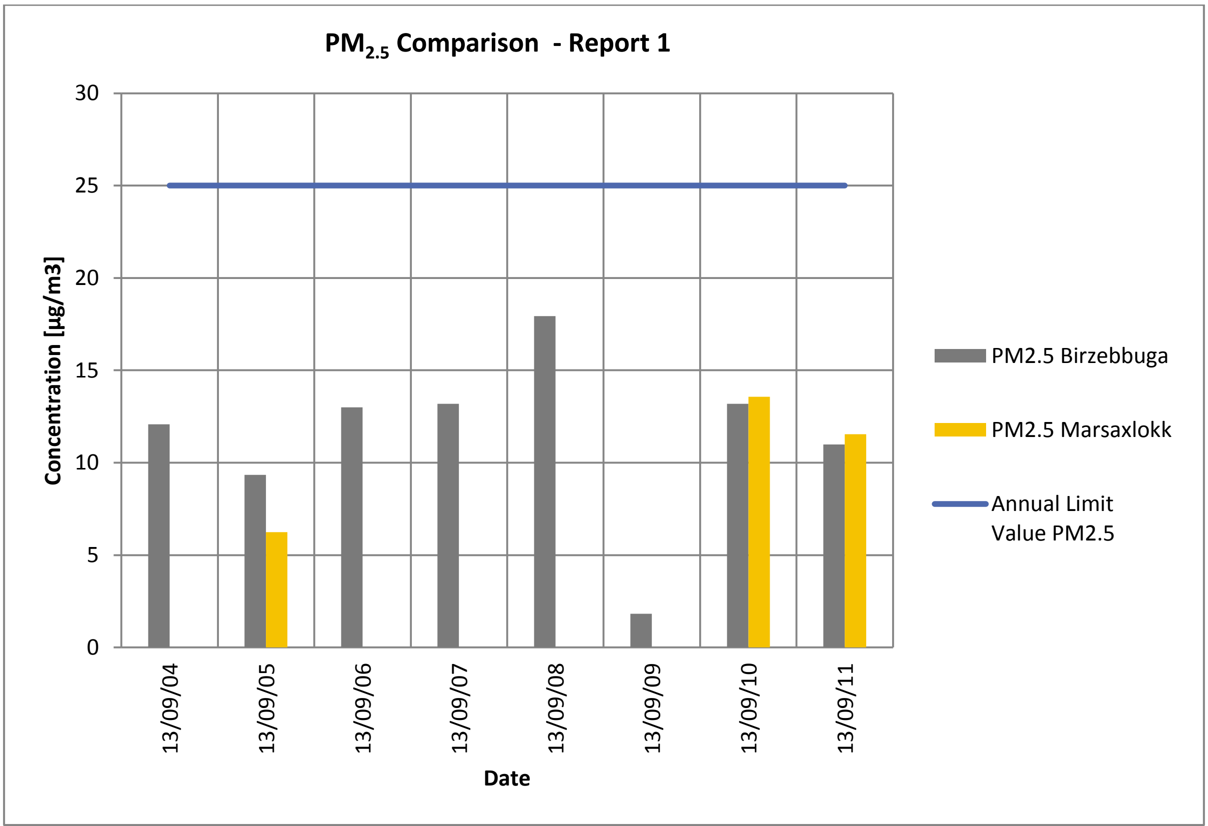

Figure 11: Marsaxlokk – PM_{10} vs $PM_{2.5}$ histogram plot Report 1

2.2. Report 2

The data period of this second report starts on the 12th September 2013 to 25th September 2013, for an effective duration of 14 sampling days. Due to mal functioning of the device, non valid PM $_{2.5}$ measurements were registered on the Marsaxlokk station except for the 13th, 14th, 15th and 16th of September. In Birżebbuġa station and for the same reason, no valid measurements for PM_{10} were registered except for the 13th of September.

During this sampling period no exceedances of the daily limit value of 50 µg/m^3 for PM10 were measured.

The average $PM_{2.5}$ concentration was lower in Birżebbuġa when compared to Marsaxlokk. Regarding PM_{10} there are not enough data in Birżebbuġa to make a relevant comparison.

The results of this monitoring period are given in the next paragraphs, which are first presented in tabular format in the following order:

1. Marsaxlokk station: PM_{10} & $PM_{2.5}$;
2. Birżebbuġa station: PM_{10} & $PM_{2.5}$;

Then, a series of significant plot comparisons are reported:

- PM_{10} *vs* $PM_{2.5}$ at Marsaxlokk station;
- PM_{10} *vs* $PM_{2.5}$ at Birżebbuġa station;
- PM_{10} *vs* PM_{10};
- $PM_{2.5}$ *vs* $PM_{2.5}$;

2.2.1. Marsaxlokk - PM_{10} and $PM_{2.5}$

Day	Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)
Thursday	13/09/12	*N.V.*[4]	*N.V.*
Friday	13/09/13	33.70	14.49
Saturday	13/09/14	32.78	12.10
Sunday	13/09/15	34.44	17.24
Monday	13/09/16	32.79	15.96
Tuesday	13/09/17	37.00	*N.V.*
Wednesday	13/09/18	35.53	*N.V.*
Thursday	13/09/19	35.17	*N.V.*
Friday	13/09/20	33.52	*N.V.*
Saturday	13/09/21	36.81	*N.V.*
Sunday	13/09/22	45.23	*N.V.*
Monday	13/09/23	28.94	*N.V.*
Tuesday	13/09/24	35.90	*N.V.*
Wednesday	13/09/25	37.34	*N.V.*
Average during reporting period		35.32	14.95
Average during calendar year (to date)		33.06	13.02

Table 4: PM_{10} and $PM_{2.5}$ data for Marsaxlokk station Report 2

[4] Non Valid due to malfunction of the device. Same reason applicable to the rest of the N.V. data in table 4 and 5

2.2.2. Birżebbuġa - PM_{10} and $PM_{2.5}$

Day	Date	PM_{10} (µg/m^3)	$PM_{2.5}$ (µg/m^3)
Thursday	13/09/12	*N.V.*	*N.V.*
Friday	13/09/13	30.03	12.99
Saturday	13/09/14	*N.V.*	16.47
Sunday	13/09/15	*N.V.*	13.91
Monday	13/09/16	*N.V.*	14.28
Tuesday	13/09/17	*N.V.*	17.02
Wednesday	13/09/18	*N.V.*	15.01
Thursday	13/09/19	*N.V.*	15. 74
Friday	13/09/20	*N.V.*	13.36
Saturday	13/09/21	*N.V.*	15.93
Sunday	13/09/22	*N.V.*	16.29
Monday	13/09/23	*N.V.*	15.74
Tuesday	13/09/24	*N.V.*	19.95
Wednesday	13/09/25	*N.V.*	19.03
Average during reporting period		30.03	15.83
Average during calendar year (to date)		31.97	14.16

Table 5: PM_{10} and $PM_{2.5}$ data for Birżebbuġa station Report 2

2.2.3. Marsaxlokk – PM_{10} vs $PM_{2.5}$ histogram

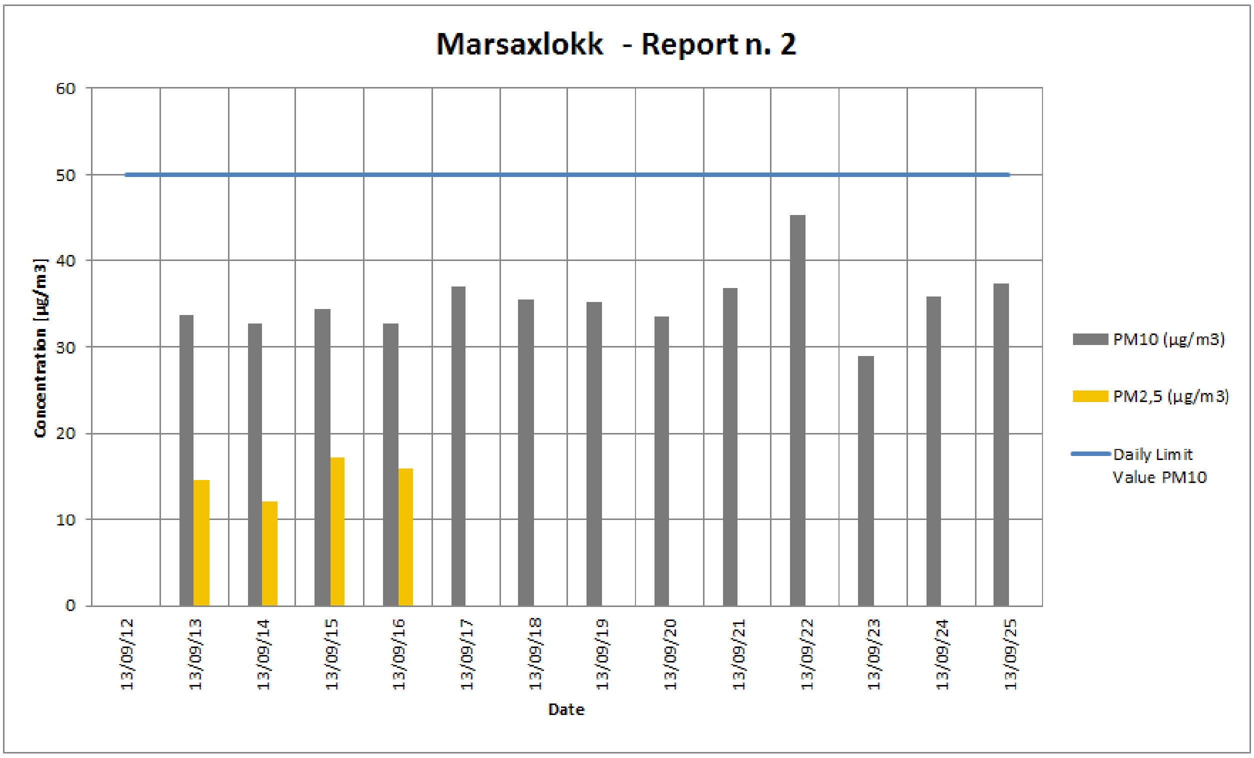

Figure 12: Marsaxlokk - PM_{10} vs $PM_{2.5}$ histogram plot Report 2

2.2.4. Birżebbuġa – PM_{10} vs $PM_{2.5}$ histogram

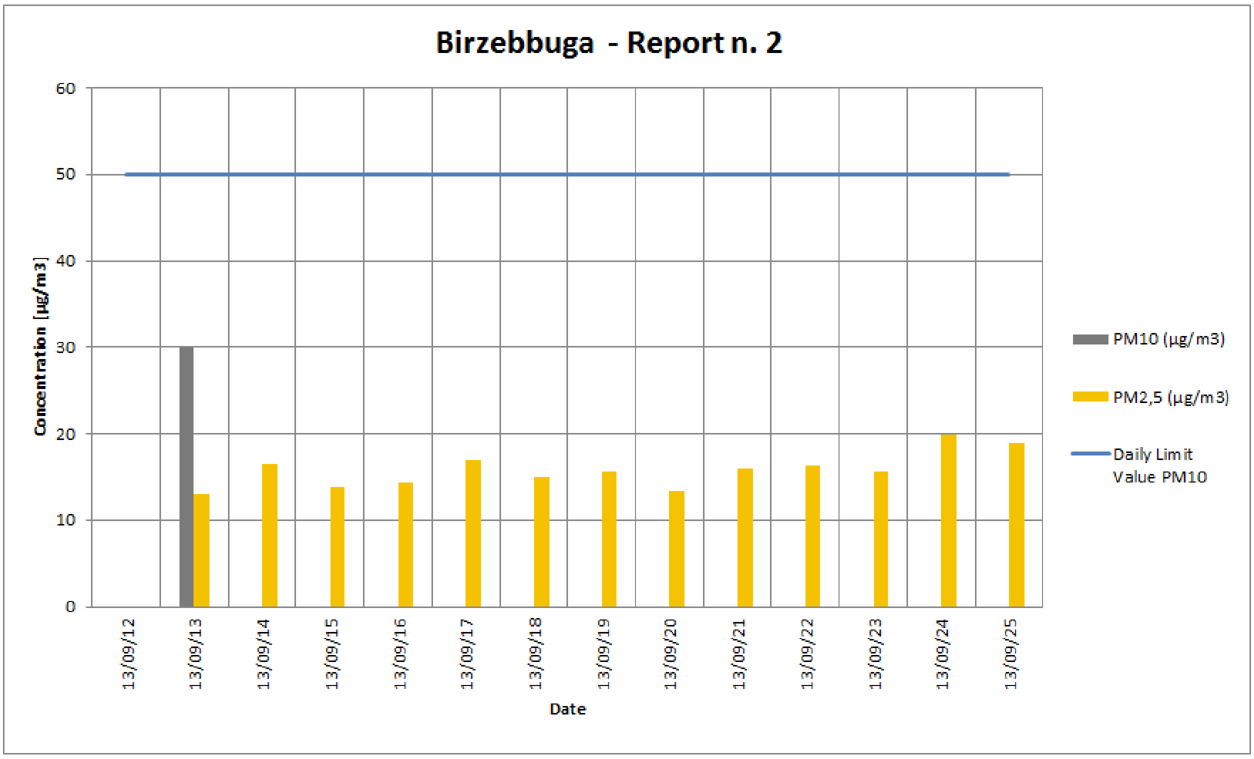

Figure 13: Birżebbuġa - PM_{10} vs $PM_{2.5}$ histogram plot Report 2

2.2.5. PM_{10} comparison

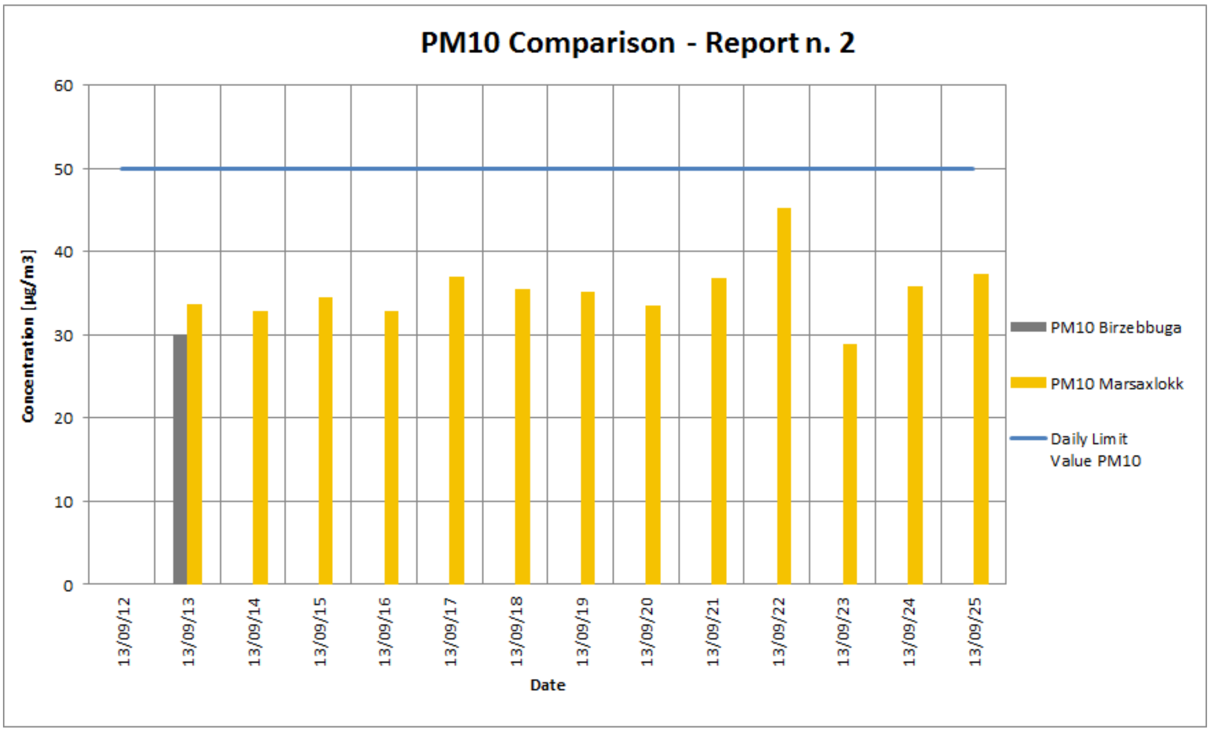

Figure 14: PM_{10} comparison – histogram plot Report 2

2.2.6. $PM_{2.5}$ comparison

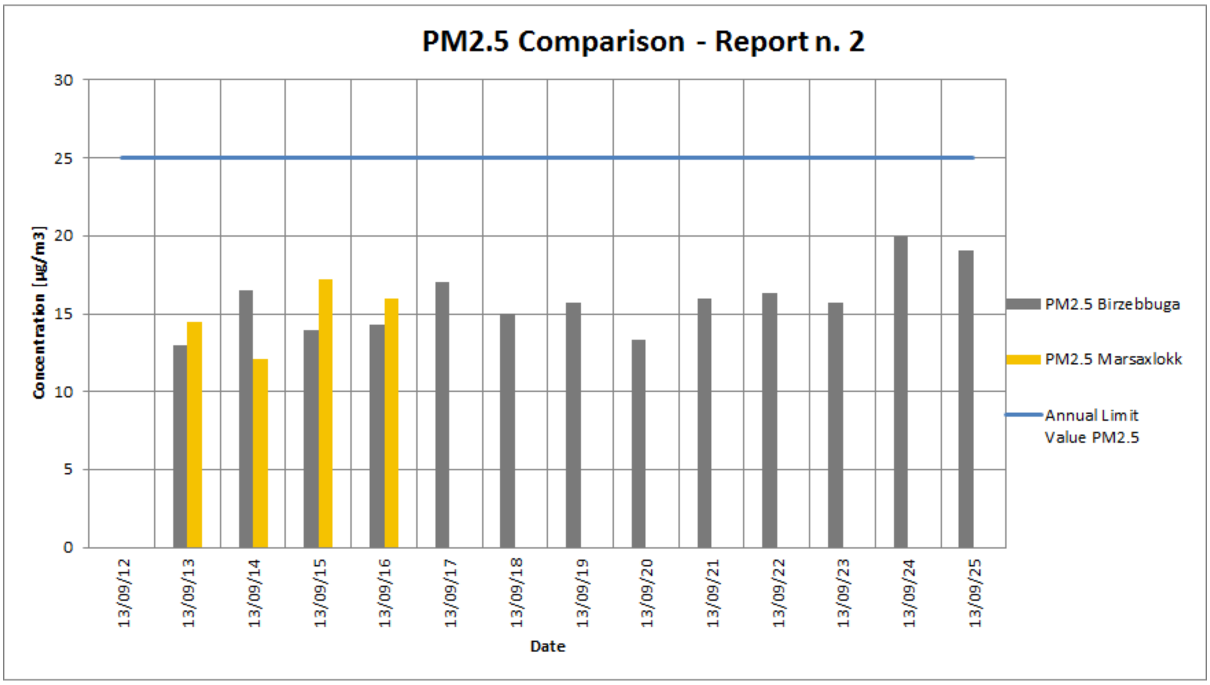

Figure 15: $PM_{2.5}$ comparison - histogram plot Report 2

2.3. Report 3

The data period of this third report starts on the 26th September to 2nd October 2013, for an effective duration of 7 sampling days. No valid measurements, due to malfunction of the monitoring device, were registered for PM_{10} concentrations at the Birżebbuġa station.

In Marsaxlokk, two exceedances of the daily limit value of 50 $\mu g/m^3$ for PM_{10} were measured on the 29th and 30th September.

The average $PM_{2.5}$ concentration was higher in Birżebbuġa than in Marsaxlokk on the 28th, 29th September and on the 2nd October. On the 30th September and 1st October, Marsaxlokk $PM_{2.5}$ concentration was higher. Regarding PM_{10} there is not data in Birżebbuġa to make a comparison.

The results of this monitoring period are given in the next paragraphs, which are first presented in tabular format in the following order:

1. Marsaxlokk station: PM_{10} & $PM_{2.5}$;
2. Birżebbuġa station: PM_{10} & $PM_{2.5}$;

Then, a series of significant plot comparisons are reported:

- PM_{10} *vs* $PM_{2.5}$ at Marsaxlokk station;
- PM_{10} *vs* $PM_{2.5}$ at Birżebbuġa station;
- $PM_{2.5}$ *vs* $PM_{2.5}$;

Consequently, the Saharan dust contribution is determined and the final adjusted PM_{10} concentrations are derived.

2.3.1. Marsaxlokk - PM_{10} and $PM_{2.5}$

Day	Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)
Thursday	13/09/26	*N.V.*	*N.V.*[5]
Friday	13/09/27	47.44	*N.V.*[6]
Saturday	13/09/28	40.49	17.60
Sunday	13/09/29	53.50	16.69
Monday	13/09/30	61.36	17.61
Tuesday	13/10/01	44.51	16.33
Wednesday	13/10/02	42.67	14.86
Average during reporting period		48.33	16.62
Average during calendar year (to date)		36.73	14.52

Table 6: PM_{10} and $PM_{2.5}$ data for Marsaxlokk station Report 3

[5] Filters Damaged
[6] *Non Valid* due to power interruption

2.3.2. Birżebbuġa - PM_{10} and $PM_{2.5}$

Day	Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)
Thursday	13/09/26	*N.V.*[7]	*N.V.*
Friday	13/09/27	*N.V.*	*N.V.*
Saturday	13/09/28	*N.V.*[8]	17.77
Sunday	13/09/29	*N.V.*	20.88
Monday	13/09/30	*N.V.*	15.57
Tuesday	13/10/01	*N.V.*	10.26
Wednesday	13/10/02	*N.V.*	15.20
Average during reporting period			15.94
Average during calendar year (to date)		31.97	14.50

Table 7: PM_{10} and $PM_{2.5}$ data for Birżebbuġa station Report 3

[7] Filters Damaged

[8] *Non Valid* because of the malfunction of the monitoring device. Same reason applicable to the rest of N.V. data for PM_{10} concentration in *Birżebbuġa* station.

2.3.3. Marsaxlokk – PM_{10} vs $PM_{2.5}$ histogram

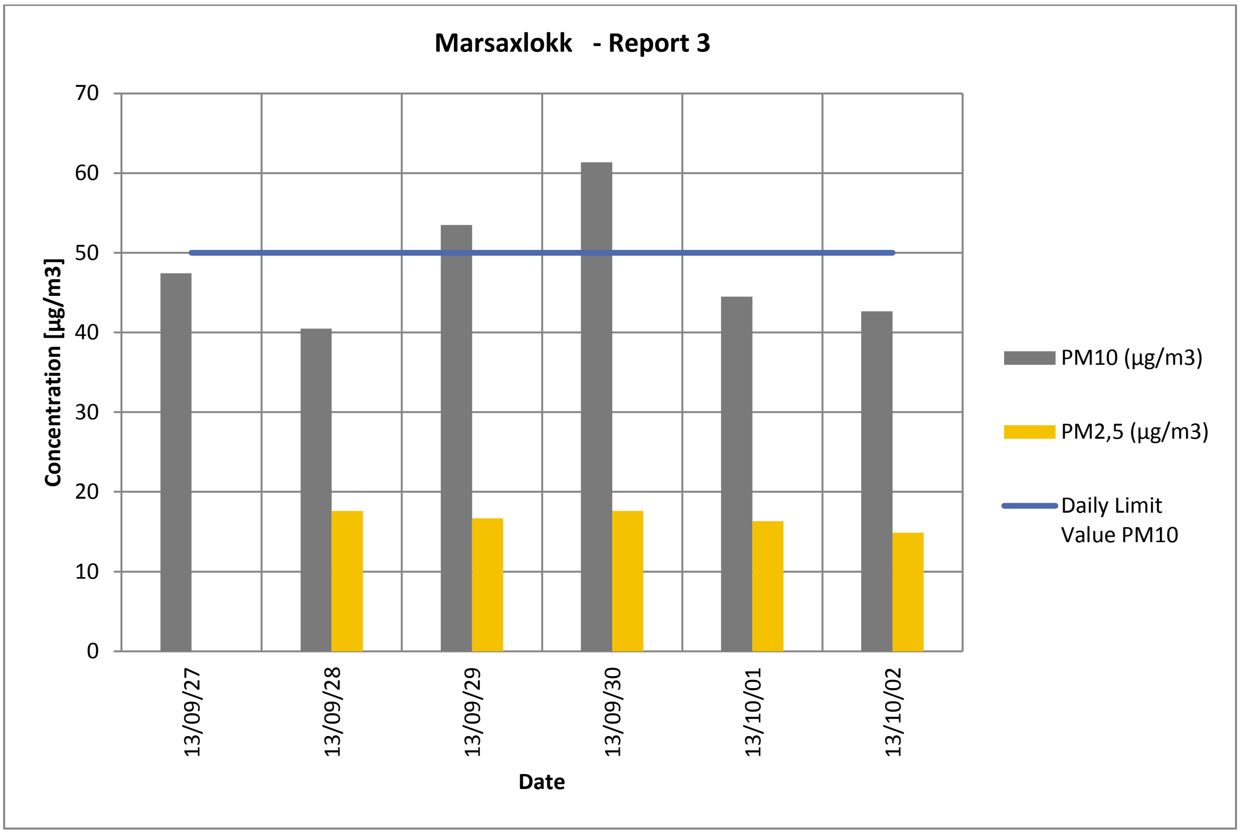

Figure 16: Marsaxlokk - PM_{10} vs $PM_{2.5}$ histogram plot Report 3

2.3.4. Birżebbuġa – PM_{10} vs $PM_{2.5}$ histogram

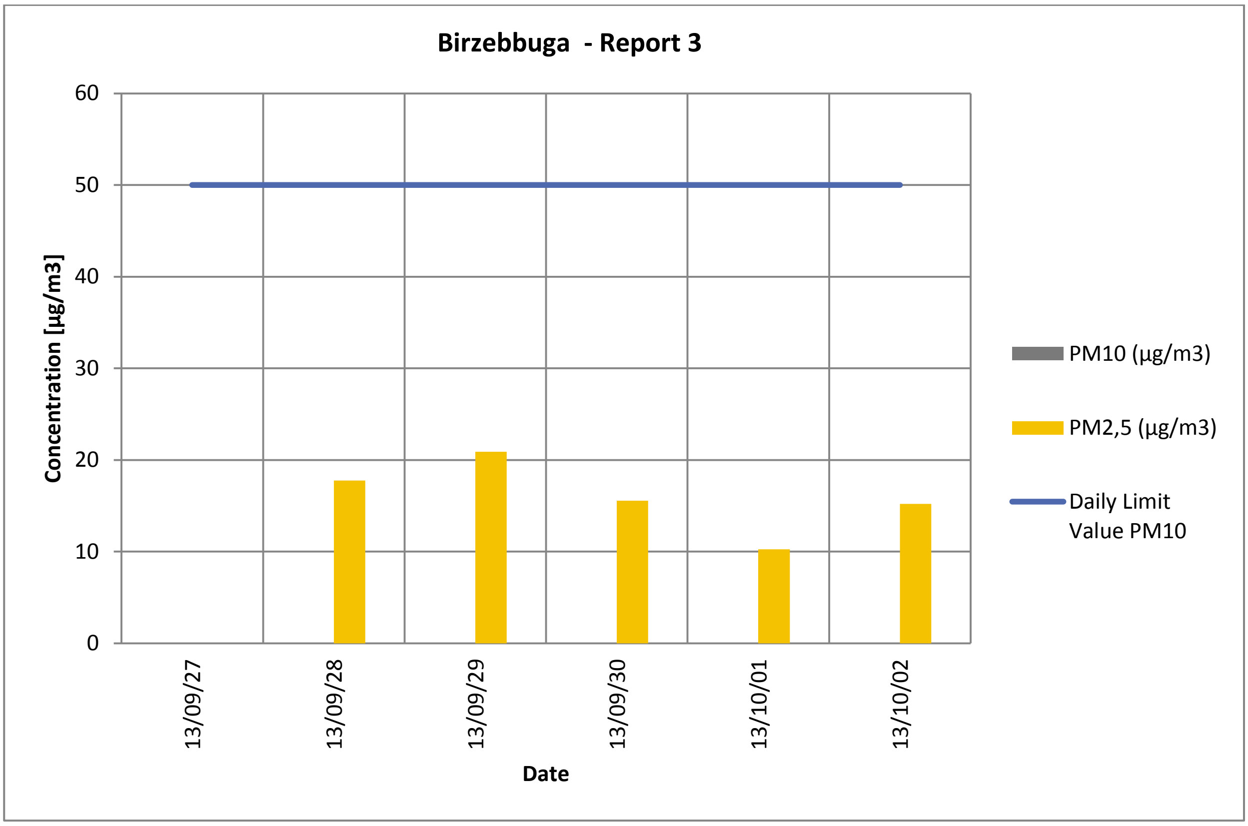

Figure 17: Birżebbuġa - PM_{10} vs $PM_{2.5}$ histogram plot Report 3

2.3.5. $PM_{2.5}$ comparison

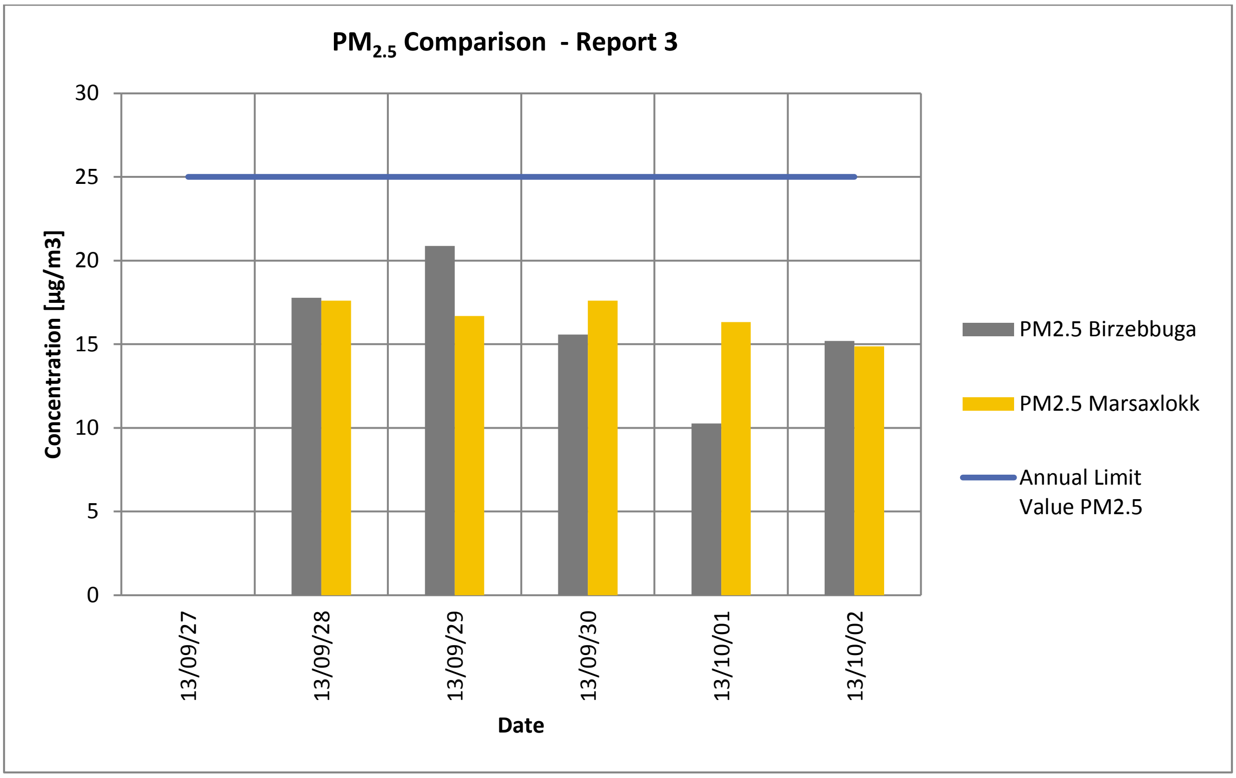

Figure 18: $PM_{2.5}$ comparison - histogram plot Report 3

An analysis of the PM_{10}-exceedance at Marsaxlokk on the 29th and 30th of September is included in Annex A. After applying mathematical modelling tools and observing satellite images, it was concluded that a Saharan dust episode took place in those dates .

2.4. Report 4

The data period of this report is between the 3rd October 2013 and the 16th October 2013 for an effective duration of 14 sampling days. Non-valid measurements, due to malfunction of the monitoring device, were registered for PM_{10} concentrations at the Birżebbuġa station. In addition, due to power interruption, non-valid measurements were recorded at the Marsaxlokk station from the 11th till the 16th for $PM_{2.5}$ and on the 11th 12th and 15th for PM_{10}.

In Marsaxlokk, two exceedances of the daily limit value of 50 µg/m^3 for PM_{10} were measured on the 10th and 16th of October.

The average $PM_{2.5}$ concentration was higher in Marsaxlokk than in Birżebbuġa.

Regarding PM_{10} there is no data in Birżebbuġa to make a comparison.

The results of this monitoring period are given in the next paragraphs, which are first presented in tabular format in the following order:

1. Marsaxlokk station: PM_{10} & $PM_{2.5}$;
2. Birżebbuġa station: PM_{10} & $PM_{2.5}$;

Then, a series of significant plot comparisons are reported:

- PM_{10} *vs* $PM_{2.5}$ at Marsaxlokk station;
- PM_{10} *vs* $PM_{2.5}$ at Birżebbuġa station;
- $PM_{2.5}$ *vs* $PM_{2.5}$;

2.4.1. Marsaxlokk - PM_{10} and $PM_{2.5}$

Day	Date	PM_{10} (µg/m³)	$PM_{2.5}$ (µg/m³)
Thursday	13/10/03	33.15	12.28
Friday	13/10/04	25.63	13.75
Saturday	13/10/05	18.13	8.98
Sunday	13/10/06	21.43	9.72
Monday	13/10/07	34.61	13.39
Tuesday	13/10/08	25.63	11.92
Wednesday	13/10/09	27.29	11.56
Thursday	13/10/10	56.58	12.93
Friday	13/10/11	*N.V.*[9]	*N.V.*[10]
Saturday	13/10/12	*N.V.*	*N.V.*
Sunday	13/10/13	42.84	*N.V.*
Monday	13/10/14	38.09	*N.V.*
Tuesday	13/10/15	*N.V.*	*N.V.*
Wednesday	13/10/16	52.38	*N.V.*
Average during reporting period		34.16	11.82
Average during calendar year (to date)		35.94	13.44

Table 8: PM_{10} and $PM_{2.5}$ data for Marsaxlokk station – Report 4

[9] *Non Valid* data due to power interruption. Same reason applies on the 12th. and 15th of October.

[10] *Non valid* data due to the malfunction of the device. The same reason applicable to the rest of *Non Valid* data for the PM 2.5.

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2.4.2. Birżebbuġa - PM_{10} and $PM_{2.5}$

Day	Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)
Thursday	13/10/03	*N.V.*[11]	*N.V.*
Friday	13/10/04	*N.V.*	11.35
Saturday	13/10/05	*N.V.*	11.72
Sunday	13/10/06	*N.V.*	7.87
Monday	13/10/07	*N.V.*	2.01
Tuesday	13/10/08	*N.V.*	8.07
Wednesday	13/10/09	*N.V.*	8.61
Thursday	13/10/10	*N.V.*	9.89
Friday	13/10/11	*N.V.*	16.73
Saturday	13/10/12	*N.V.*	12.45
Sunday	13/10/13	*N.V.*	8.87
Monday	13/10/14	*N.V.*	1.83
Tuesday	13/10/15	*N.V.*	13.76
Wednesday	13/10/16	*N.V.*	14.46
Average during reporting period			9.82
Average during calendar year (to date)		31.97	12.94

Table 9: PM_{10} and $PM_{2.5}$ data for Birżebbuġa station – Report 4

[11] Non Valid due to the malfunction of the device. The same reason applicable to the rest of *Non Valid* data in this table.

2.4.3. Marsaxlokk – PM_{10} vs $PM_{2.5}$ histogram

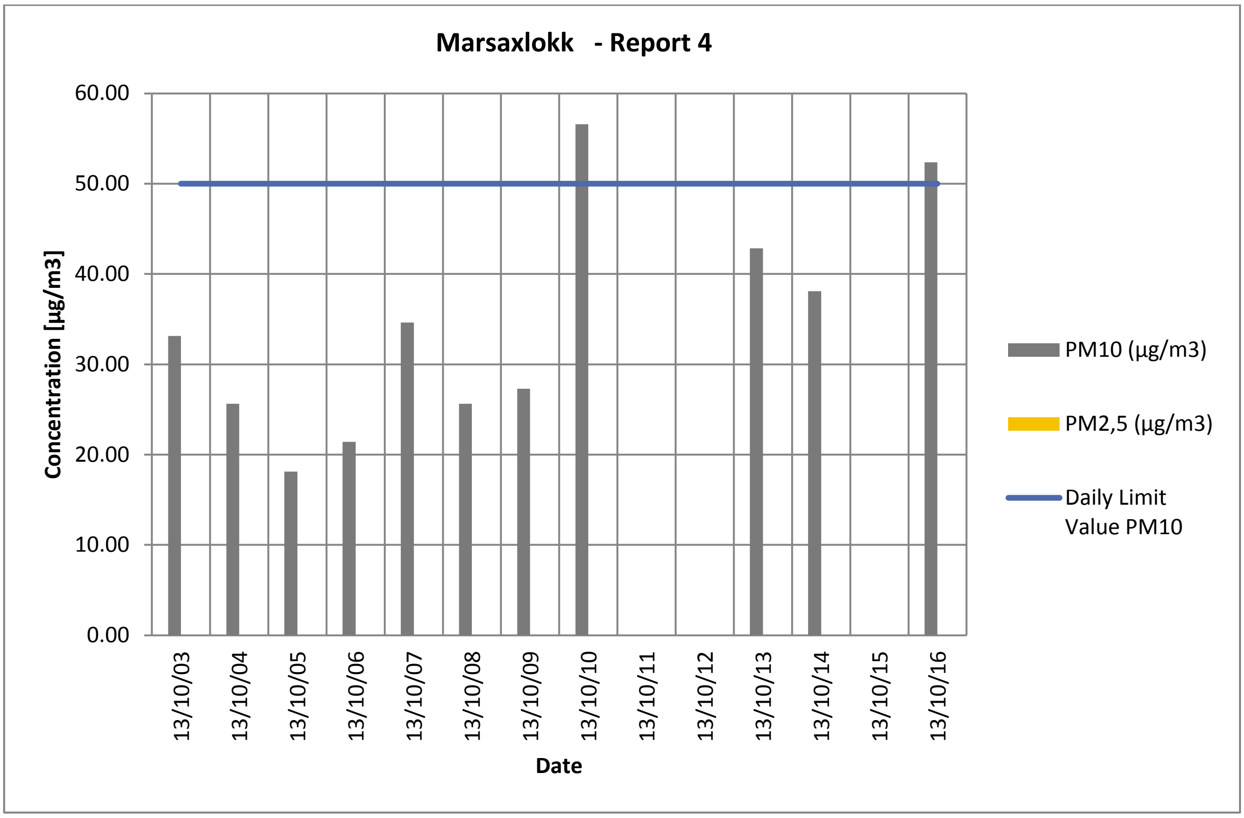


Figure 19: Marsaxlokk - PM_{10} vs $PM_{2.5}$ histogram plot – Report 4

2.4.4. Birżebbuġa – PM_{10} vs $PM_{2.5}$ histogram

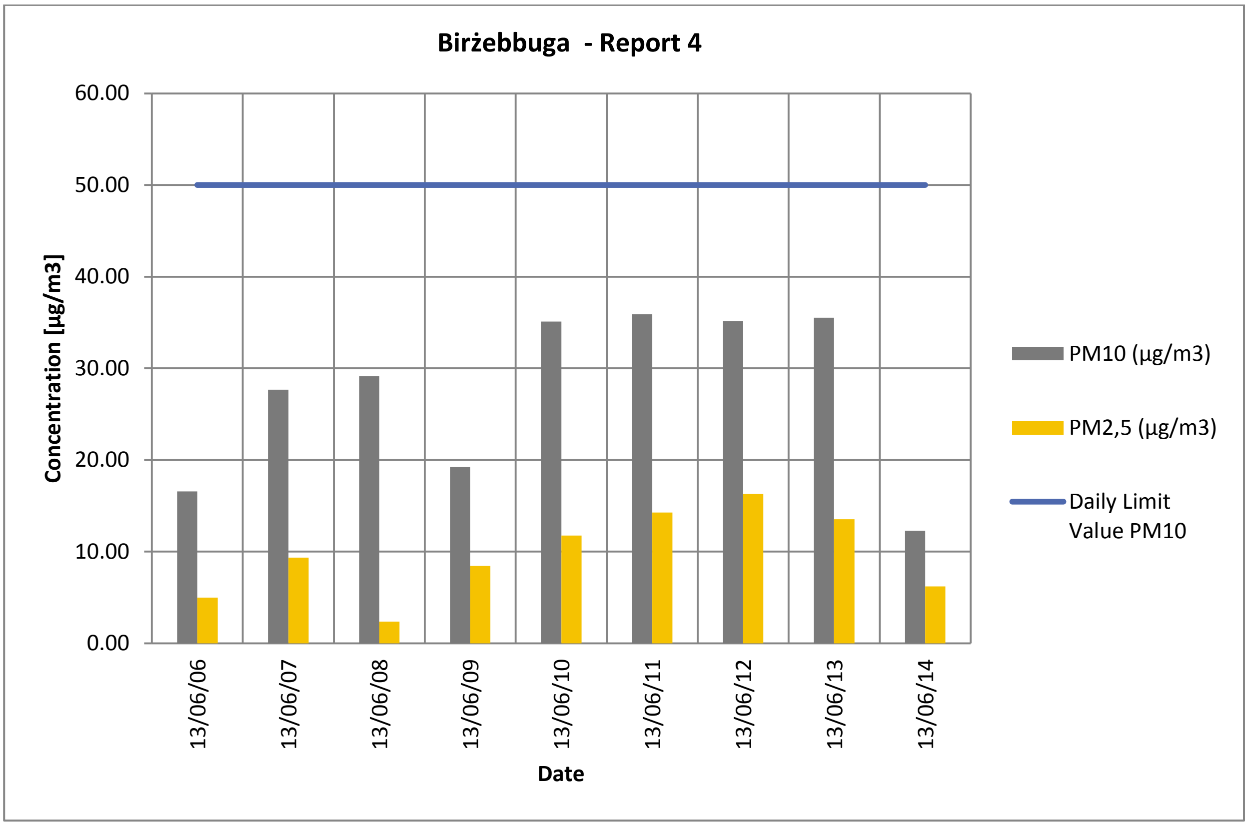


Figure 20: Birżebbuġa - PM_{10} vs $PM_{2.5}$ histogram plot – Report 4

2.4.5. $PM_{2.5}$ comparison

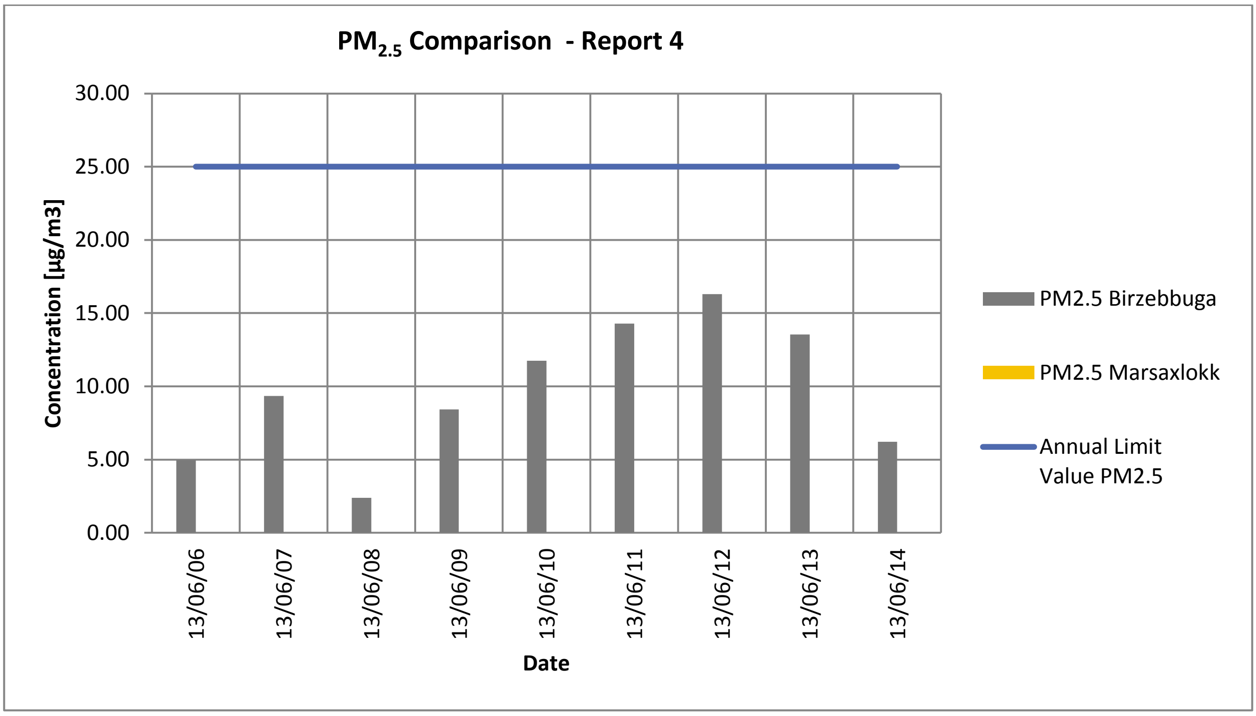


Figure 21: $PM_{2.5}$ comparison - histogram plot – Report 4

An analysis of the PM_{10}-exceedance at Marsaxlokk on the 10th and 16th of October is included in Annex A. After applying mathemathical modelling tools and observing satelitte images, it was concluded that, on the 10th the PM_{10} excedeence could be attributed to a dust loading episode, while on the 16th due to anthropogenic activities.

2.5. Report 5

The data period of this report is between the 17th and the 30th October 2013 for an effective duration of 14 sampling days. Non-valid measurements, due to malfunction of the monitoring device, were registered for $PM_{2.5}$ concentrations at the Marsaxlokk station. In addition, due to power interruption, non - valid measurements were recorded at the Birżebbuġa station on the 17th and 21st for PM_{10} as well as on the 17th and 21st for $PM_{2.5}$.

The results of this monitoring period are given in the next paragraphs, which are first presented in tabular format in the following order:

1. Marsaxlokk station: PM_{10} & $PM_{2.5}$;
2. Birżebbuġa station: PM_{10} & $PM_{2.5}$;

Then, a series of significant plot comparisons are reported:

- PM_{10} *vs* $PM_{2.5}$ at Marsaxlokk station;
- PM_{10} *vs* $PM_{2.5}$ at Birżebbuġa station;
- PM_{10} *vs* PM_{10};
- $PM_{2.5}$ *vs* $PM_{2.5}$.

2.5.1. Marsaxlokk - PM_{10} and $PM_{2.5}$

Day	Date	PM_{10} (µg/m³)	$PM_{2.5}$ (µg/m³)
Thursday	13/10/17	30.29	*N.V.*[12]
Friday	13/10/18	31.68	*N.V.*
Saturday	13/10/19	5.31	*N.V.*
Sunday	13/10/20	12.63	*N.V.*
Monday	13/10/21	12.94	*N.V.*
Tuesday	13/10/22	15.38	*N.V.*
Wednesday	13/10/23	13.55	*N.V.*
Thursday	13/10/24	17.03	8.61
Friday	13/10/25	18.13	9.16
Saturday	13/10/26	15.56	10.45
Sunday	13/10/27	21.42	11.73
Monday	13/10/28	23.62	12.47
Tuesday	13/10/29	16.11	9.53
Wednesday	13/10/30	8.24	6.78
Average during reporting period		17.28	9.82
Average during calendar year (to date)		30.72	12.50

Table 10: PM_{10} and $PM_{2.5}$ data for Marsaxlokk station – Report 5

[12] *Non Valid data* due to the malfunction of the device. The same reason applicable to the rest of *Non Valid* data for $PM_{2.5}$

2.5.2. Birżebbuġa - PM_{10} and $PM_{2.5}$

Day	Date	PM_{10} (µg/m³)	$PM_{2.5}$ (µg/m³)
Thursday	13/10/17	*N.V.*[13]	*N.V.*
Friday	13/10/18	26.40	6.79
Saturday	13/10/19	18.30	5.13
Sunday	13/10/20	19.96	5.68
Monday	13/10/21	*N.V*	*N.V*
Tuesday	13/10/22	20.78	4.71
Wednesday	13/10/23	17.94	1.83
Thursday	13/10/24	20.05	7.91
Friday	13/10/25	17.95	8.43
Saturday	13/10/26	20.22	10.30
Sunday	13/10/27	17.96	9.90
Monday	13/10/28	20.72	12.47
Tuesday	13/10/29	15.38	7.51
Wednesday	13/10/30	15.56	5.86
Average during reporting period		19.27	7.21
Average during calendar year (to date)		24.71	11.59

Table 11: PM_{10} and $PM_{2.5}$ data for Birżebbuġa station – Report 5

[13] *Non Valid* due to power interruption. Same reason applies on the 21st of October

2.5.3. Marsaxlokk – PM_{10} vs $PM_{2.5}$ histogram

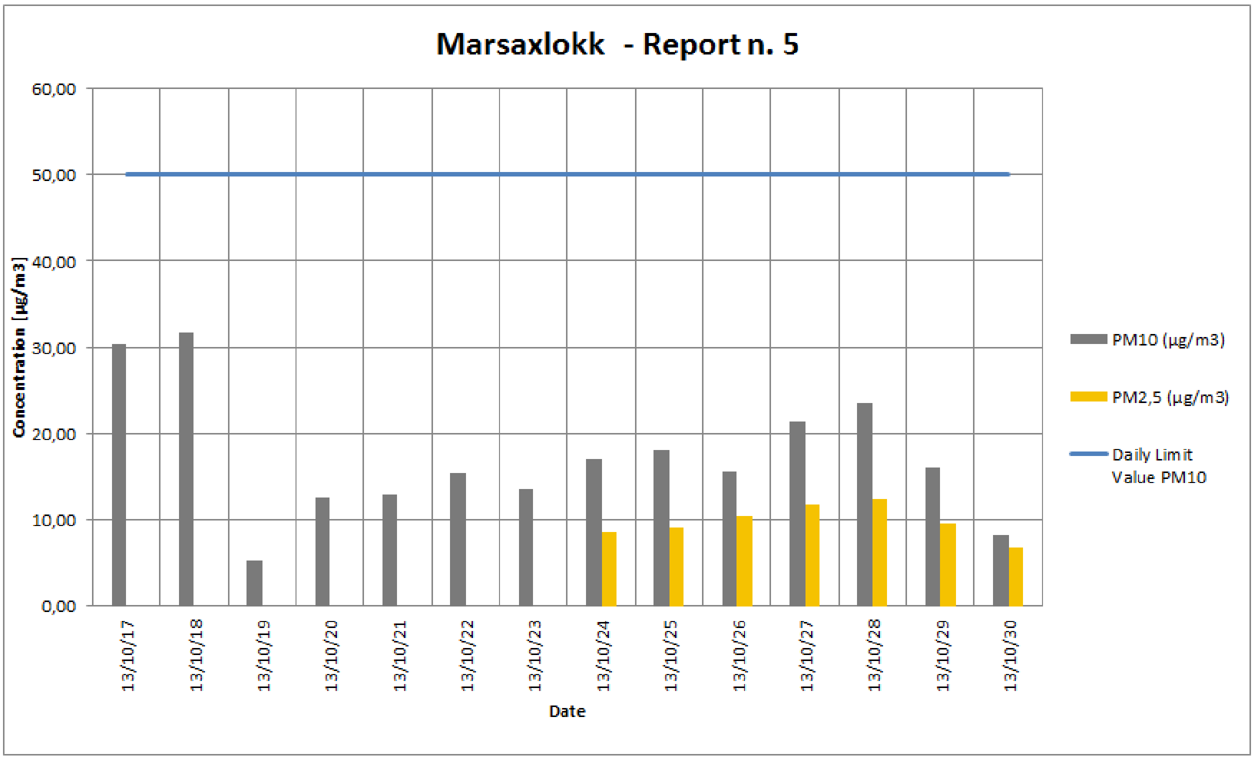


Figure 22: Marsaxlokk - PM_{10} vs $PM_{2.5}$ histogram plot – Report 5

2.5.4. Birżebbuġa – PM_{10} vs $PM_{2.5}$ histogram

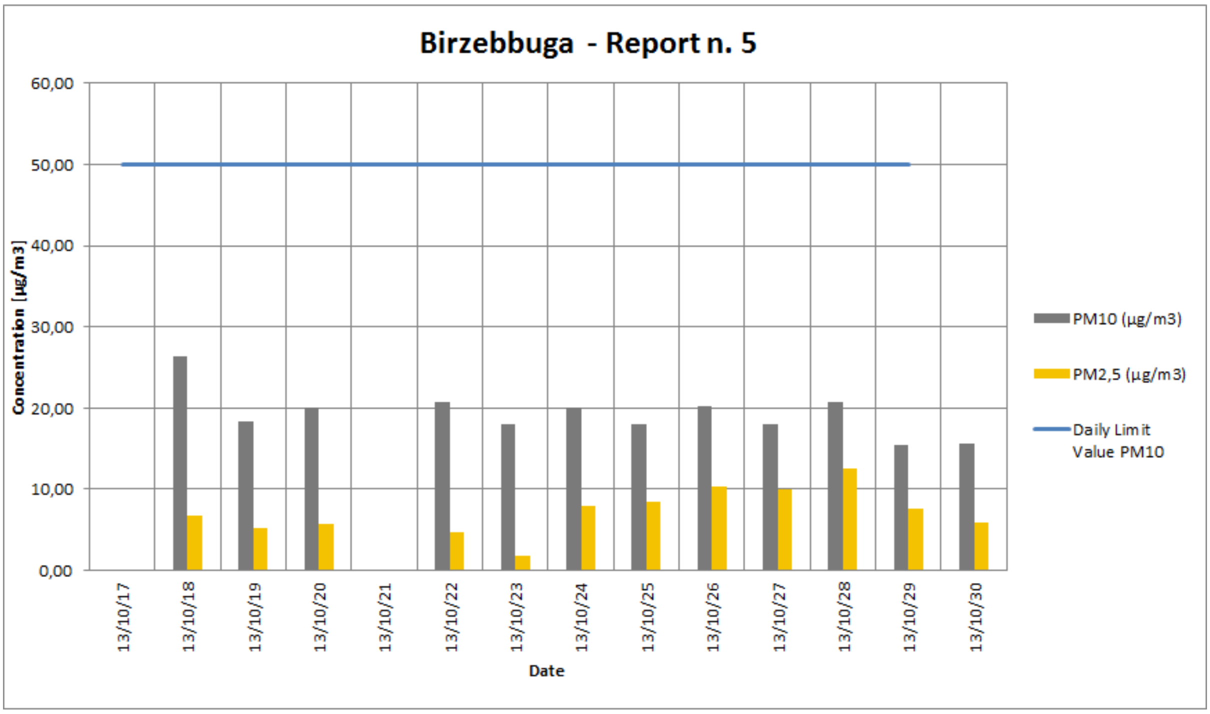


Figure 23: Birżebbuġa - PM_{10} vs $PM_{2.5}$ histogram plot – Report 5

2.5.5. PM_{10} comparison

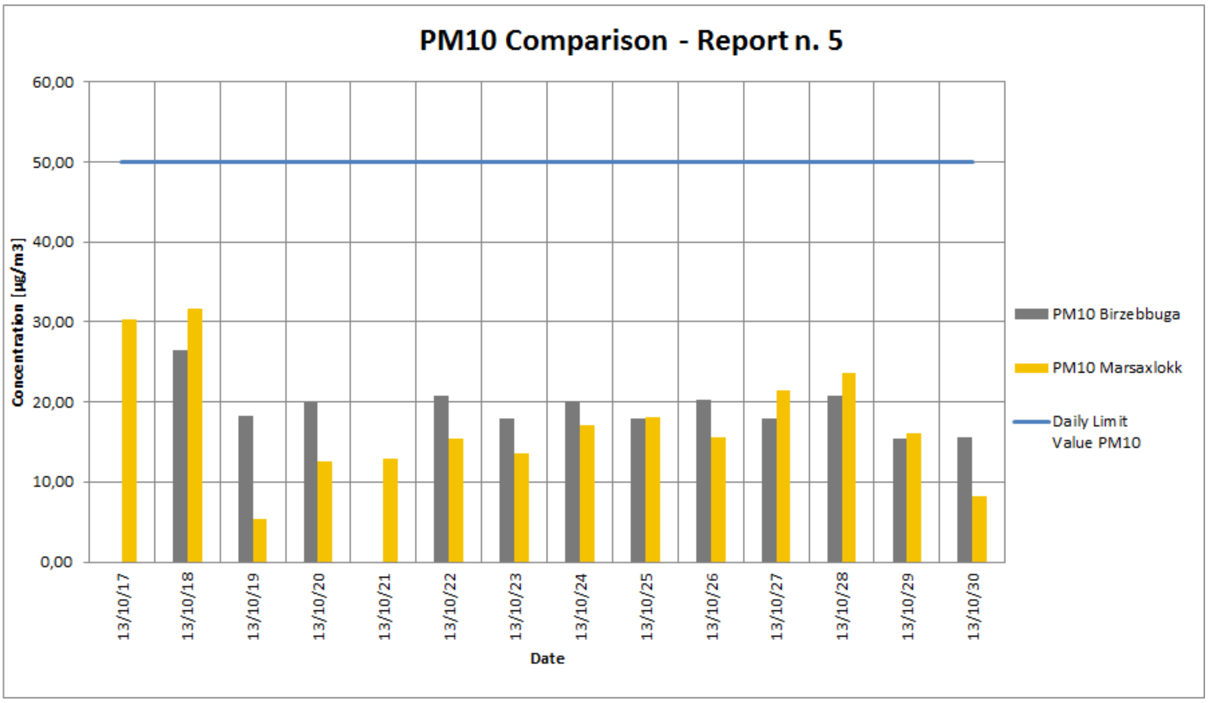


Figure 24: PM_{10} comparison - histogram plot – Report 5

2.5.6. $PM_{2.5}$ comparison

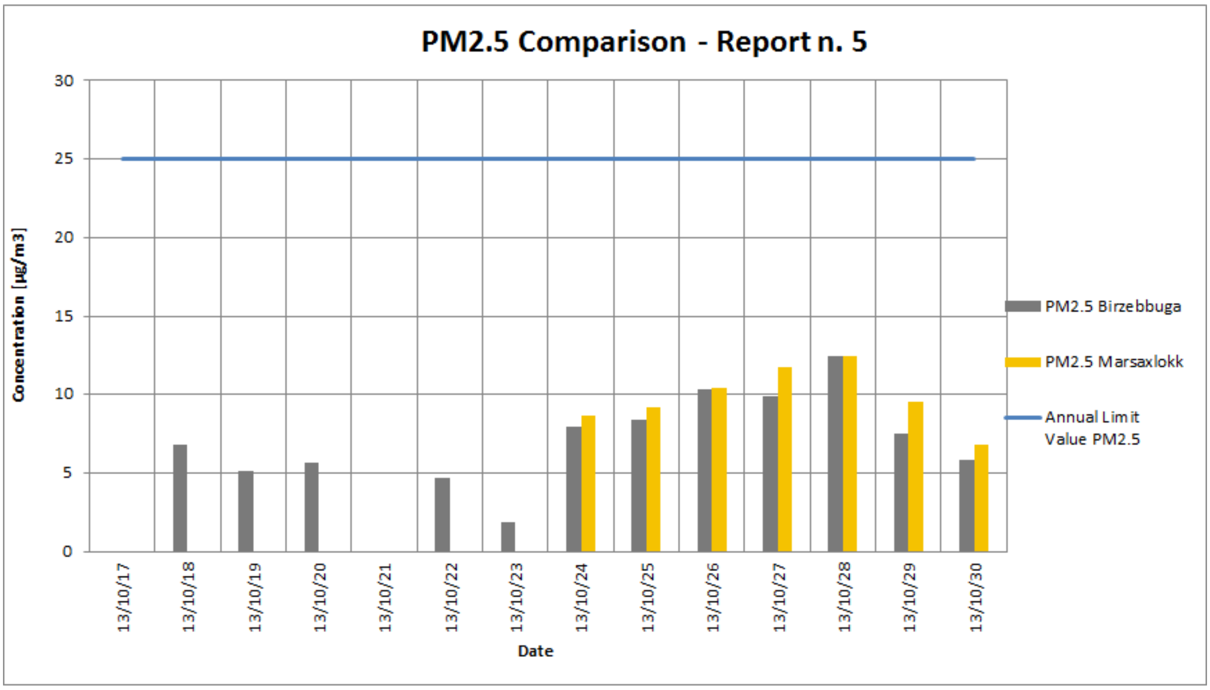


Figure 25: $PM_{2.5}$ comparison - histogram plot – Report5

2.6. Report 6

The data period of this report is between the 31st October and the 13th November 2013 for an effective duration of 14 sampling days. Non-valid measurements, due to power interruption, were registered for PM_{10} and $PM_{2.5}$ concentrations at the Birżebbuġa station on the 31st October and the 1st November. No exceedance was registered in this monitoring period.

The results of this monitoring period are given in the next paragraphs, which are first presented in tabular format in the following order:

1. Marsaxlokk station: PM_{10} & $PM_{2.5}$;
2. Birżebbuġa station: PM_{10} & $PM_{2.5}$;

Then, a series of significant plot comparisons are reported:

- PM_{10} *vs* $PM_{2.5}$ at Marsaxlokk station;
- PM_{10} *vs* $PM_{2.5}$ at Birżebbuġa station;
- PM_{10} *vs* PM_{10};
- $PM_{2,5}$ *vs* $PM_{2.5}$.

2.6.1. Marsaxlokk - PM_{10} and $PM_{2.5}$

Day	**Date**	**PM_{10} (µg/m^3)**	**$PM_{2.5}$ (µg/m^3)**
Thursday	13/10/31	13.59	2.95
Friday	13/11/01	15.75	4.40
Saturday	13/11/02	20.14	11.36
Sunday	13/11/03	18.31	2.20
Monday	13/11/04	18.49	2.75
Tuesday	13/11/05	32.59	<1.83
Wednesday	13/11/06	32.65	<1.83
Thursday	13/11/07	31.30	4.22
Friday	13/11/08	30.39	<1.83
Saturday	13/11/09	23.62	2.93
Sunday	13/11/10	26.91	2.75
Monday	13/11/11	29.65	<1.83
Tuesday	13/11/12	13.18	<1.83
Wednesday	13/11/13	9.89	2.38
Average during reporting period		22.60	3.22
Average during calendar year (to date)		28.94	9.57

Table 12: PM_{10} and $PM_{2.5}$ data for Marsaxlokk station – Report 6

2.6.2. Birżebbuġa - PM_{10} and $PM_{2.5}$

Day	Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)
Thursday	13/10/31	*N.V.*[14]	*N.V.*
Friday	13/11/01	*N.V.*	*N.V.*
Saturday	13/11/02	38.08	15.55
Sunday	13/11/03	10.07	<1.83
Monday	13/11/04	22.00	<1.83
Tuesday	13/11/05	14.64	<1.83
Wednesday	13/11/06	17.24	<1.83
Thursday	13/11/07	3.11	<1.83
Friday	13/11/08	13.08	<1.83
Saturday	13/11/09	8.97	<1.83
Sunday	13/11/10	12.09	<1.83
Monday	13/11/11	6.77	<1.83
Tuesday	13/11/12	7.69	<1.83
Wednesday	13/11/13	6.41	<1.83
Average during reporting period		13.35	2.98
Average during calendar year (to date)		20.58	9.95

Table 13: PM_{10} and $PM_{2.5}$ data for Birżebbuġa station – Report 6

[14] *Non Valid* data due to power interruption. The same reason applicable to the rest of *Non valid* data in this table.

2.6.3. Marsaxlokk – PM_{10} vs $PM_{2.5}$ histogram

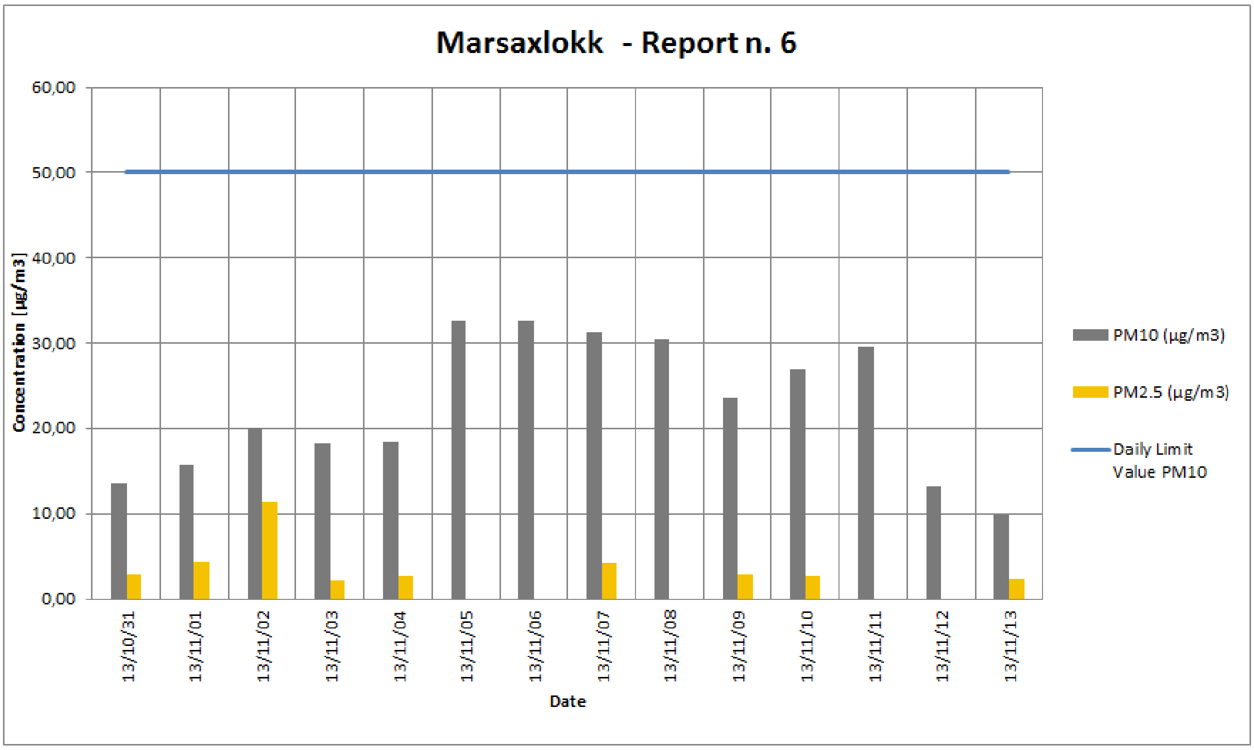


Figure 26: Marsaxlokk - PM_{10}vs$PM_{2.5}$ histogram plot – Report 6

2.6.4. Birżebbuġa – PM_{10} vs $PM_{2.5}$ histogram

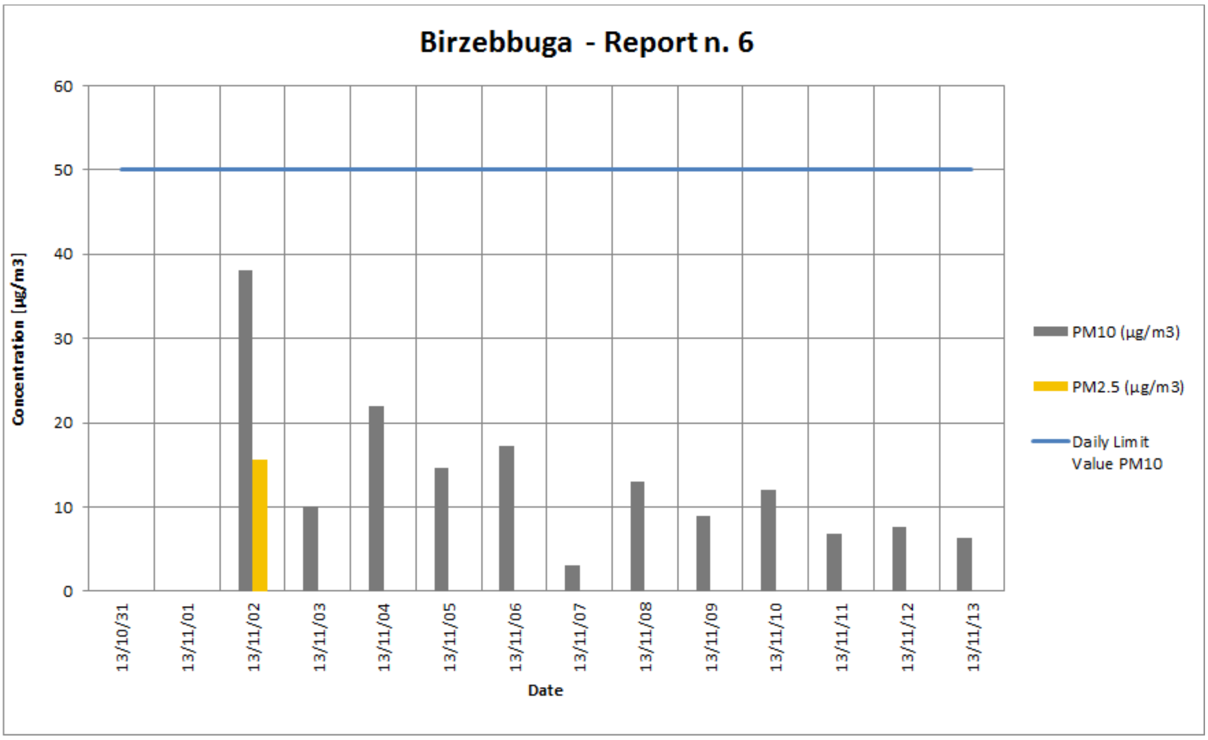


Figure 27: Birżebbuġa - PM_{10}vs$PM_{2.5}$ histogram plot – Report 6

2.6.5. PM_{10} comparison

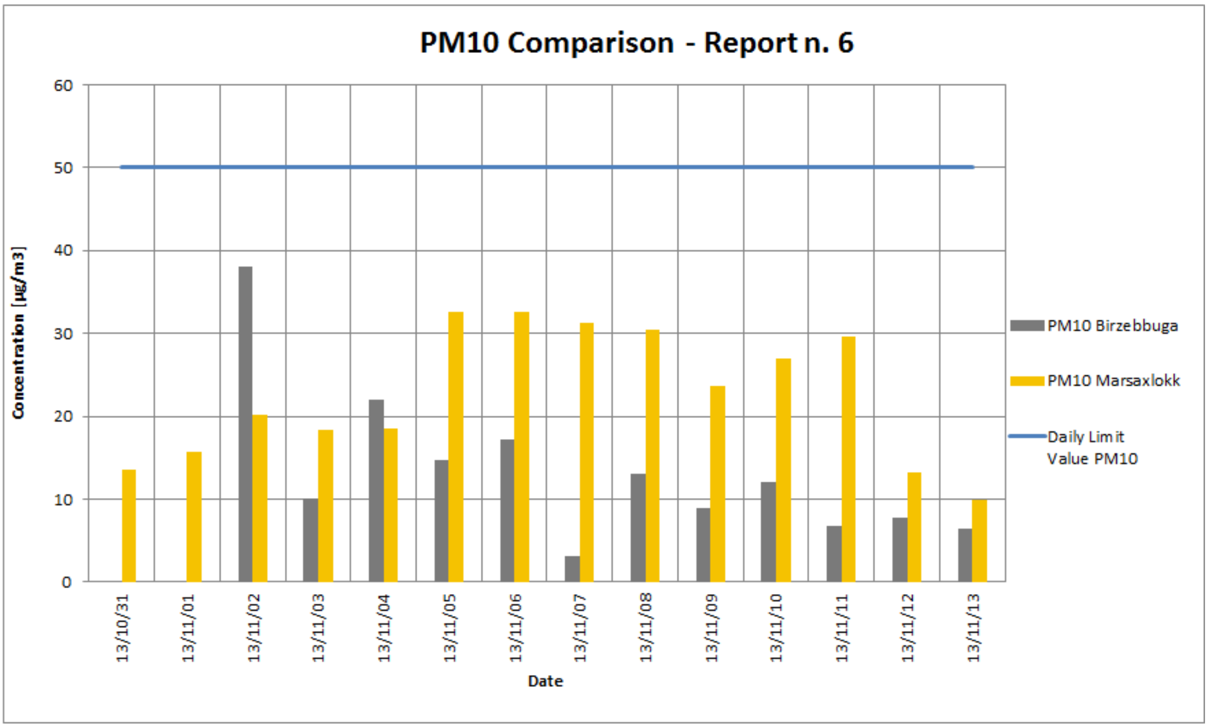


Figure 28: PM_{10} comparison - histogram plot – Report 6

2.6.6. $PM_{2.5}$ comparison

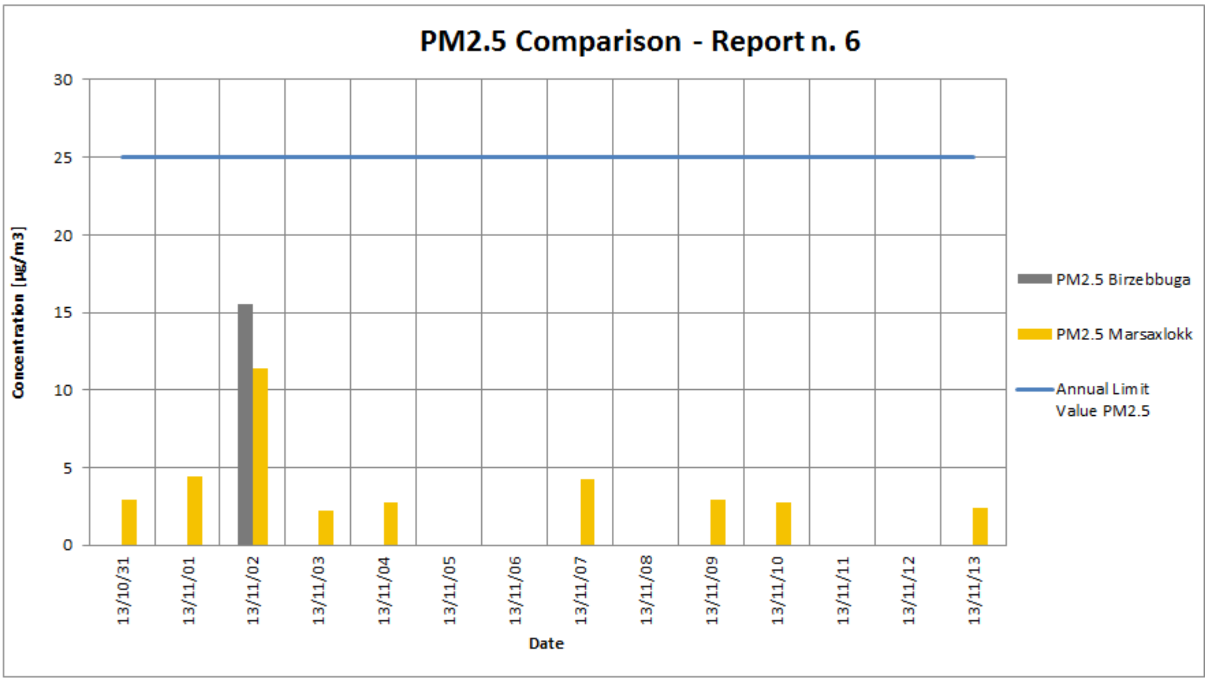


Figure 29: $PM_{2.5}$ comparison - histogram plot – Report6

2.7. Metal Analysis

Metal analysis followed the procedures described in earlier sections. The limit values for Arsenic, Cadmium, Nickel and Lead listed in the table below are annual limit values according to the L.N. 478/2010. Therefore the interpretation of the results achieved from the analysis of metals will be drawn up following the completion of the monitoring program which spans over one calendar year.

2.7.1. October 2013

2.7.1.1. Marsaxlokk Metals

Day	*Date*	*Arsenic*	*Cadmium*	*Nickel*	*Lead*	*Vanadium*
		ng/mc	ng/mc	ng/mc	ng/mc	ng/mc
Wednesday	13/10/02	<1.83	<1.83	7.33	25.64	9.16
Thursday	13/10/03	1.83	1.83	3.66	31.13	7.33
Friday	13/10/04	1.83	1.83	3.66	9.16	3.66
Saturday	13/10/05	1.83	1.83	1.83	5.49	1.83
Sunday	13/10/06	1.83	1.83	1.83	5.49	3.66
Monday	13/10/07	1.83	1.83	3.66	7.33	7.33
Tuesday	13/10/08	1.83	1.83	5.49	25.63	3.66
Wednesday	13/10/09	1.83	1.83	7.33	25.64	12.82
Thursday	13/10/10	1.83	1.83	7.32	18.31	9.15
Friday	13/10/11					
Saturday	13/10/12					
Sunday	13/10/13	1.83	1.83	3.66	12.82	7.33
Monday	13/10/14	<1.83	<1.83	1.83	1.83	3.66
Tuesday	13/10/15					
Wednesday	13/10/16	1.83	1.83	3.66	31.13	7.33
Thursday	13/10/17	<1.83	<1.83	1.84	3.67	3.67
Friday	13/10/18	<1.83	<1.83	3.67	9.18	5.51
Saturday	13/10/19	<1.83	<1.83	3.67	5.51	3.67
Sunday	13/10/20	<1.83	<1.83	7.34	1.84	1.84
Monday	13/10/21	<1.83	<1.83	3.67	3.67	1.84
Tuesday	13/10/22	<1.83	<1.83	1.84	9.18	1.84
Wednesday	13/10/23	<1.83	<1.83	3.67	3.67	1.84
Thursday	13/10/24	<1.83	<1.83	5.51	7.34	3.67
Friday	13/10/25	<1.83	<1.83	9.18	7.34	5.51
Saturday	13/10/26	<1.83	<1.83	5.51	14.69	5.51
Sunday	13/10/27	<1.83	<1.83	5.51	16.52	7.34
Monday	13/10/28	<1.83	<1.83	9.18	11.02	5.51
Tuesday	13/10/29	<1.83	<1.83	5.51	11.02	1.84
Wednesday	13/10/30	<1.83	<1.83	7.34	20.20	5.51
Thursday	13/10/31	<1.83	<1.83	1.84	3.67	5.51

Table 14. Metals data for Marsaxlokk station – October

2.7.1.2. Birżebbuġa Metals

Day	***Date***	***Arsenic***	***Cadmium***	***Nickel***	***Lead***	***Vanadium***
		ng/mc	**ng/mc**	**ng/mc**	**ng/mc**	**ng/mc**
Tuesday	13/10/01					
Wednesday	13/10/02					
Thursday	13/10/03					
Friday	13/10/04					
Saturday	13/10/05					
Sunday	13/10/06					
Monday	13/10/07					
Tuesday	13/10/08					
Wednesday	13/10/09					
Thursday	13/10/10					
Friday	13/10/11					
Saturday	13/10/12					
Sunday	13/10/13					
Monday	13/10/14					
Tuesday	13/10/15					
Wednesday	13/10/16					
Thursday	13/10/17					
Friday	13/10/18	1.83	<1.83	11.00	20.17	7.33
Saturday	13/10/19	1.83	<1.83	3.67	7.33	7.33
Sunday	13/10/20	1.83	<1.83	3.67	1.83	7.33
Monday	13/10/21					
Tuesday	13/10/22	1.83	<1.83	3.67	20.17	5.50
Wednesday	13/10/23	<1.83	<1.83	1.83	1.83	3.67
Thursday	13/10/24	1.83	<1.83	3.67	9.17	5.50
Friday	13/10/25	1.83	<1.83	1.83	11.00	1.83
Saturday	13/10/26	1.83	<1.83	9.17	16.50	11.00
Sunday	13/10/27	1.83	<1.83	9.17	16.50	11.00
Monday	13/10/28	<1.83	<1.83	1.83	7.33	5.50
Tuesday	13/10/29	1.83	<1.83	1.83	11.00	3.67
Wednesday	13/10/30	1.83	<1.83	7.33	9.17	20.17
Thursday	13/10/31	1.83	<1.83	3.67	20.17	5.50

Table 15. Metals data for Birżebbuġa station – October

2.8. Report 7

The data period of this report is between the 14th and the 27th November 2013 for an effective duration of 14 sampling days.

The results of this monitoring period are given in the next paragraphs, which are first presented in tabular format in the following order:

1. Marsaxlokk station: PM_{10} & $PM_{2.5}$;
2. Birżebbuġa station: PM_{10} & $PM_{2.5}$;

Then, a series of significant plot comparisons are reported:

- PM_{10} *vs* $PM_{2.5}$ at Marsaxlokk station;
- PM_{10} *vs* $PM_{2.5}$ at Birżebbuġa station;
- PM_{10} *vs* PM_{10};
- $PM_{2.5}$ *vs* $PM_{2.5}$.

2.8.1. Marsaxlokk - PM_{10} and $PM_{2.5}$

Day	**Date**	**PM_{10} (µg/m^3)**	**$PM_{2.5}$ (µg/m^3)**
Thursday	13/11/14	26.17	13.59
Friday	13/11/15	16.29	13.75
Saturday	13/11/16	13.91	10.64
Sunday	13/11/17	12.09	6.97
Monday	13/11/18	10.25	7.34
Tuesday	13/11/19	67.20	28.98
Wednesday	13/11/20	24.90	15.03
Thursday	13/11/21	15.19	3.30
Friday	13/11/22	21.42	14.48
Saturday	13/11/23	40.09	25.10
Sunday	13/11/24	4.95	4.58
Monday	13/11/25	10.99	2.20
Tuesday	13/11/26	10.80	8.98
Wednesday	13/11/27	17.58	14.65
Average during reporting period		20.85	12.12
Average during calendar year (to date)		27.49	10.04

Table 16: PM_{10} and $PM_{2.5}$ data for Marsaxlokk station – Report 7

2.8.2. Birżebbuġa - PM_{10} and $PM_{2.5}$

Day	**Date**	**PM_{10} (µg/m^3)**	**$PM_{2.5}$ (µg/m^3)**
Thursday	13/11/14	10.12	4.22
Friday	13/11/15	<1.83	<1.83
Saturday	13/11/16	7.87	<1.83
Sunday	13/11/17	6.95	<1.83
Monday	13/11/18	15.01	<1.83
Tuesday	13/11/19	74.12	12.08
Wednesday	13/11/20	28.55	2.01
Thursday	13/11/21	11.35	<1.83
Friday	13/11/22	25.07	<1.83
Saturday	13/11/23	10.98	<1.83
Sunday	13/11/24	4.76	<1.83
Monday	13/11/25	5.49	<1.83
Tuesday	13/11/26	7.87	2.56
Wednesday	13/11/27	2.75	2.20
Average during reporting period		15.20	2.83
Average during calendar year (to date)		18.97	8.65

Table 17: PM_{10} and $PM_{2.5}$ data for Birżebbuġa station – Report 7

2.8.3. Marsaxlokk – PM_{10}vs$PM_{2.5}$ histogram

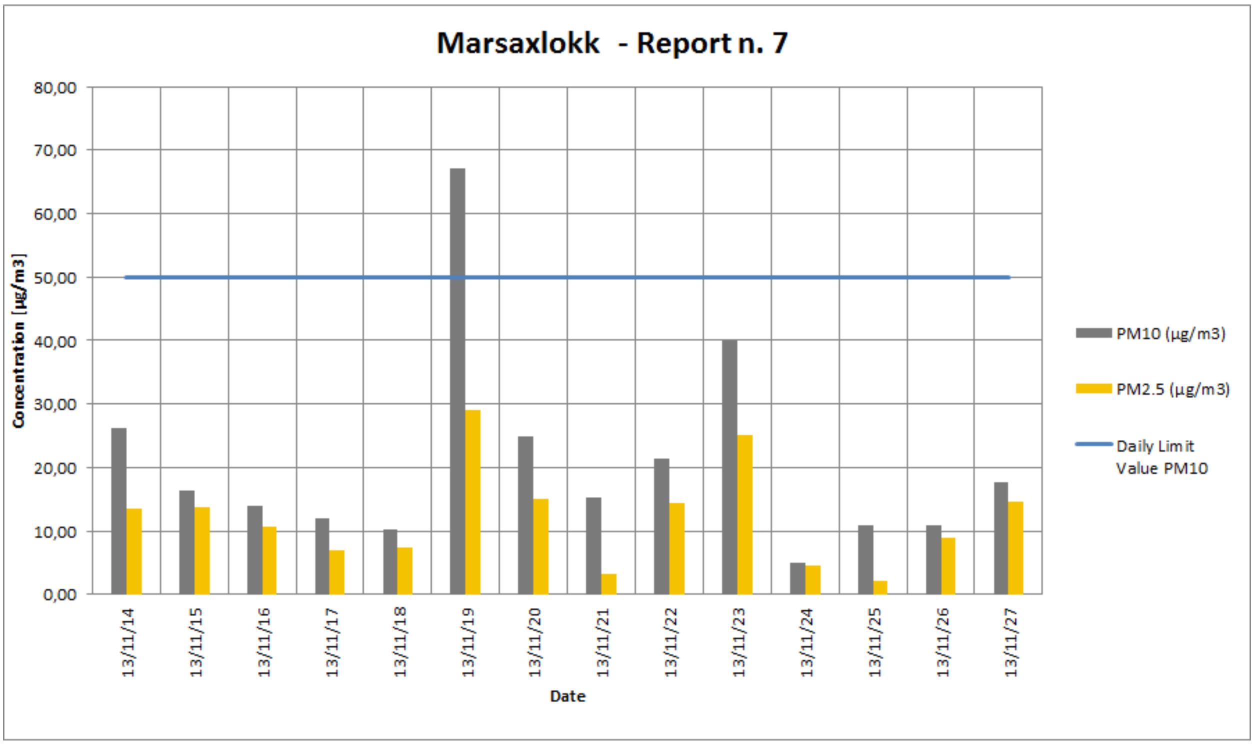


Figure 30: Marsaxlokk - PM_{10}vs$PM_{2.5}$ histogram plot – Report 7

2.8.4. Birżebbuġa – PM_{10}vs$PM_{2.5}$ histogram

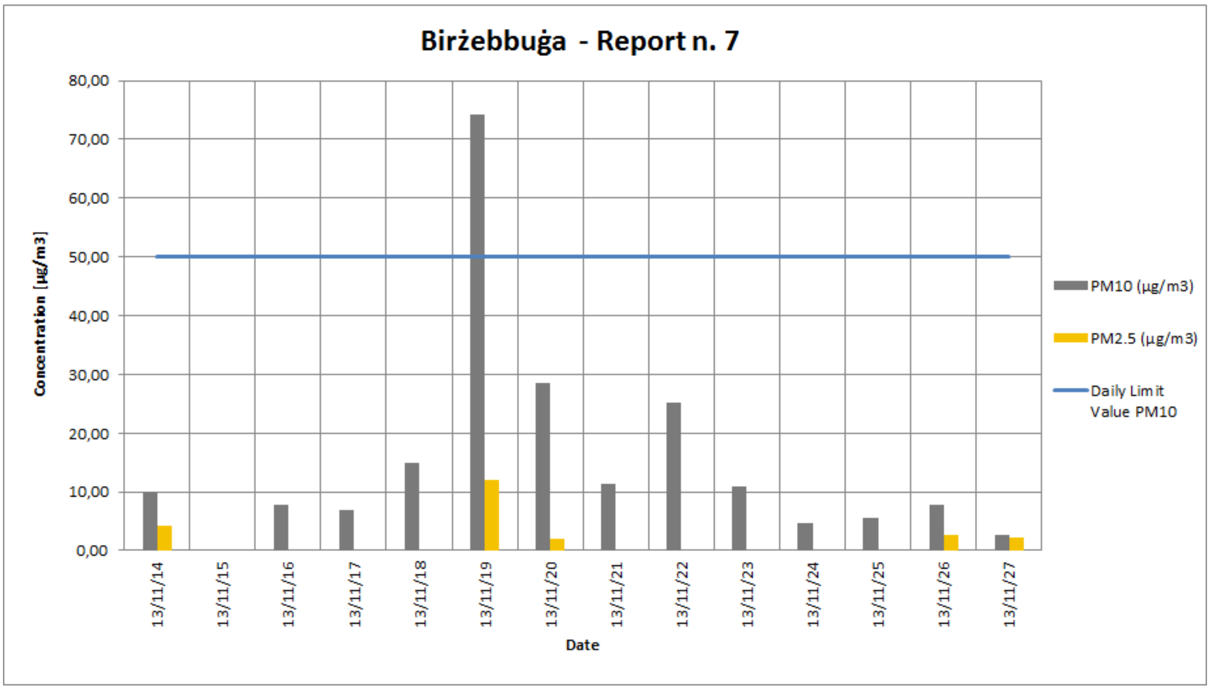


Figure 31: Birżebbuġa - PM_{10}vs$PM_{2.5}$ histogram plot – Report 7

2.8.5. PM_{10} comparison

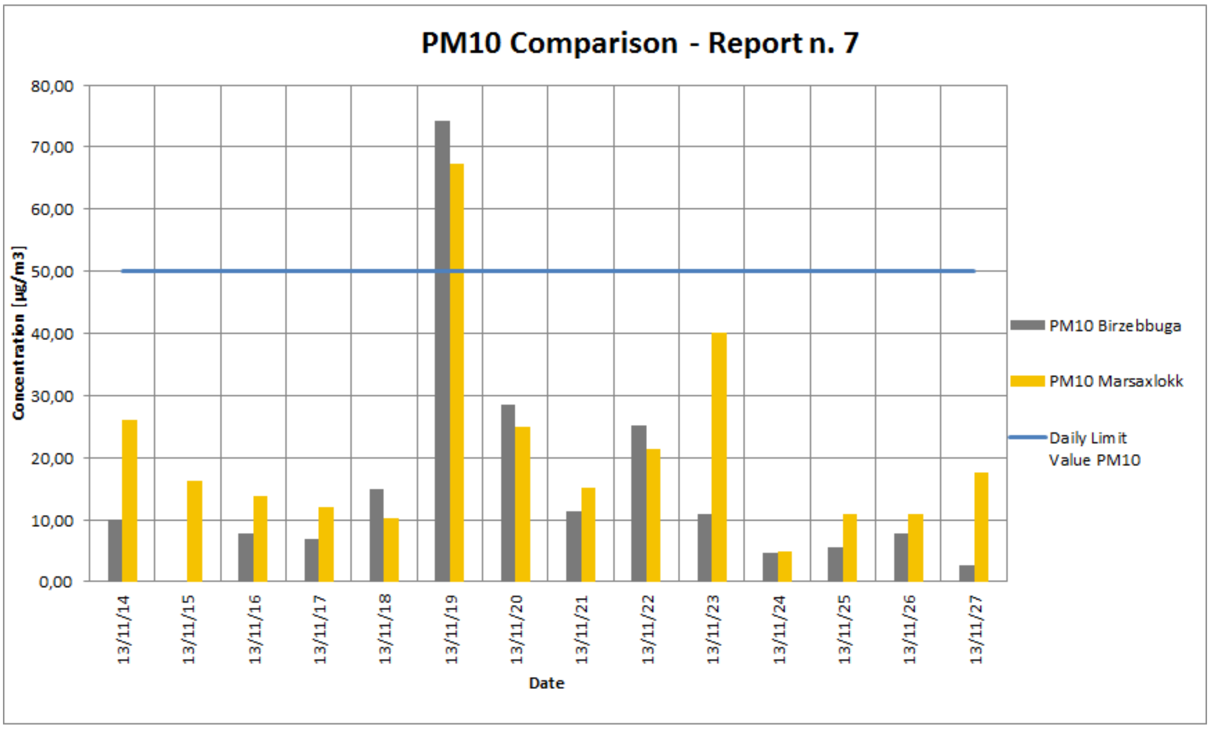


Figure 32: PM_{10} comparison - histogram plot – Report 7

2.8.6. $PM_{2.5}$ comparison

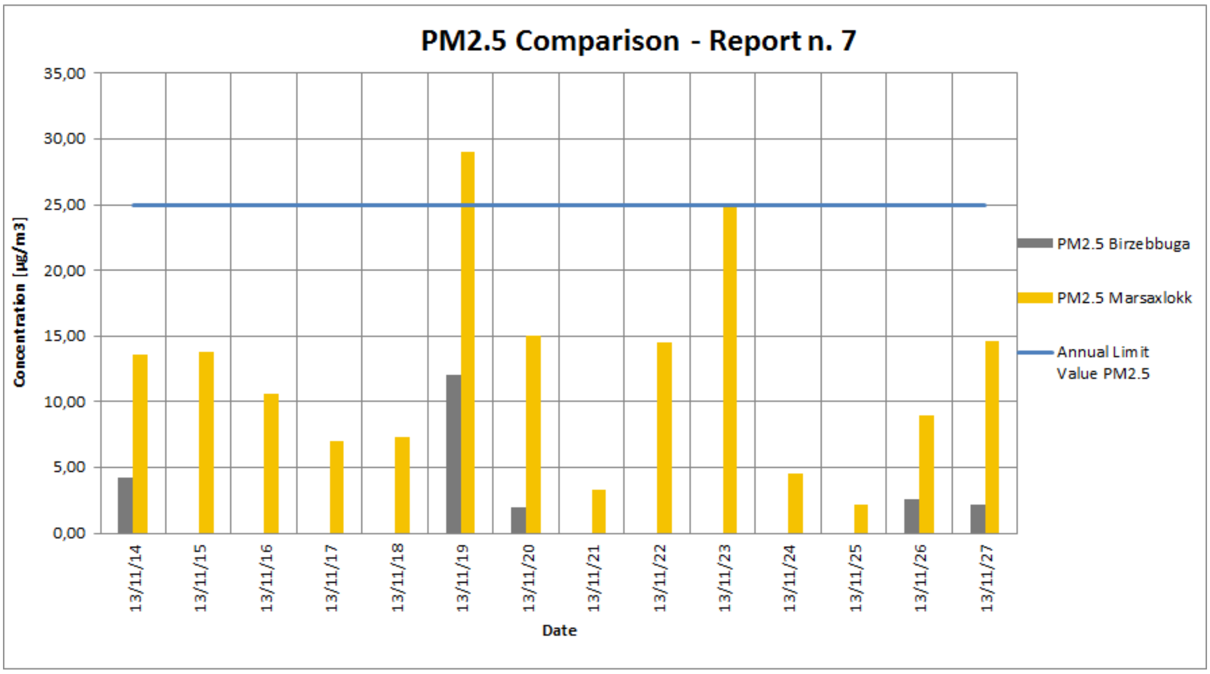


Figure 33: $PM_{2.5}$ comparison - histogram plot – Report 7

An analysis of the PM_{10}-exceedance at Marsaxlokk and Birżebbuġa on the 19th of November is included in Annex A. After applying mathemathical modelling tools and observing satelitte images, it was concluded that, on the 19th the PM_{10} excedeence could be attributed to a dust loading episode.

2.8.7. Quantification of African dust

The quantification of African dust has been determined only when exceedances of the daily limit value for PM_{10} were found. Applying the method reported in paragraph 1.4 and the data from Għarb station (this data from the Għarb station is at this stage raw, unverified data; should the verified data be different, revisions will be carried out), the following African dust loads were determined:

Days affected by African dust episodes	African dust load [μg/m^3]
2013/11/19	7.3

Table 18: Determination of the African dust load.

By subtraction of the African dust load from the PM_{10} concentrations recorded in Marsaxlokk and Birżebbuġa, it can be determined when the exceedances are due to natural (adjusted value <50 μg/m^3) or anthropogenic (adjusted value >50 μg/m^3) origin. On the 19th November 2013, the calculated African dust was 7.3 μg/m^3. After adjusting the Marsaxlokk and Birżebbuġa values, their PM_{10} concentrations were still above the daily limit value. Based on this and on the analysis performed in section 2.21, it was assumed that on the 19th November the final PM_{10} concentrations registered were not only affected by Saharan dust but also by anthropogenic activities.

Data	Adjusted value		Source	
	Marsaxlokk	Birżebbuġa	Marsaxlokk	Birżebbuġa
2013/11/19	59.9	66.82	Anthropogenic and Natural	Anthropogenic and Natural

Table 19: Determination of the source for PM_{10} exceedances.

The following table reports the PM_{10} concentrations after subtracting Saharan dust contribution:

2.8.7.1. Marsaxlokk PM_{10}concentrations after subtracting Saharan dust contribution

Day	Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)
Thursday	13/11/14	26.17	13.59
Friday	13/11/15	16.29	13.75
Saturday	13/11/16	13.91	10.64
Sunday	13/11/17	12.09	6.97
Monday	13/11/18	10.25	7.34
Tuesday	13/11/19	59.9	28.98
Wednesday	13/11/20	24.90	15.03
Thursday	13/11/21	15.19	3.30
Friday	13/11/22	21.42	14.48
Saturday	13/11/23	40.09	25.10
Sunday	13/11/24	4.95	4.58
Monday	13/11/25	10.99	2.20
Tuesday	13/11/26	10.80	8.98
Wednesday	13/11/27	17.58	14.65
Average during reporting period		20.32	12.12
Average during calendar year (to date)		27.40	12.37

Table 20: PM_{10} adjusted values for Marsaxlokk station – Report 7

2.8.7.2. Birżebbuġa-PM_{10}concentrations after subtracting Saharan dust contribution

Day	Date	PM_{10} (µg/m^3)	$PM_{2.5}$ (µg/m^3)
Thursday	13/11/14	10.12	4.22
Friday	13/11/15	<1.83	<1.83
Saturday	13/11/16	7.87	<1.83
Sunday	13/11/17	6.95	<1.83
Monday	13/11/18	15.01	<1.83
Tuesday	13/11/19	66.82	12.08
Wednesday	13/11/20	28.55	2.01
Thursday	13/11/21	11.35	<1.83
Friday	13/11/22	25.07	<1.83
Saturday	13/11/23	10.98	<1.83
Sunday	13/11/24	4.76	<1.83
Monday	13/11/25	5.49	<1.83
Tuesday	13/11/26	7.87	2.56
Wednesday	13/11/27	2.75	2.20
Average during reporting period		14.67	2.83
Average during calendar year (to date)		18.82	9.70

Table 21: PM_{10} adjusted values for Birżebbuġa station – Report 7

2.8.8. Marsaxlokk – PM_{10} concentration after substracting Saharan dust contribution

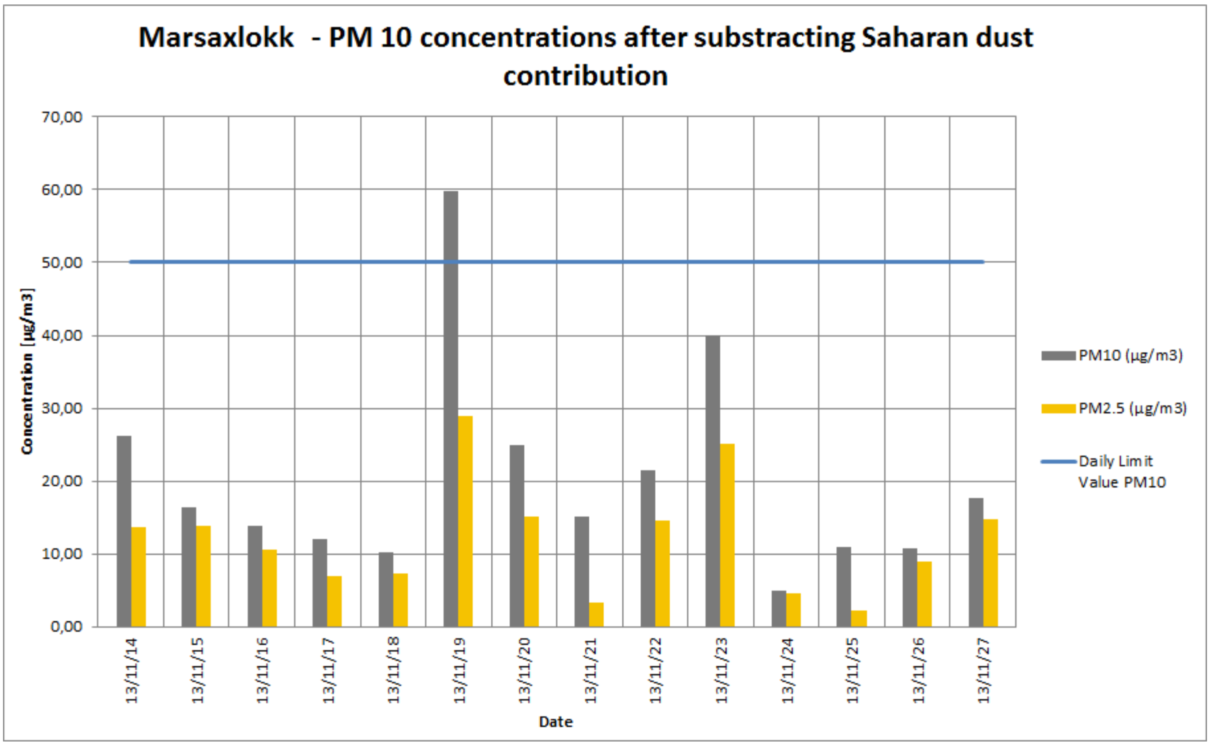


Figure 34: Marsaxlokk – PM_{10} concentrations after subtracting Saharan dust contribution

2.8.9. Birżebbuġa – PM_{10} concentration after substracting Saharan dust contribution

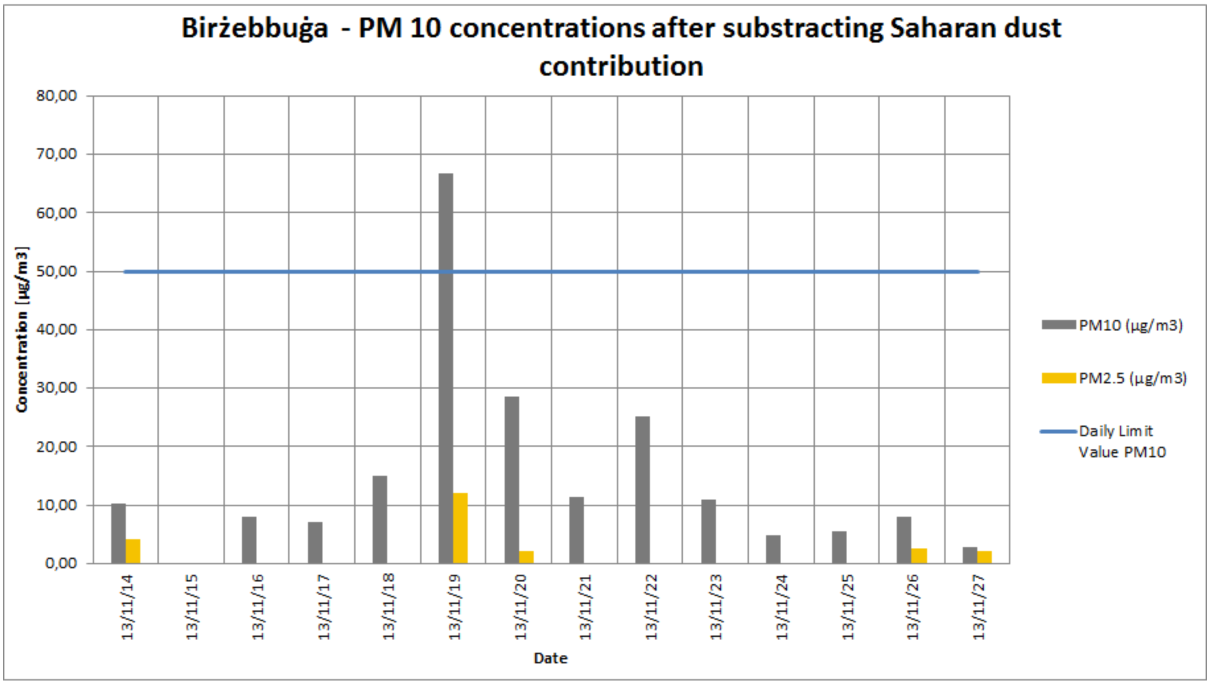


Figure 35: Birżebbuġa – PM_{10} concentrations after subtracting Saharan dust contribution

2.9. Report 8

The data period of this report is between the 28th November and the 11th December 2013 for an effective duration of 14 sampling days.

Due to power interruption complications it was not possible to collect sampling data in accordance with the minimum data capture requirements established by the directive.

2.10. Report 9

The data period of this report is between the 12th and the 22nd December 2013 for an effective duration of 11 sampling days.

The results of this monitoring period are given in the next paragraphs, which are first presented in tabular format in the following order:

1. Marsaxlokk station: PM_{10} & $PM_{2.5}$;
2. Birżebbuġa station: PM_{10} & $PM_{2.5}$;

Then, a series of significant plot comparisons are reported:

- PM_{10} *vs* $PM_{2.5}$ at Marsaxlokk station;
- PM_{10} *vs* $PM_{2.5}$ at Birżebbuġa station;
- PM_{10} *vs* PM_{10};
- $PM_{2.5}$ *vs* $PM_{2.5}$.

2.10.1. Marsaxlokk - PM_{10} and $PM_{2.5}$

Day	Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)
Thursday	13/12/12	*N.V.*[15]	*N.V.*
Friday	13/12/13	32.78	20.70
Saturday	13/12/14	34.06	6.04
Sunday	13/12/15	40.10	27.11
Monday	13/12/16	26.97	15.99
Tuesday	13/12/17	22.15	13.37
Wednesday	13/12/18	25.09	15.21
Thursday	13/12/19	28.56	11.17
Friday	13/12/20	8.60	2.75
Saturday	13/12/21	19.04	10.44
Sunday	13/12/22	21.42	17.04
Average during reporting period		25.88	13.98
Average during calendar year (to date)		27.22	10.65

Table 22: PM_{10} and $PM_{2.5}$ data for Marsaxlokk station – Report 9

[15] *Non valid* data due to power interruption.

2.10.2. Birżebbuġa - PM_{10} and $PM_{2.5}$

Day	Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)
Thursday	13/12/12	*N.V.*[16]	*N.V.*
Friday	13/12/13	27.82	16.11
Saturday	13/12/14	24.71	15.56
Sunday	13/12/15	23.24	14.47
Monday	13/12/16	26.55	18.95
Tuesday	13/12/17	38.62	13.00
Wednesday	13/12/18	27.64	13.73
Thursday	13/12/19	23.79	14.64
Friday	13/12/20	12.81	9.34
Saturday	13/12/21	20.13	9.70
Sunday	13/12/22	39.91	10.07
Average during reporting period		26.52	13.56
Average during calendar year (to date)		20.17	9.22

Table 23: PM_{10} and $PM_{2.5}$ data for Birżebbuġa station – Report 9

[16] *Non valid* data due to power interruption

2.10.3. Marsaxlokk – PM_{10}vs$PM_{2.5}$ histogram

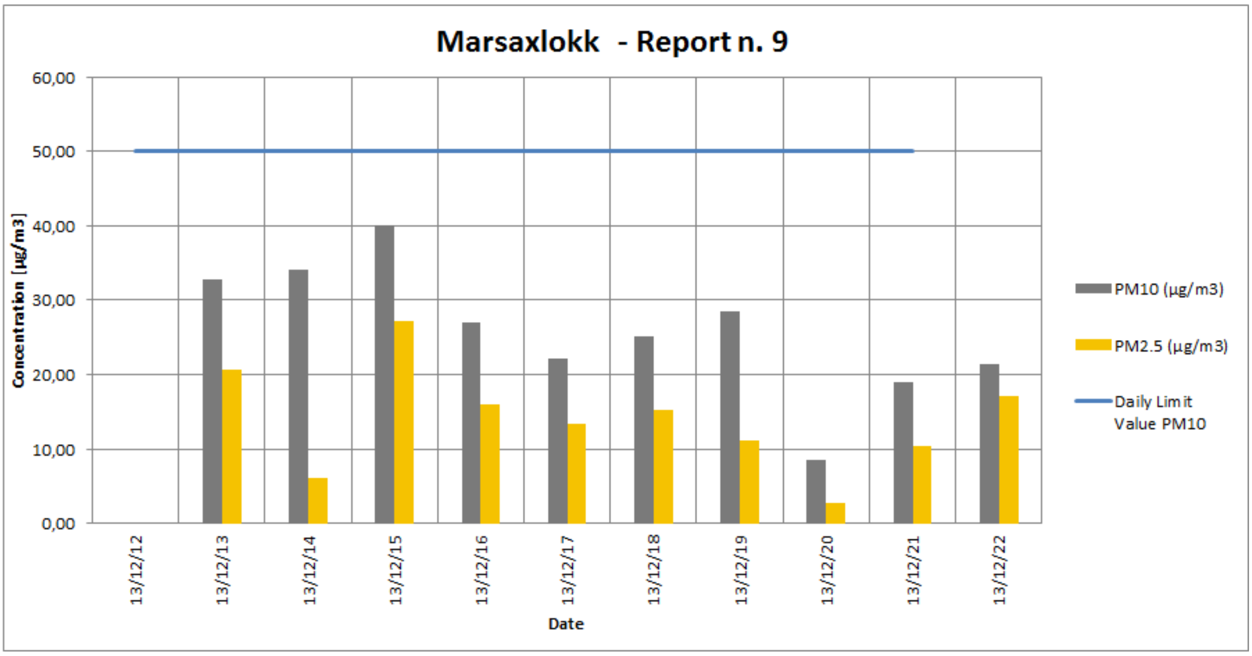


Figure 36: Marsaxlokk - PM_{10}vs$PM_{2.5}$ histogram plot – Report 9

2.10.4. Birżebbuġa – PM_{10}vs$PM_{2.5}$ histogram

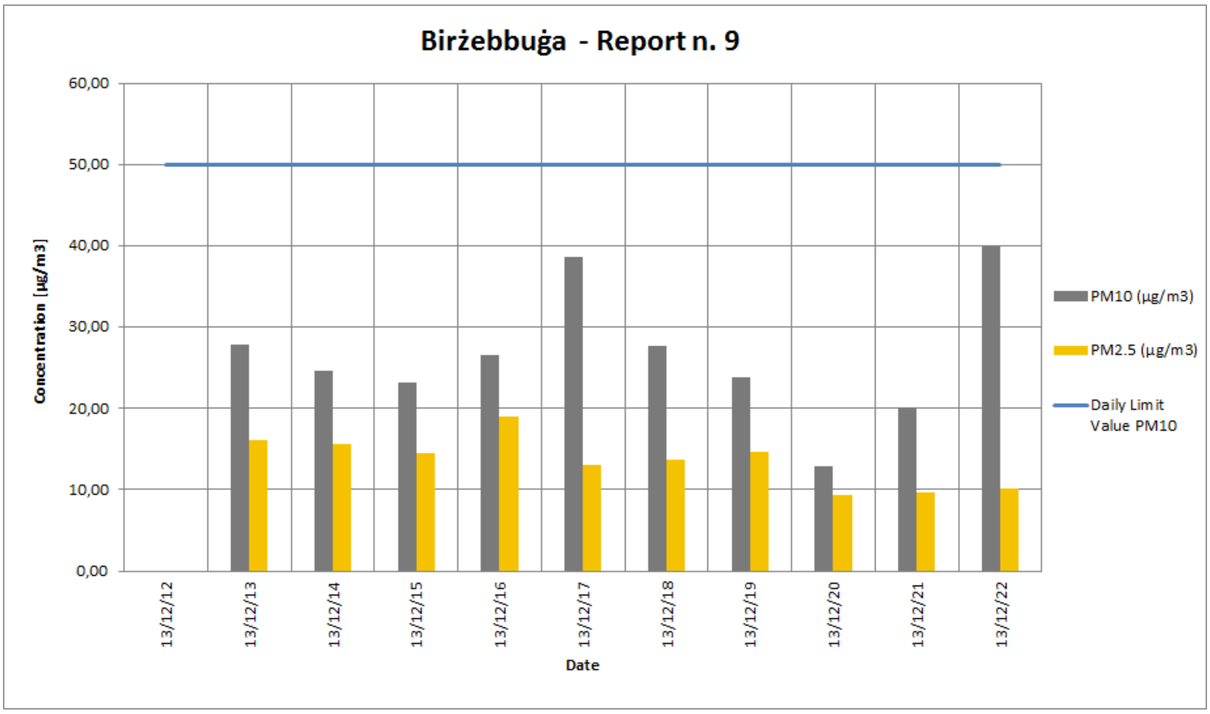


Figure 37: Birżebbuġa - PM_{10}vs$PM_{2.5}$ histogram plot – Report 9

2.10.5. PM_{10} comparison

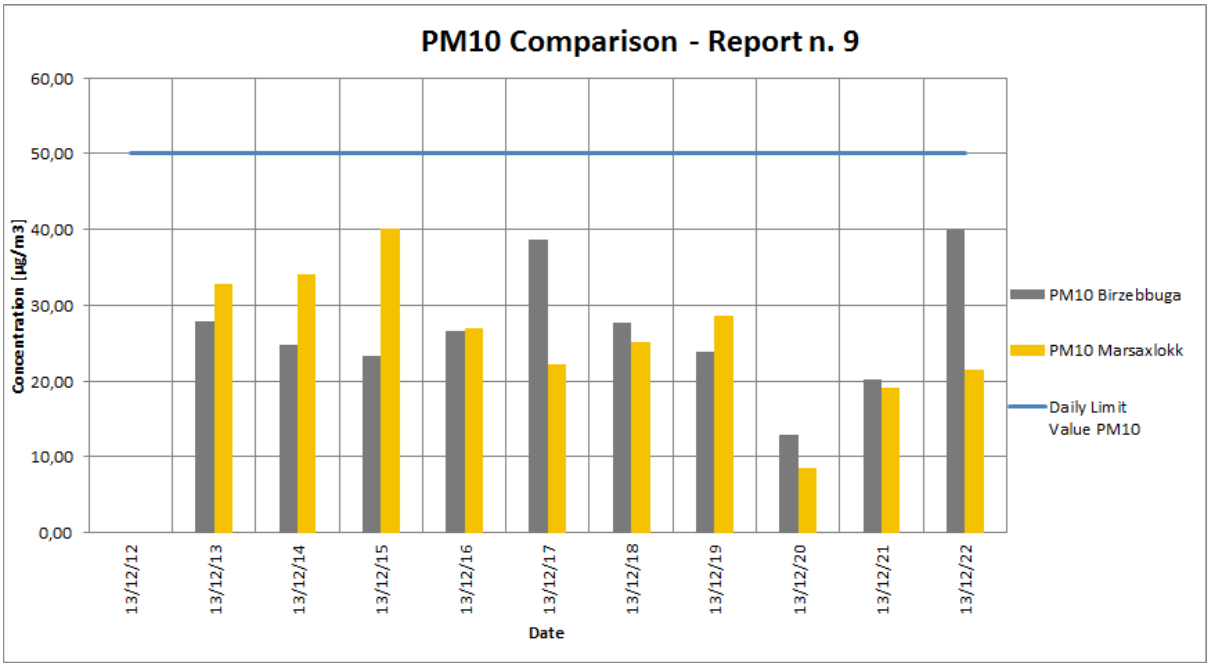


Figure 38: PM_{10} comparison - histogram plot – Report 9

2.10.6. $PM_{2.5}$ comparison

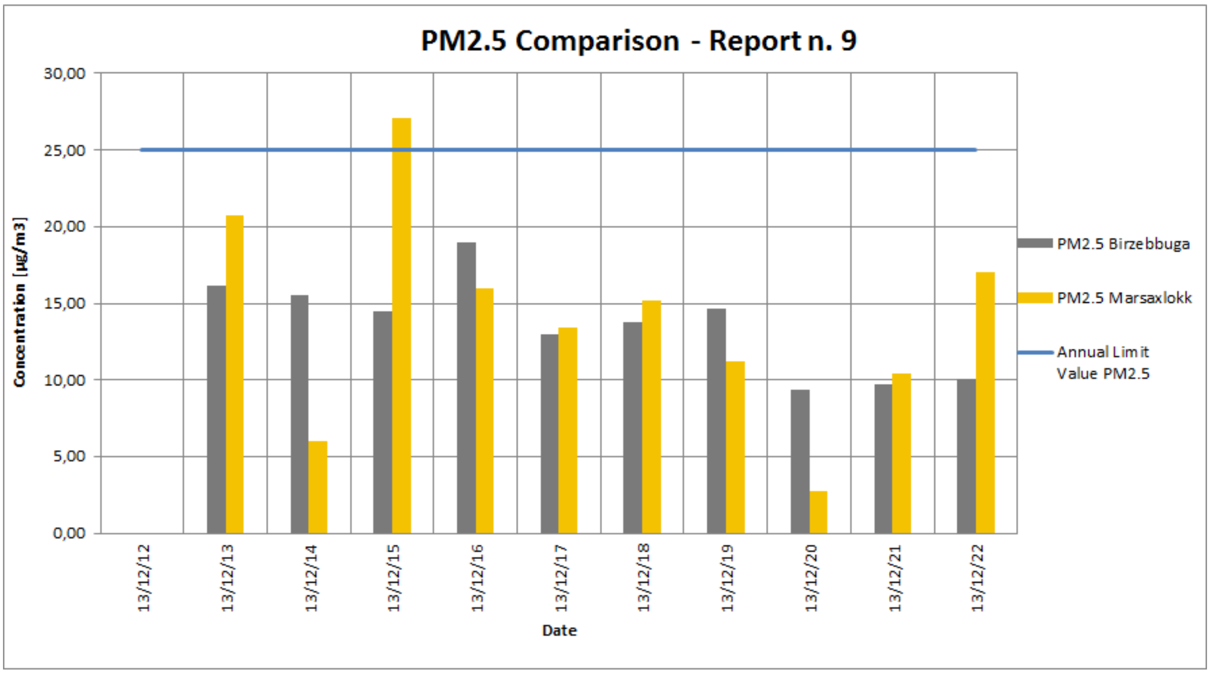


Figure 39: $PM_{2.5}$ comparison - histogram plot – Report 9

2.11. Report 10

The data period of this report is between the 23rd December 2013 and the 6th January 2014 for an effective duration of 15 sampling days.

The results of this monitoring period are given in the next paragraphs, which are first presented in tabular format in the following order:

1. Marsaxlokk station: PM_{10} & $PM_{2.5}$;
2. Birżebbuġa station: PM_{10} & $PM_{2.5}$;

Then, a series of significant plot comparisons are reported:

- PM_{10} *vs* $PM_{2.5}$ at Marsaxlokk station;
- PM_{10} *vs* $PM_{2.5}$ at Birżebbuġa station;
- PM_{10} *vs* PM_{10};
- $PM_{2.5}$ *vs* $PM_{2.5}$.

2.11.1. Marsaxlokk - PM_{10} and $PM_{2.5}$

Day	Date	PM_{10} (µg/m^3)	$PM_{2.5}$ (µg/m^3)
Monday	13/12/23	13.64	12.29
Tuesday	13/12/24	25.81	11.91
Wednesday	13/12/25	23.98	13.56
Thursday	13/12/26	31.86	11.91
Friday	13/12/27	21.97	12.64
Saturday	13/12/28	38.28	17.59
Sunday	13/12/29	35.52	16.49
Monday	13/12/30	29.11	13.92
Tuesday	13/12/31	23.67	10.18
Wednesday	14/01/01	26.18	11.91
Thursday	14/01/02	28.75	14.84
Friday	14/01/03	33.88	15.94
Saturday	14/01/04	14.28	13.92
Sunday	14/01/05	26.18	11.36
Monday	14/01/06	18.31	10.26
Average during reporting period		26.09	13.25
Average during calendar year (to date)		27.06	11.13

Table 24: PM_{10} and $PM_{2.5}$ data for Marsaxlokk station – Report 10

2.11.2. Birżebbuġa - PM_{10} and $PM_{2.5}$

Day	Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)
Monday	13/12/23	18.52	8.83
Tuesday	13/12/24	31.11	10.62
Wednesday	13/12/25	18.12	10.25
Thursday	13/12/26	27.09	8.79
Friday	13/12/27	17.75	6.77
Saturday	13/12/28	22.14	10.80
Sunday	13/12/29	19.22	9.15
Monday	13/12/30	19.22	10.43
Tuesday	13/12/31	14.28	7.32
Wednesday	14/01/01	18.48	8.24
Thursday	14/01/02	23.80	12.44
Friday	14/01/03	29.28	17.75
Saturday	14/01/04	*N.V.*[17]	*N.V.*
Sunday	14/01/05	*N.V.*	*N.V.*
Monday	14/01/06	*N.V.*	*N.V.*
Average during reporting period		21.58	10.12
Average during calendar year (to date)		20.42	9.33

Table 25: PM_{10} and $PM_{2.5}$ data for Birżebbuġa station – Report 10

[17] *Non valid* data due to power interruption.

2.11.3. Marsaxlokk – PM_{10}vs$PM_{2.5}$ histogram

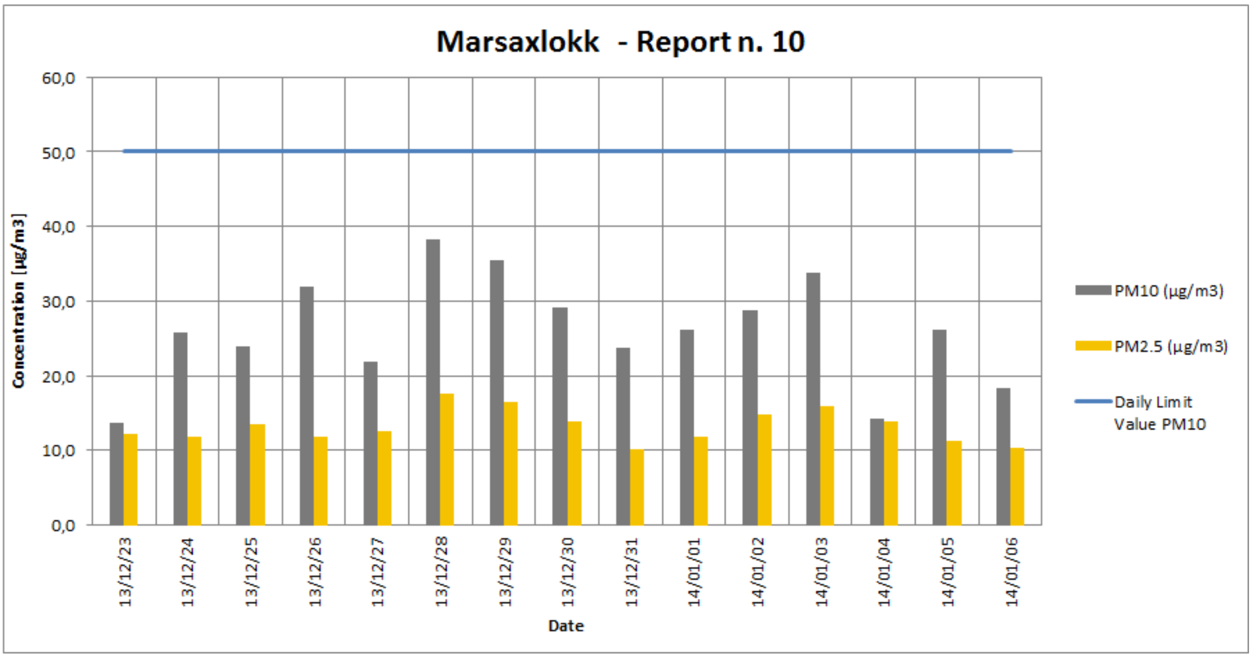


Figure 40: Marsaxlokk - PM_{10}vs$PM_{2.5}$ histogram plot – Report 10

2.11.4. Birżebbuġa – PM_{10}vs$PM_{2.5}$ histogram

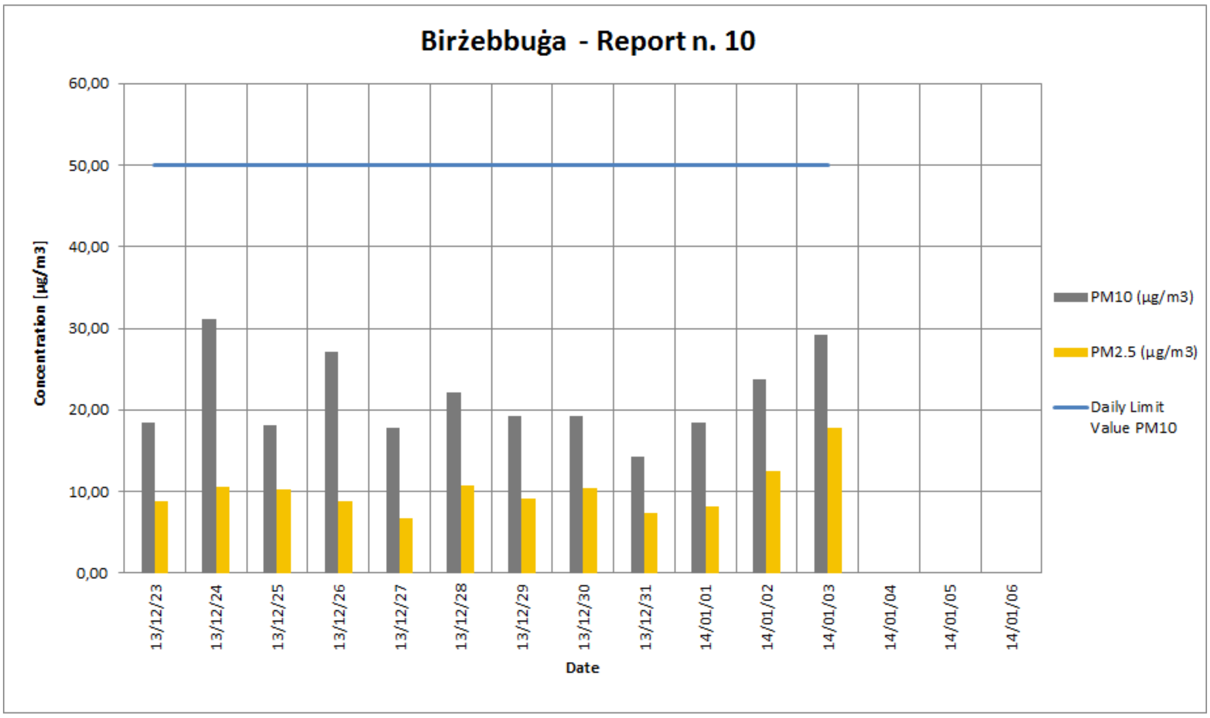


Figure 41: Birżebbuġa - PM_{10}vs$PM_{2.5}$ histogram plot – Report 10

2.11.5. PM_{10} comparison

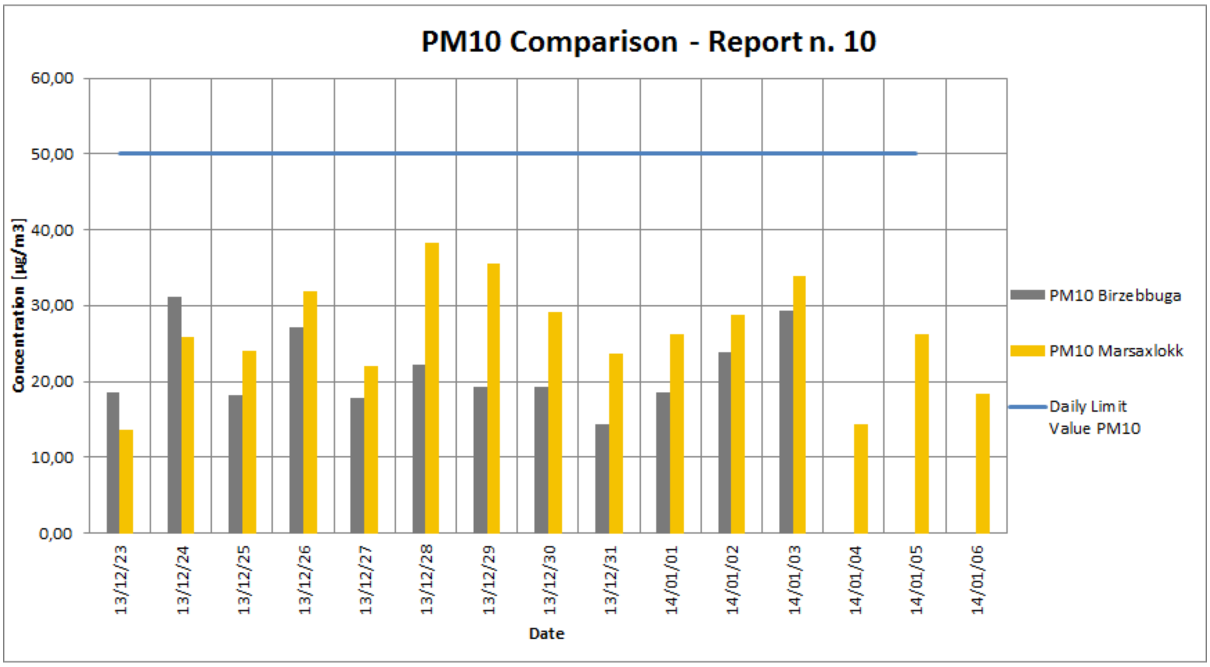


Figure 42: PM_{10} comparison - histogram plot – Report 10

2.11.6. $PM_{2.5}$ comparison

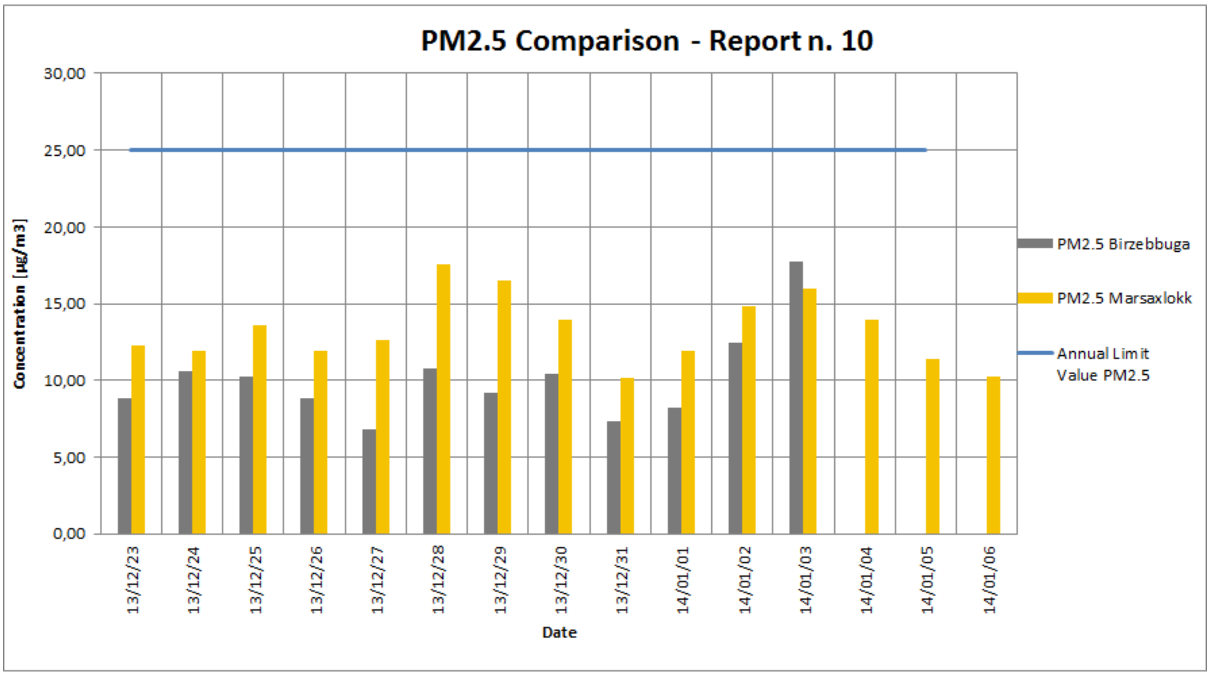


Figure 43: $PM_{2.5}$ comparison - histogram plot – Report 10

2.12. Report 11

The data period of this report is between the 7th and the 21st January 2014 for an effective duration of 15 sampling days.

The results of this monitoring period are given in the next paragraphs, which are first presented in tabular format in the following order:

1. Marsaxlokk station: PM_{10} & $PM_{2.5}$;
2. Birżebbuġa station: PM_{10} & $PM_{2.5}$;

Then, a series of significant plot comparisons are reported:

- PM_{10} *vs* $PM_{2.5}$ at Marsaxlokk station;
- PM_{10} *vs* $PM_{2.5}$ at Birżebbuġa station;
- PM_{10} *vs* PM_{10};
- $PM_{2.5}$ *vs* $PM_{2.5}$.

2.12.1. Marsaxlokk - PM_{10} and $PM_{2.5}$

Day	Date	PM_{10} (µg/m^3)	$PM_{2.5}$ (µg/m^3)
Tuesday	14/01/07	20.5	12.53
Wednesday	14/01/08	8.1	3.11
Thursday	14/01/09	27.1	13.65
Friday	14/01/10	22.2	3.48
Saturday	14/01/11	28.9	11.73
Sunday	14/01/12	31.9	11.92
Monday	14/01/13	28.4	11.00
Tuesday	14/01/14	30.9	13.38
Wednesday	14/01/15	24.9	11.92
Thursday	14/01/16	37.2	16.87
Friday	14/01/17	20.70	5.68
Saturday	14/01/18	79.86	17.24
Sunday	14/01/19	102.63	26.85
Monday	14/01/20	149.62	33.37
Tuesday	14/01/21	21.61	2.57
Average during reporting period		42.29	13.43
Average during calendar year (to date)		29.06	11.43

Table 26: PM_{10} and $PM_{2.5}$ data for Marsaxlokk station – Report 11

2.12.2. Birżebbuġa - PM_{10} and $PM_{2.5}$

Day	Date	PM_{10} (µg/m^3)	$PM_{2.5}$ (µg/m^3)
Tuesday	14/01/07	*N.V.*	*N.V.*
Wednesday	14/01/08	23.79	9.89
Thursday	14/01/09	18.33	8.87
Friday	14/01/10	19.40	7.69
Saturday	14/01/11	24.71	7.69
Sunday	14/01/12	22.70	6.41
Monday	14/01/13	22.70	9.52
Tuesday	14/01/14	12.45	11.90
Wednesday	14/01/15	21.41	9.34
Thursday	14/01/16	23.43	10.25
Friday	14/01/17	18.85	<1.83
Saturday	14/01/18	95.73	20.88
Sunday	14/01/19	99.94	27.64
Monday	14/01/20	150.25	32.96
Tuesday	14/01/21	10.25	9.88
Average during reporting period		40.28	13.30
Average during calendar year (to date)		23.86	9.79

Table 27: PM_{10} and $PM_{2.5}$ data for Birżebbuġa station – Report 11

2.12.3. Marsaxlokk – PM_{10}vs$PM_{2.5}$ histogram

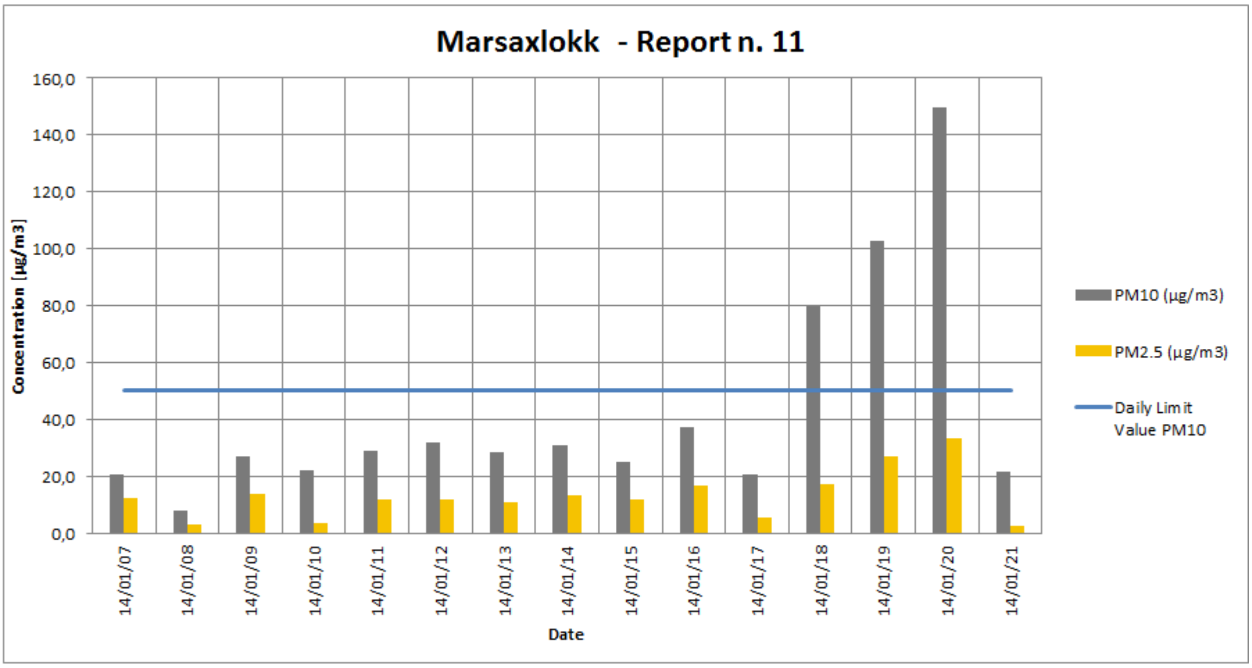


Figure 44: Marsaxlokk - PM_{10}vs$PM_{2.5}$ histogram plot – Report 11

2.12.4. Birżebbuġa – PM_{10}vs$PM_{2.5}$ histogram

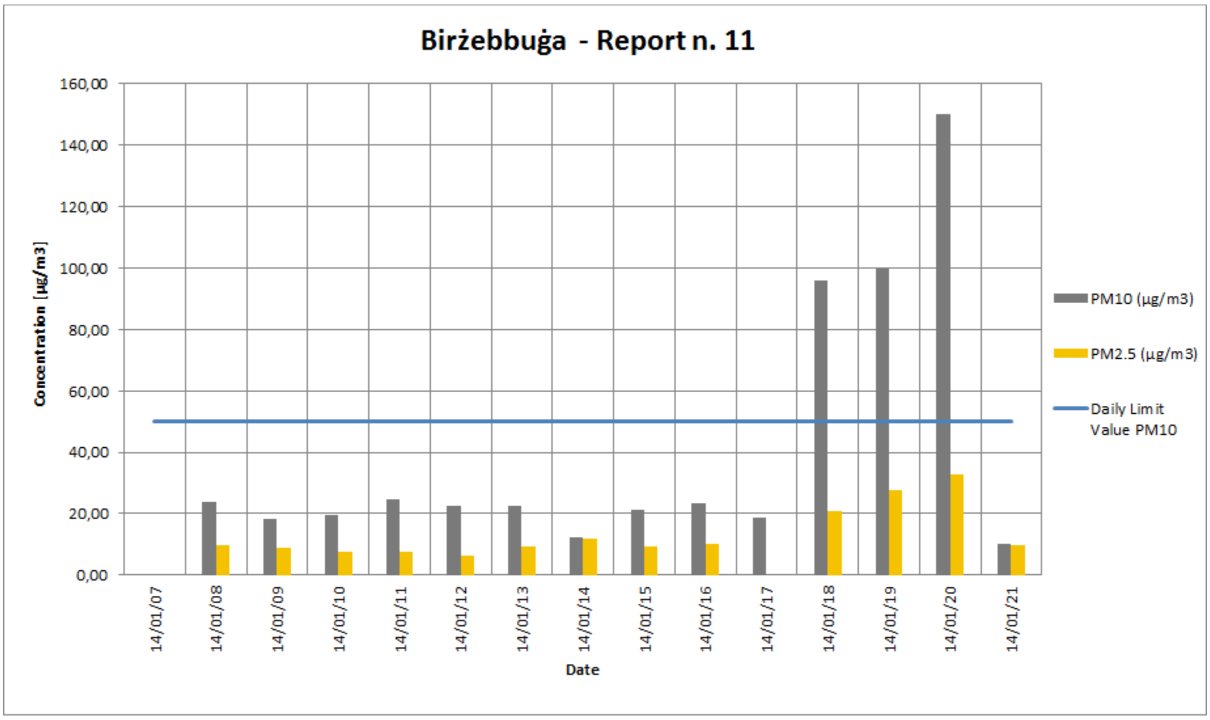


Figure 45: Birżebbuġa - PM_{10}vs$PM_{2.5}$ histogram plot – Report 11

2.12.5. PM_{10} comparison

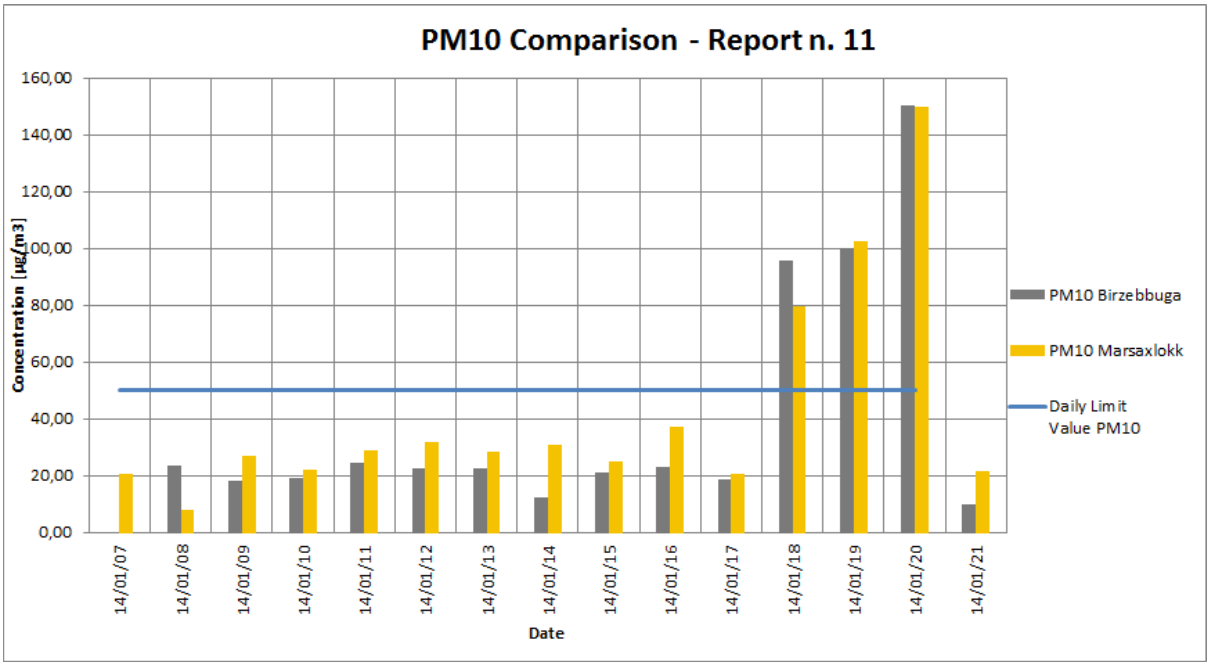


Figure 46: PM_{10} comparison - histogram plot – Report 11

2.12.6. $PM_{2.5}$ comparison

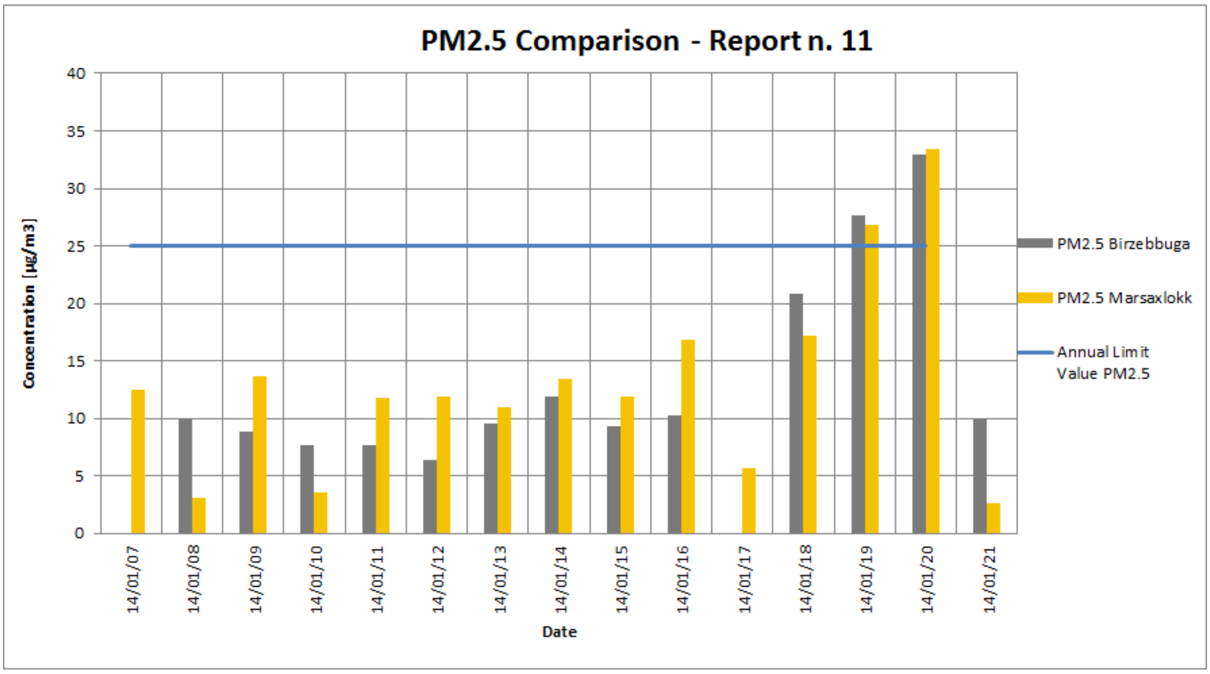


Figure 47: $PM_{2.5}$ comparison - histogram plot – Report 11

2.12.7. Quantification of African dust

The quantification of African dust has been determined only when exceedances of the daily limit value for PM_{10} were found. The method reported in paragraph 1.4 was applied, taking the data from the Għarb station (Note: the data from the Għarb station is still raw at this stage i.e. unverified data; should the verified data be different, revisions will be carried out), the following African dust loads were determined:

Days affected by African dust episodes	African dust load [μg/m^3]
2014/01/18	108.55
2014/01/19	88.81
2014/01/20	71.98

Table 28: Determination of the African dust load

By subtracting the African dust load from the PM_{10} concentrations recorded in Marsaxlokk and Birżebbuġa, one can determinwhen the exceedances are due to natural (adjusted value <50 μg/m^3) or anthropogenic (adjusted value >50 μg/m^3) origin. On the 18th January, the calculated African dust was 108.55 μg/m^3, on the 19th January, it was 88.81 μg/m^3 and on the 20th January, it was 71.98 μg/m^3. After adjusting the Marsaxlokk and Birżebbuġa values, the PM_{10} concentrations were below the daily limit value. Based on this, and on the analysis performed in section 0 it was assumed that on the 18th, 19th and 20th January, the final PM_{10} concentrations registered were affected by Saharan dust episodes.

Data	Adjusted value		Source	
	Marsaxlokk	Birżebbuġa	Marsaxlokk	Birżebbuġa
2014/01/18	7.88	23.75	Natural	Natural
2014/01/19	13.82	11.13	Natural	Natural
2014/01/20	41.07	41.70	Natural	Natural

Table 29: Determination of the source for PM_{10} exceedances

The following table reports the PM_{10} concentrations after subtracting Saharan dust contribution:

2.12.7.1. Marsaxlokk PM_{10}concentrations after subtracting Saharan dust contribution

Day	Date	PM_{10} (µg/m³)	$PM_{2.5}$ (µg/m³)
Tuesday	14/01/07	20.5	12.53
Wednesday	14/01/08	8.1	3.11
Thursday	14/01/09	27.1	13.65
Friday	14/01/10	22.2	3.48
Saturday	14/01/11	28.9	11.73
Sunday	14/01/12	31.9	11.92
Monday	14/01/13	28.4	11.00
Tuesday	14/01/14	30.9	13.38
Wednesday	14/01/15	24.9	11.92
Thursday	14/01/16	37.2	16.87
Friday	14/01/17	20.70	5.68
Saturday	14/01/18	7.88	17.24
Sunday	14/01/19	13.82	26.85
Monday	14/01/20	41.07	33.37
Tuesday	14/01/21	21.61	2.57
Average during reporting period		25.25	13.43
Average during calendar year (to date)		26.83	11.43

Table 30: PM_{10} adjusted values for Marsaxlokk station – Report 11

2.12.7.2. Birżebbuġa-PM_{10}concentrations after subtracting Saharan dust contribution

Day	Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)
Tuesday	14/01/07	N.V.	N.V.
Wednesday	14/01/08	23.79	9.89
Thursday	14/01/09	18.33	8.87
Friday	14/01/10	19.40	7.69
Saturday	14/01/11	24.71	7.69
Sunday	14/01/12	22.70	6.41
Monday	14/01/13	22.70	9.52
Tuesday	14/01/14	12.45	11.90
Wednesday	14/01/15	21.41	9.34
Thursday	14/01/16	23.43	10.25
Friday	14/01/17	18.85	<1.83
Saturday	14/01/18	23.75	20.88
Sunday	14/01/19	11.13	27.64
Monday	14/01/20	41.70	32.96
Tuesday	14/01/21	10.25	9.88
Average during reporting period		21.04	13.30
Average during calendar year (to date)		20.52	9.79

Table 31: PM_{10} adjusted values for Birżebbuġa station – Report 11

2.12.7.3. Marsaxlokk – PM_{10} concentration after substracting Saharan dust contribution

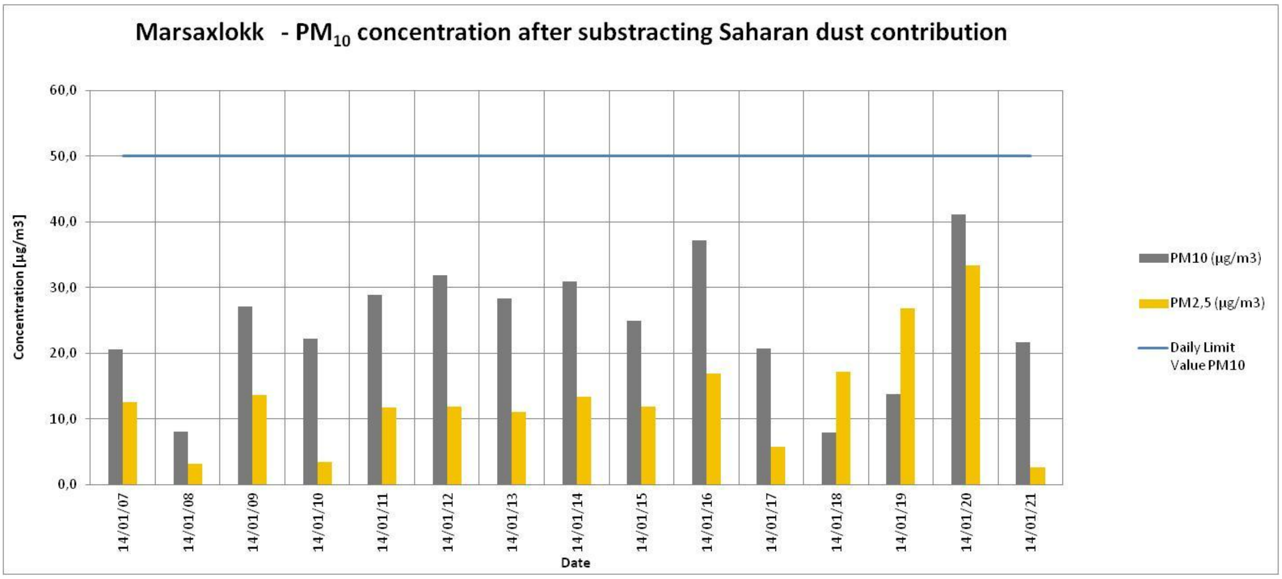


Figure 48: Marsaxlokk – PM_{10} concentrations after subtracting Saharan dust contribution

2.12.7.4. Birżebbuġa – PM_{10} concentration after substracting Saharan dust contribution

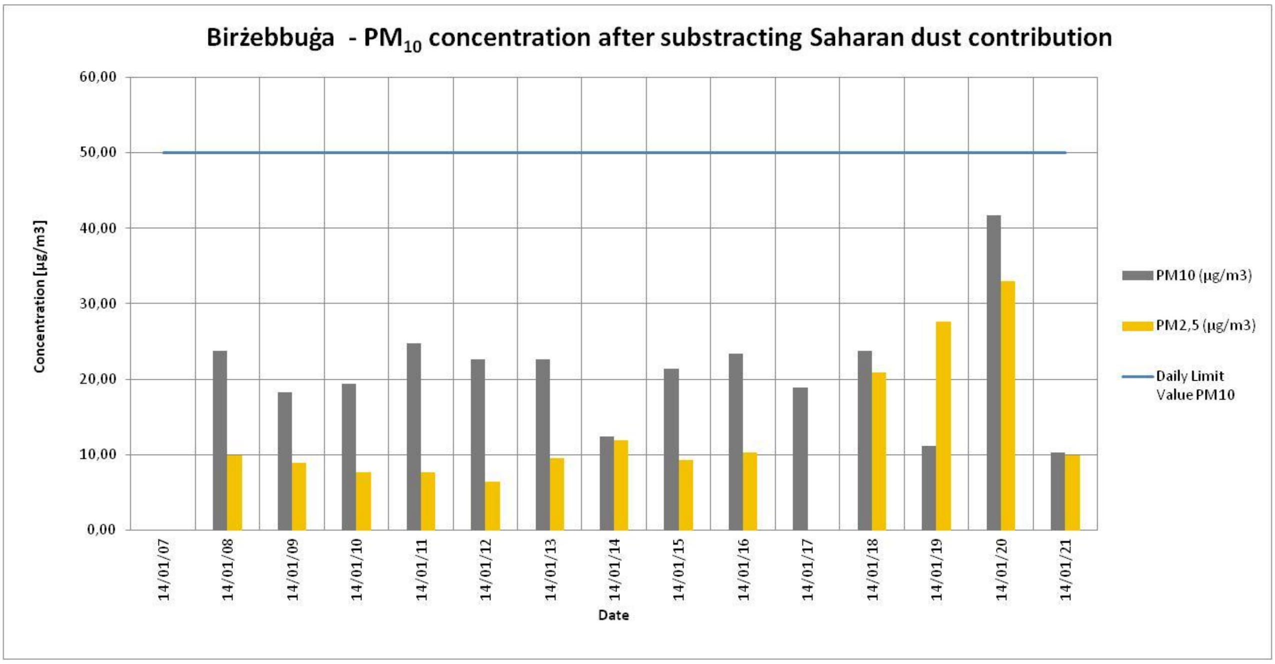


Figure 49: Birżebbuġa – PM_{10} concentrations after subtracting Saharan dust contribution

2.13. Report 12

The data period of this report is between the 22nd Janurary and the 5th February 2014 for an effective duration of 15 sampling days.

The results of this monitoring period are given in the next paragraphs, which are first presented in tabular format in the following order:

1. Marsaxlokk station: PM_{10} & $PM_{2.5}$;
2. Birżebbuġa station: PM_{10} & $PM_{2.5}$;

Then, a series of significant plot comparisons are reported:

- PM_{10} *vs* $PM_{2.5}$ at Marsaxlokk station;
- PM_{10} *vs* $PM_{2.5}$ at Birżebbuġa station;
- PM_{10} *vs* PM_{10};
- $PM_{2.5}$ *vs* $PM_{2.5}$.

2.13.1. Marsaxlokk - PM_{10} and $PM_{2.5}$

Day	Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)
Wednesday	14/01/22	23.10	7.55
Thursday	14/01/23	29.30	5.50
Friday	14/01/24	23.26	6.97
Saturday	14/01/25	17.02	7.52
Sunday	14/01/26	14.65	6.97
Monday	14/01/27	18.86	17.60
Tuesday	14/01/28	12.73	4.25
Wednesday	14/01/29	24.72	4.03
Thursday	14/01/30	64.46	15.41
Friday	14/01/31	127.61	44.20
Saturday	14/02/01	102.00	39.96
Sunday	14/02/02	26.37	1.83
Monday	14/02/03	21.43	6.41
Tuesday	14/02/04	28.57	17.05
Wednesday	14/02/05	21.24	5.68
Average during reporting period		37.02	12.73
Average during calendar year (to date)		27.65	11.61

Table 32: PM_{10} and $PM_{2.5}$ data for Marsaxlokk station – Report 12

2.13.2. Birżebbuġa - PM_{10} and $PM_{2.5}$

Day	Date	PM_{10} (µg/m³)	$PM_{2.5}$ (µg/m³)
Wednesday	14/01/22	19.24	6.64
Thursday	14/01/23	36.25	8.60
Friday	14/01/24	23.61	3.11
Saturday	14/01/25	17.39	1.83
Sunday	14/01/26	20.68	4.76
Monday	14/01/27	20.68	5.49
Tuesday	14/01/28	13.18	3.11
Wednesday	14/01/29	23.61	1.83
Thursday	14/01/30	74.88	14.65
Friday	14/01/31	144.19	32.77
Saturday	14/02/01	140.58	36.79
Sunday	14/02/02	40.94	7.38
Monday	14/02/03	5.31	5.31
Tuesday	14/02/04	24.71	6.04
Wednesday	14/02/05	16.10	6.64
Average during reporting period		41.42	9.66
Average during calendar year (to date)		23.72	9.71

Table 33: PM_{10} and $PM_{2.5}$ data for Birżebbuġa station – Report 12

2.13.3. Marsaxlokk – PM_{10}vs$PM_{2.5}$ histogram

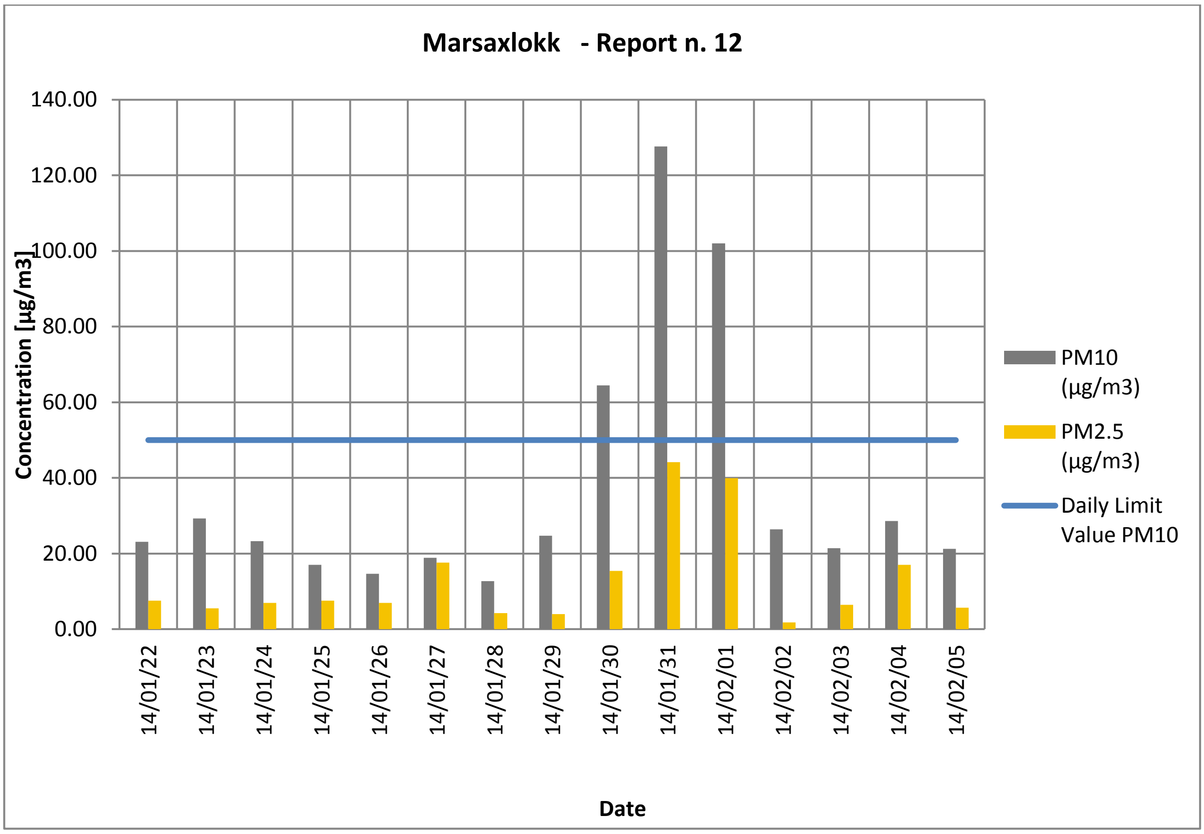


Figure 50: Marsaxlokk - PM_{10}vs$PM_{2.5}$ histogram plot – Report 12

2.13.4. Birżebbuġa – PM_{10}vs$PM_{2.5}$ histogram

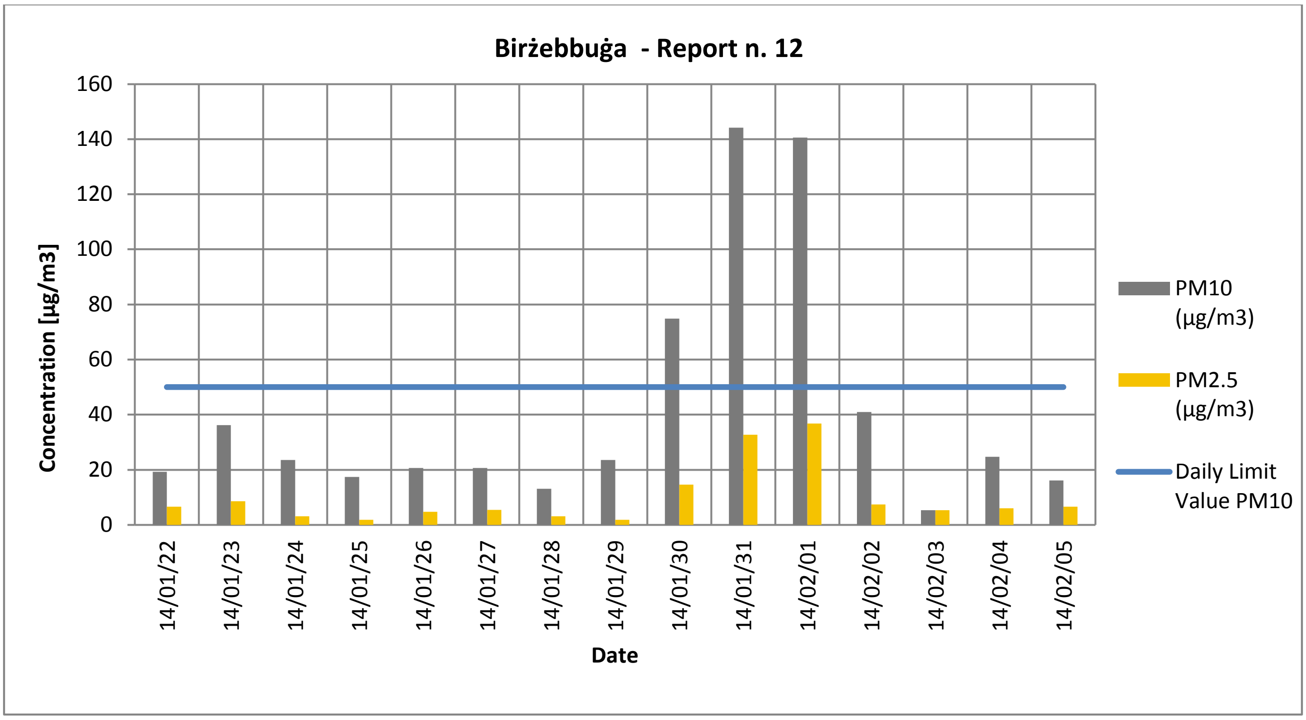


Figure 51: Birżebbuġa - PM_{10}vs$PM_{2.5}$ histogram plot – Report 12

2.13.5. PM_{10} comparison

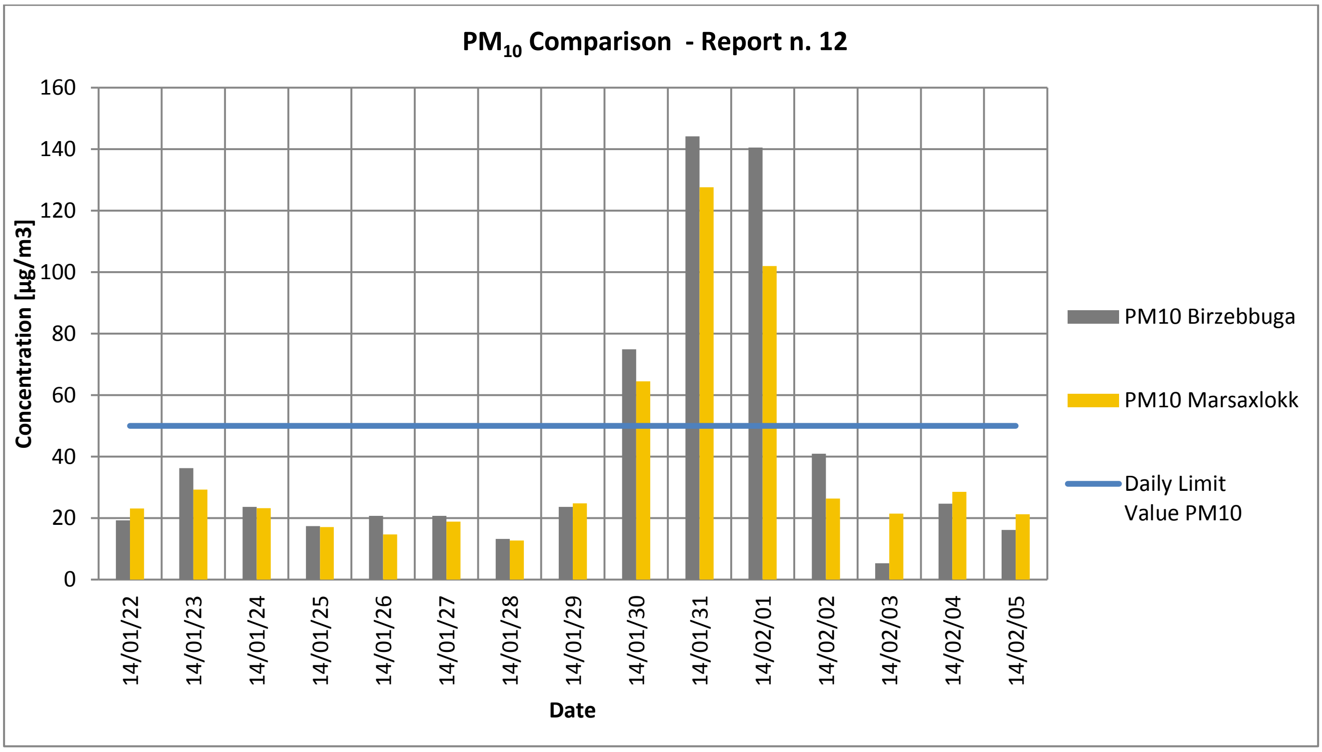


Figure 52: PM_{10} comparison - histogram plot – Report 12

2.13.6. $PM_{2.5}$ comparison

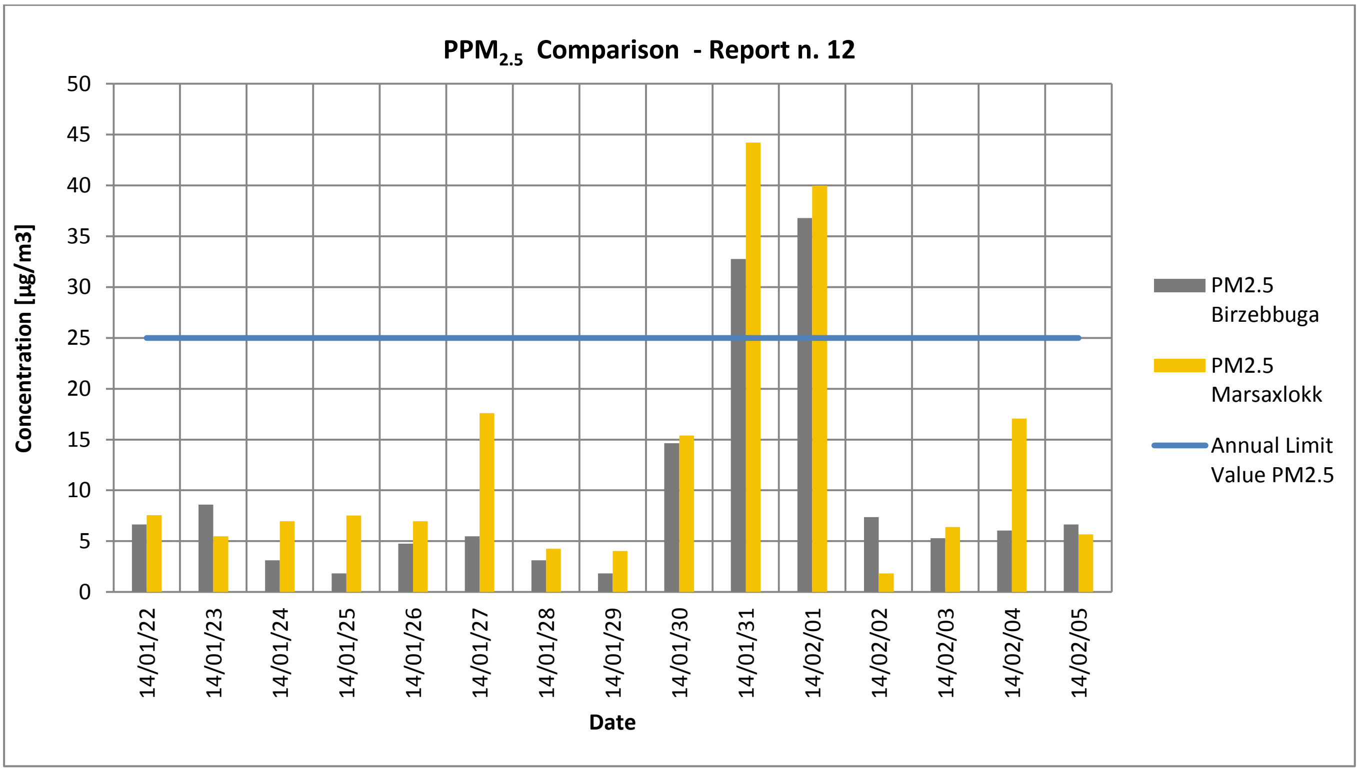


Figure 53: $PM_{2.5}$ comparison - histogram plot – Report 12

2.13.7. Quantification of African dust

The quantification of African dust has been determined only when exceedances of the daily limit value for PM_{10} were found. The method reported in paragraph 1.4 was applied, taking the data from the Għarb station (Note: the data from the Għarb station is still raw at this stage i.e. unverified data; should the verified data be different, revisions will be carried out), the following African dust loads were determined:

Days affected by African dust episodes	African dust load [μg/m^3]
2014/01/30	40.82
2014/01/31	81.95
2014/02/01	90.48

Table 34: Determination of the African dust load

By subtracting the African dust load from the PM_{10} concentrations recorded in Marsaxlokk and Birżebbuġa, one can determine when the exceedances are due to natural (adjusted value <50 μg/m^3) or anthropogenic (adjusted value >50 μg/m^3) origin.

On the 30th January, the calculated African dust was 40.82 μg/m^3, on the 31st January, it was 81.95 μg/m^3 and on the 1st February was 90.48 μg/m^3. After adjusting the values, the PM_{10} concentrations at Marsaxlokk on the 30th, 31st and 1st were below the daily limit value. Based on this, and on the analysis performed in section **Error! Reference source not found.** it was assumed that the final PM_{10} oncentrations registered on Marsaxlokk were affected by Saharan dust episodes.

In Birżebbuġa, after adjusting the values and after the analysis performed in section **Error! Reference ource not found.**, it could be concluded that on the 30th, the high concentration could be attributed to natural sources, on the 31st to natural, and to anthropogenic sources and finally, on the 1st February, due to natural sources, as it was considered that the exceedance on the daily limit value, 0.10 μg/m^3, was due to the instrinsict uncertainty of the measurement instruments.

Data	Adjusted value [μg/m^3]		Source	
	Marsaxlokk	Birżebbuġa	Marsaxlokk	Birżebbuġa
2014/01/30	23.64	34.07	Natural	Natural
2014/01/31	45.66	62.24	Natural	Natural/Anthropogenic
2014/02/01	11.52	50.10	Natural	Natural

Table 35: Determination of the source for PM_{10} exceedances

The following table reports the PM_{10} concentrations after subtracting Saharan dust contribution:

2.13.7.1. Marsaxlokk PM_{10}concentrations after subtracting Saharan dust contribution

Day	Date	PM_{10} (µg/m^3)	$PM_{2.5}$ (µg/m^3)
Wednesday	14/01/22	23.10	7.55
Thursday	14/01/23	29.30	5.50
Friday	14/01/24	23.26	6.97
Saturday	14/01/25	17.02	7.52
Sunday	14/01/26	14.65	6.97
Monday	14/01/27	18.86	17.60
Tuesday	14/01/28	12.73	4.25
Wednesday	14/01/29	24.72	4.03
Thursday	14/01/30	23.64	15.41
Friday	14/01/31	45.66	44.20
Saturday	14/02/01	11.52	39.96
Sunday	14/02/02	26.37	1.83
Monday	14/02/03	21.43	6.41
Tuesday	14/02/04	28.57	17.05
Wednesday	14/02/05	21.24	5.68
Average during reporting period		22.80	12.73
Average during calendar year (to date)		26.38	11.61

Table 36: PM_{10} adjusted values for Marsaxlokk station – Report 12

2.13.7.2. Birżebbuġa-PM_{10}concentrationsafter subtracting Saharan dust contribution

Day	Date	PM_{10} (µg/m^3)	$PM_{2.5}$ (µg/m^3)
Wednesday	14/01/22	19.24	6.64
Thursday	14/01/23	36.25	8.60
Friday	14/01/24	23.61	3.11
Saturday	14/01/25	17.39	1.83
Sunday	14/01/26	20.68	4.76
Monday	14/01/27	20.68	5.49
Tuesday	14/01/28	13.18	3.11
Wednesday	14/01/29	23.61	1.83
Thursday	14/01/30	34.07	14.65
Friday	14/01/31	62.24	32.77
Saturday	14/02/01	50.10	36.79
Sunday	14/02/02	40.94	7.38
Monday	14/02/03	5.31	5.31
Tuesday	14/02/04	24.71	6.04
Wednesday	14/02/05	16.10	6.64
Average during reporting period		27.21	9.66
Average during calendar year (to date)		21.55	9.71

Table 37: PM_{10} adjusted values for Birżebbuġa station – Report 12

2.13.7.3. Marsaxlokk – PM_{10} concentration after substracting Saharan dust contribution

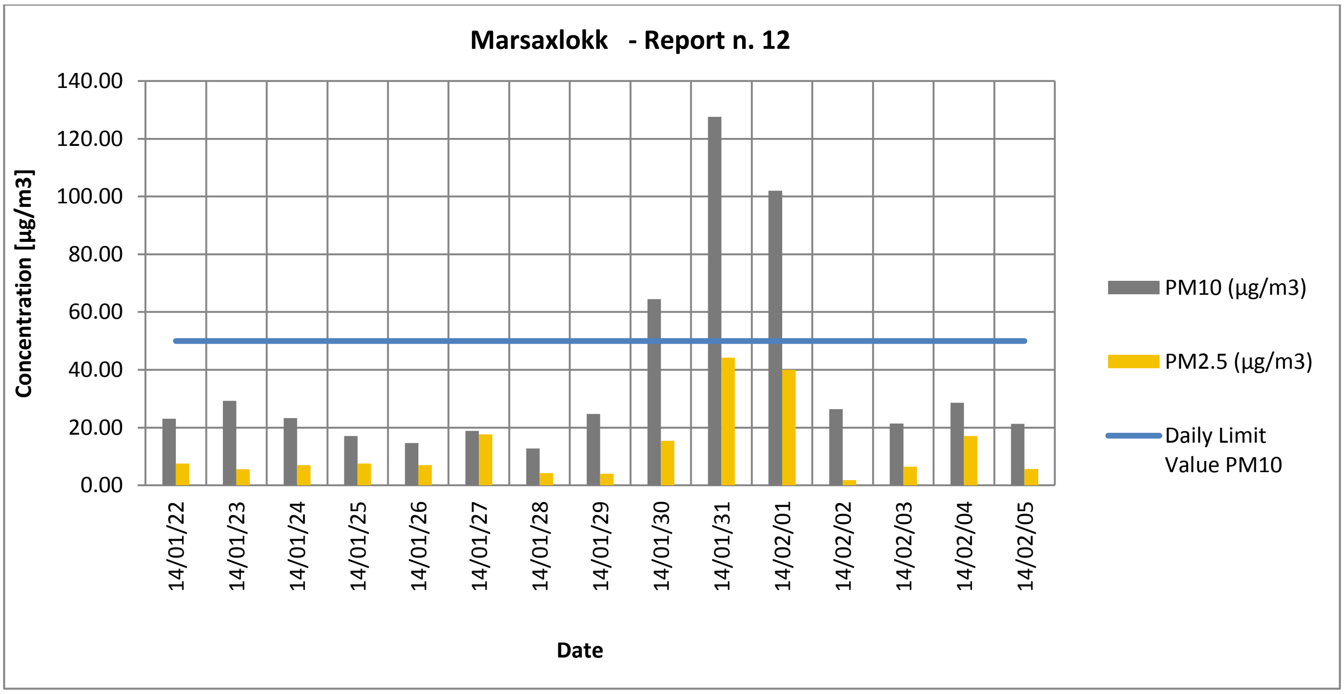


Figure 54: Marsaxlokk – PM_{10} concentrations after subtracting Saharan dust contribution

2.13.7.4. Birżebbuġa – PM_{10} concentration after substracting Saharan dust contribution

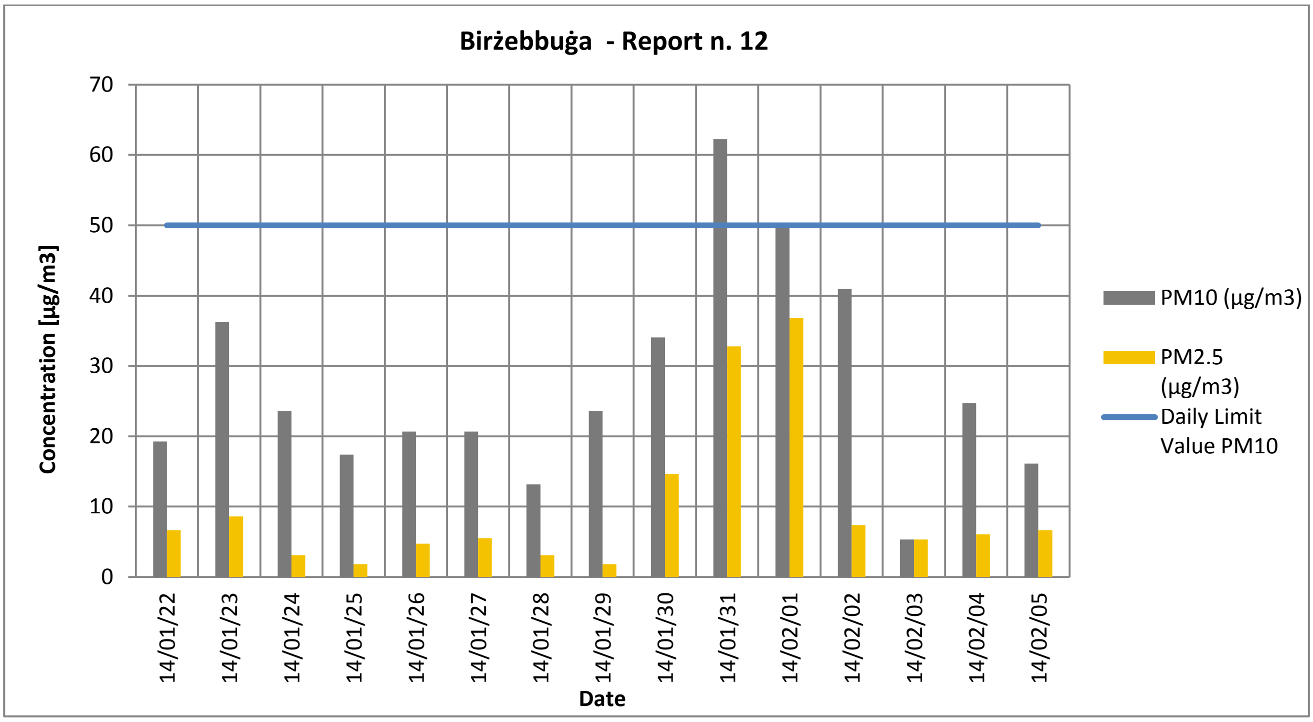


Figure 55: Birżebbuġa – PM_{10} concentrations after subtracting Saharan dust contribution

2.14. Report 13

The data period of this report is between the 7th and the 17th of February 2014 for an effective duration of 11 sampling days.

The results of this monitoring period are given in the next paragraphs, which are first presented in tabular format in the following order:

1. Marsaxlokk station: PM_{10} & $PM_{2.5}$;
2. Birżebbuġa station: PM_{10} & $PM_{2.5}$;

Then, a series of significant plot comparisons are reported:

- PM_{10} *vs* $PM_{2.5}$ at Marsaxlokk station;
- PM_{10} *vs* $PM_{2.5}$ at Birżebbuġa station;
- PM_{10} *vs* PM_{10};
- $PM_{2.5}$ *vs* $PM_{2.5}$.

2.14.1. Marsaxlokk - PM_{10} and $PM_{2.5}$

Day	Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)
Friday	14/02/07	26.54	9.89
Saturday	14/02/08	31.50	9.71
Sunday	14/02/09	35.72	*N.V.*[18]
Monday	14/02/10	66.12	*N.V.*
Tuesday	14/02/11	27.65	*N.V.*
Wednesday	14/02/12	21.79	*N.V.*
Thursday	14/02/13	29.48	*N.V.*
Friday	14/02/14	28.02	*N.V.*
Saturday	14/02/15	24.18	*N.V.*
Sunday	14/02/16	23.07	*N.V.*
Monday	14/02/17	16.12	*N.V.*
Average during reporting period		30.02	9.80
Average during calendar year (to date)		29.96	11.58

Table 38: PM_{10} and $PM_{2.5}$ data for Marsaxlokk station – Report 13

[18] *Non valid* data due to power interruption. The same reason applicable to the rest of *Non Valid* data for $PM_{2.5}$

2.14.2. Birżebbuġa - PM_{10} and $PM_{2.5}$

Day	Date	PM_{10} (µg/m³)	$PM_{2.5}$ (µg/m³)
Friday	14/02/07	21.78	5.49
Saturday	14/02/08	25.99	9.15
Sunday	14/02/09	35.87	11.90
Monday	14/02/10	61.67	14.64
Tuesday	14/02/11	27.09	10.98
Wednesday	14/02/12	25.80	7.50
Thursday	14/02/13	25.07	2.93
Friday	14/02/14	24.52	10.06
Saturday	14/02/15	24.52	9.70
Sunday	14/02/16	26.54	9.70
Monday	14/02/17	26.17	8.60
Average during reporting period		29.55	9.15
Average during calendar year (to date)		26.76	9.67

Table 39: PM_{10} and $PM_{2.5}$ data for Birżebbuġa station – Report 13

2.14.3. Marsaxlokk – PM_{10}vs$PM_{2.5}$ histogram

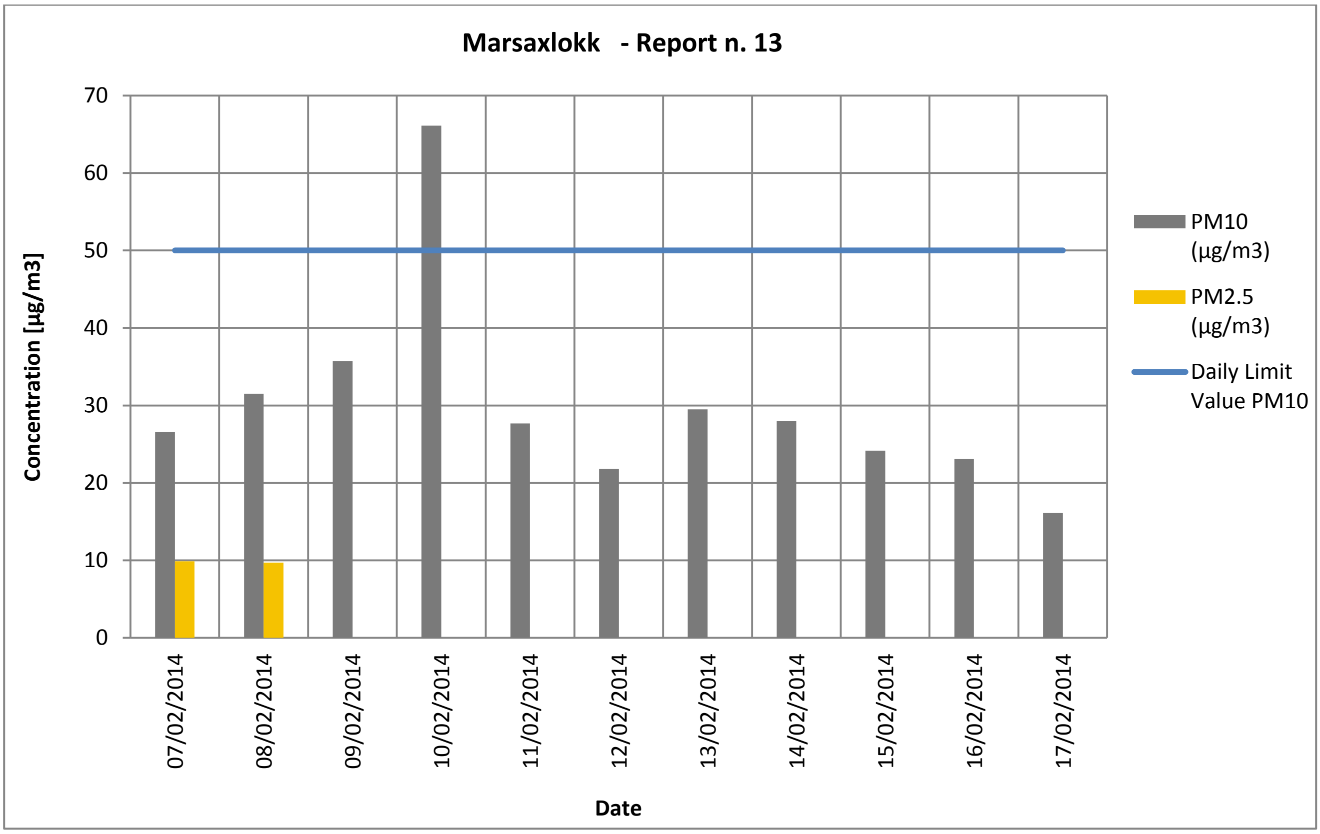


Figure 56: Marsaxlokk - PM_{10}vs$PM_{2.5}$ histogram plot – Report 13

2.14.4. Birżebbuġa – PM_{10}vs$PM_{2.5}$ histogram

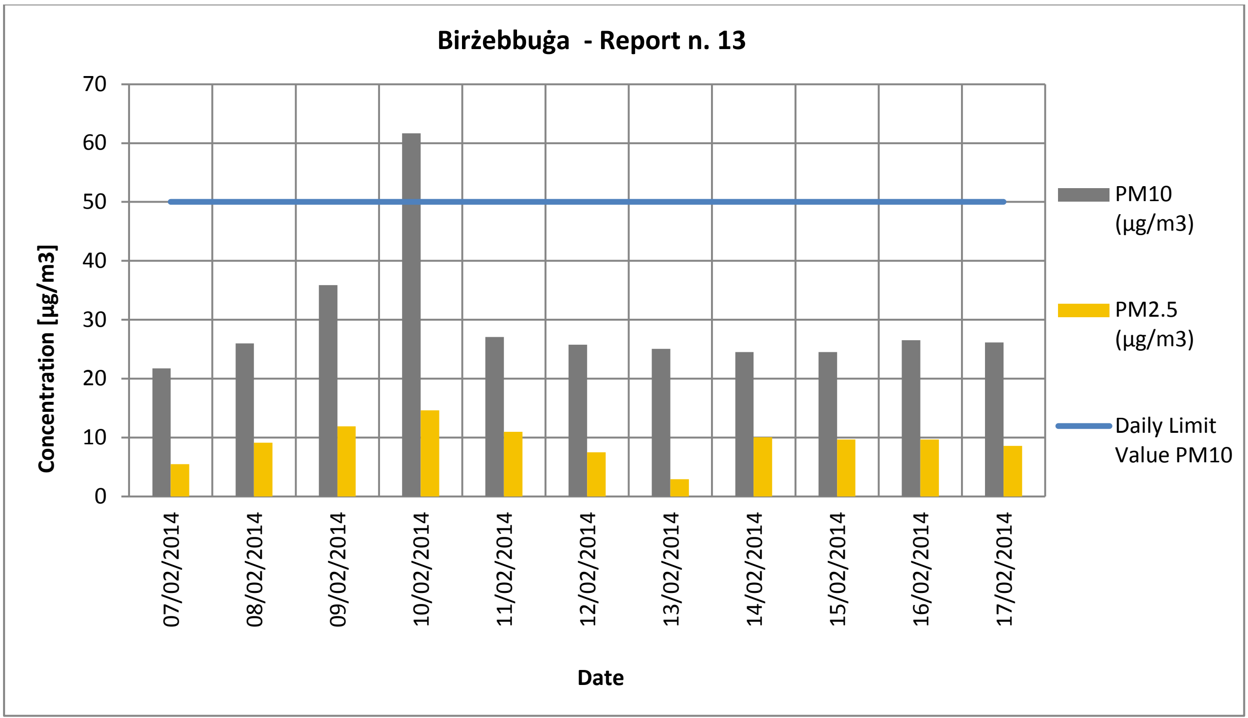


Figure 57: Birżebbuġa - PM_{10}vs$PM_{2.5}$ histogram plot – Report 13

2.14.5. PM_{10} comparison

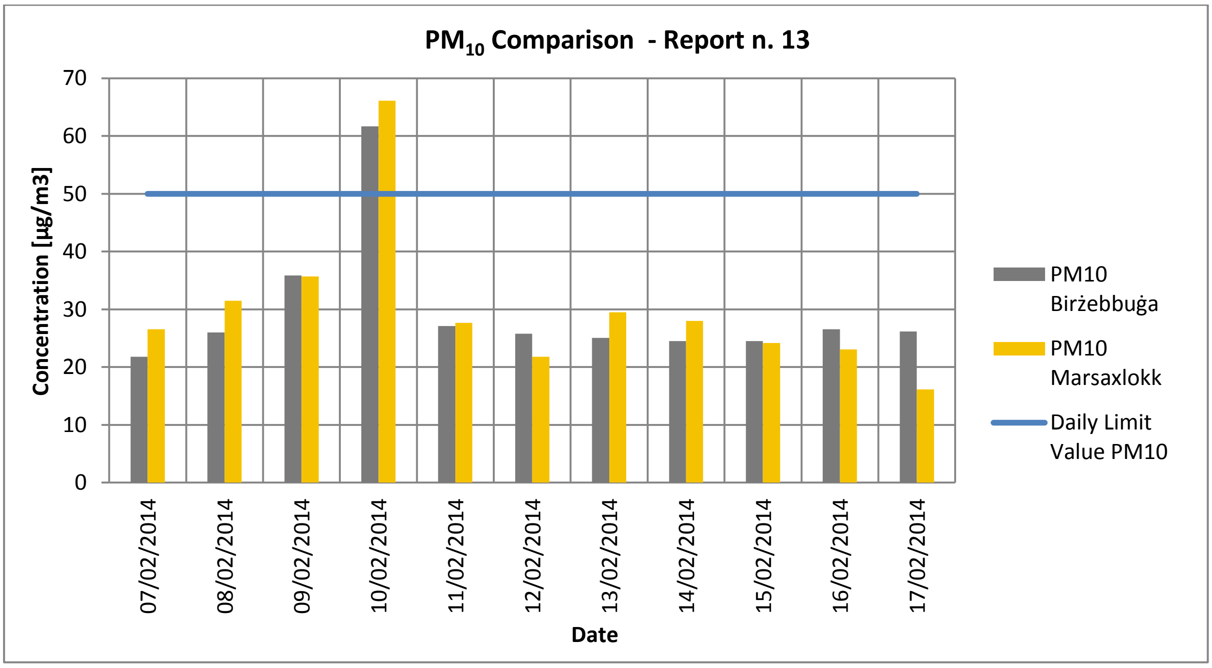


Figure 58: PM_{10} comparison - histogram plot – Report 13

2.14.6. $PM_{2.5}$ comparison

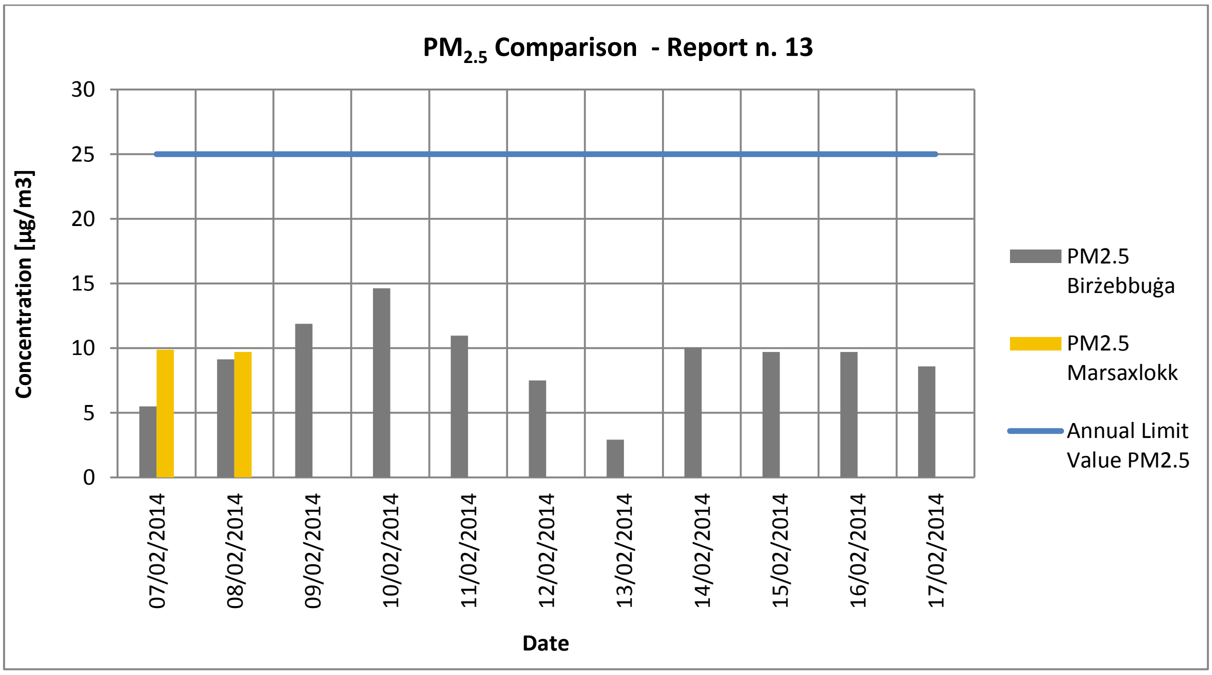


Figure 59: $PM_{2.5}$ comparison - histogram plot – Report 13

2.14.7. Quantification of African dust

The quantification of African dust has been determined only when exceedances of the daily limit value for PM_{10} were found. The method reported in paragraph 1.4 was applied, taking the data from the Għarb station (Note: the data from the Għarb station is still raw at this stage i.e. unverified data; should the verified data be different, revisions will be carried out), the following African dust loads were determined:

Days affected by African dust episodes	African dust load [µg/m^3]
2014/02/10	9.25

Table 40: Determination of the African dust load

By subtracting the African dust load from the PM_{10} concentrations recorded in Marsaxlokk and Birżebbuġa, one can determine when the exceedances are due to natural (adjusted value <50 µg/m^3) or anthropogenic (adjusted value >50 µg/m^3) origin.

On the 10th February, the calculated African dust was 9.25 µg/m^3. After adjusting the values, the PM_{10} concentrations at Marsaxlokk and Birżebbuġa on the 10th February were still above the daily limit value. Based on this, and on the analysis performed in section 2.23 it was assumed that the final PM_{10} concentrations registered on Marsaxlokk were affected by Saharan dust episodes.

Data	Adjusted value [µg/m^3]		Source	
	Marsaxlokk	Birżebbuġa	Marsaxlokk	Birżebbuġa
2014/02/10	56.87	52.42	Natural/Anthropogenic	Natural/Anthropogenic

Table 41: Determination of the source for PM_{10} exceedances

The following table reports the PM_{10} concentrations after subtracting Saharan dust contribution:

2.14.7.1. Marsaxlokk PM_{10}concentrations after subtracting Saharan dust contribution

Day	Date	PM_{10} (µg/m³)	$PM_{2.5}$ (µg/m³)
Friday	14/02/07	26.54	9.89
Saturday	14/02/08	31.50	9.71
Sunday	14/02/09	35.72	*N.V.*[19]
Monday	14/02/10	56.87	*N.V.*
Tuesday	14/02/11	27.65	*N.V.*
Wednesday	14/02/12	21.79	*N.V.*
Thursday	14/02/13	29.48	*N.V.*
Friday	14/02/14	28.02	*N.V.*
Saturday	14/02/15	24.18	*N.V.*
Sunday	14/02/16	23.07	*N.V.*
Monday	14/02/17	16.12	*N.V.*
Average during reporting period		29.18	9.80
Average during calendar year (to date)		26.59	11.58

Table 42: PM_{10} adjusted values for Marsaxlokk station – Report 13

[19] *Non valid* data due to power interruption. The same reason applicable to the rest of *Non Valid* data for $PM_{2.5}$

2.14.7.2. Birżebbuġa-PM_{10}concentrationsafter subtracting Saharan dust contribution

Day	Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)
Friday	14/02/07	21.78	5.49
Saturday	14/02/08	25.99	9.15
Sunday	14/02/09	35.87	11.90
Monday	14/02/10	52.42	14.64
Tuesday	14/02/11	27.09	10.98
Wednesday	14/02/12	25.80	7.50
Thursday	14/02/13	25.07	2.93
Friday	14/02/14	24.52	10.06
Saturday	14/02/15	24.52	9.70
Sunday	14/02/16	26.54	9.70
Monday	14/02/17	26.17	8.60
Average during reporting period		28.71	9.15
Average during calendar year (to date)		22.27	9.67

Table 43: PM_{10} adjusted values for Birżebbuġa station – Report 13

2.14.7.3. *Marsaxlokk – PM_{10} concentration after substracting Saharan dust contribution*

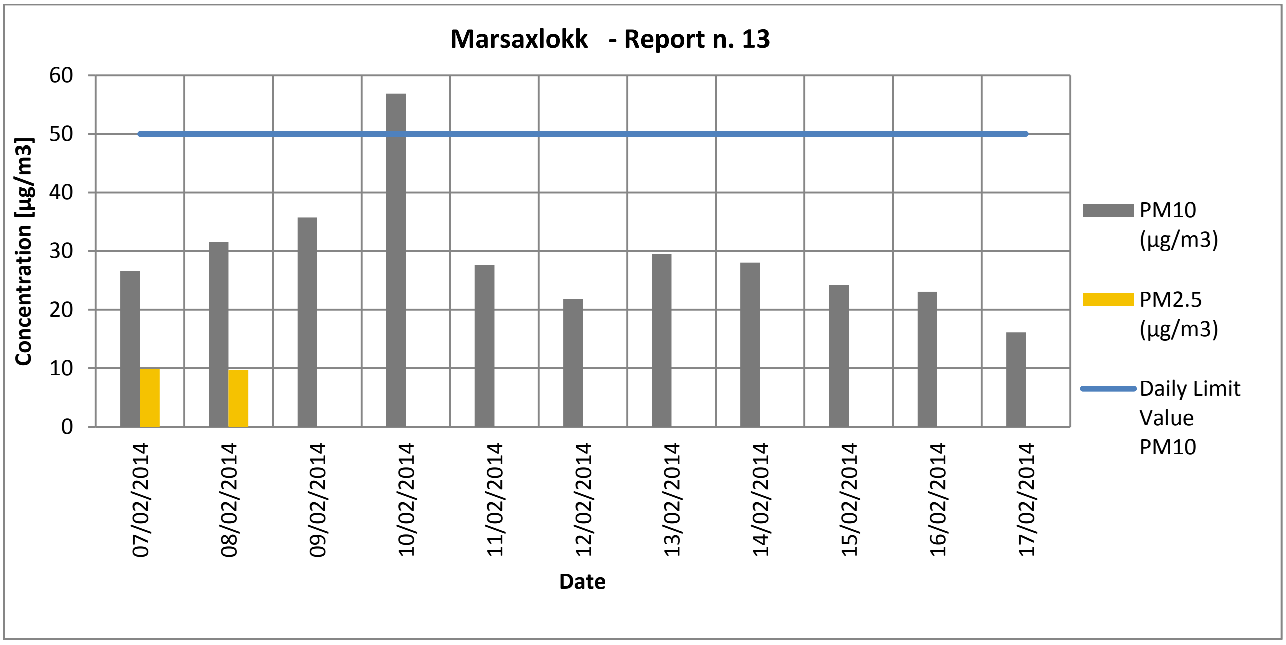


Figure 60: Marsaxlokk – PM_{10} concentrations after subtracting Saharan dust contribution

2.14.7.4. *Birżebbuġa – PM_{10} concentration after substracting Saharan dust contribution*

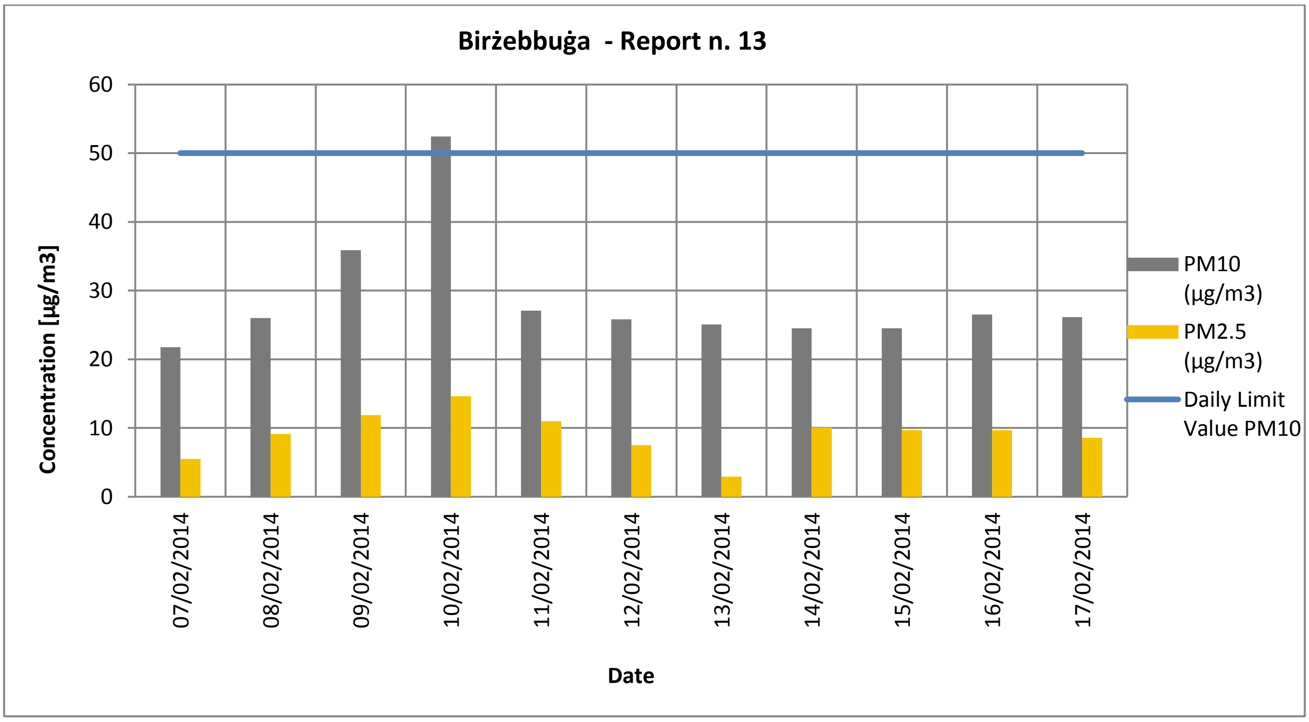


Figure 61: Birżebbuġa – PM_{10} concentrations after subtracting Saharan dust contribution

2.15. Report 14

The data period of this report is between the 18th February and the 4th March 2014 for an effective duration of 15 sampling days.

The results of this monitoring period are given in the next paragraphs, which are first presented in tabular format in the following order:

1. Marsaxlokk station: PM_{10} & $PM_{2.5}$;
2. Birżebbuġa station: PM_{10} & $PM_{2.5}$;

Then, a series of significant plot comparisons are reported:

- PM_{10} *vs* $PM_{2.5}$ at Marsaxlokk station;
- PM_{10} *vs* $PM_{2.5}$ at Birżebbuġa station;
- PM_{10} *vs* PM_{10};
- $PM_{2.5}$ *vs* $PM_{2.5}$;

2.15.1. Marsaxlokk - PM_{10} and $PM_{2.5}$

Day	Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)
Tuesday	14/02/18	*N.A.*[20]	*N.A.*
Wednesday	14/02/19	*N.A.*	*N.A.*
Thursday	14/02/20	53.29	16.86
Friday	14/02/21	46.71	15.94
Saturday	14/02/22	35.04	13.74
Sunday	14/02/23	49.64	12.64
Monday	14/02/24	27.19	10.45
Tuesday	14/02/25	29.93	12.46
Wednesday	14/02/26	29.20	11.00
Thursday	14/02/27	16.24	8.25
Friday	14/02/28	17.71	9.16
Saturday	14/03/01	15.69	15.39
Sunday	14/03/02	18.43	9.89
Monday	14/03/03	15.33	7.51
Tuesday	14/03/04	22.26	8.06
Average during reporting period		28.97	11.64
Average during calendar year (to date)		26.79	11.58

Table 44: PM_{10} and $PM_{2.5}$ data for Marsaxlokk station – Report 14

[20] Non Available due to maintenance operations carried out on the instrument. Same reason applicable to the rest of the *N.A.* data

2.15.2. Birżebbuġa - PM_{10} and $PM_{2.5}$

Day	Date	PM_{10} (μg/m^3)	$PM_{2.5}$ (μg/m^3)
Tuesday	14/02/18	*N.A.*[21]	*N.A.*
Wednesday	14/02/19	*N.A.*	*N.A.*
Thursday	14/02/20	58.38	21.42
Friday	14/02/21	53.44	16.11
Saturday	14/02/22	32.76	12.45
Sunday	14/02/23	26.35	12.45
Monday	14/02/24	8.42	8.24
Tuesday	14/02/25	21.96	8.42
Wednesday	14/02/26	18.49	8.60
Thursday	14/02/27	18.12	6.04
Friday	14/02/28	16.10	10.07
Saturday	14/03/01	23.98	13.73
Sunday	14/03/02	17.02	6.22
Monday	14/03/03	13.73	4.94
Tuesday	14/03/04	19.77	6.96
Average during reporting period		27.80	11.75
Average during calendar year (to date)		22.59	9.73

Table 45: PM_{10} and $PM_{2.5}$ data for Birżebbuġa station – Report 14

[21]Non Available due to maintenance operations carried out on the instrument. Same reason applicable to the rest of the *N.A.* data

2.15.3. Marsaxlokk – PM_{10}vs$PM_{2.5}$ histogram

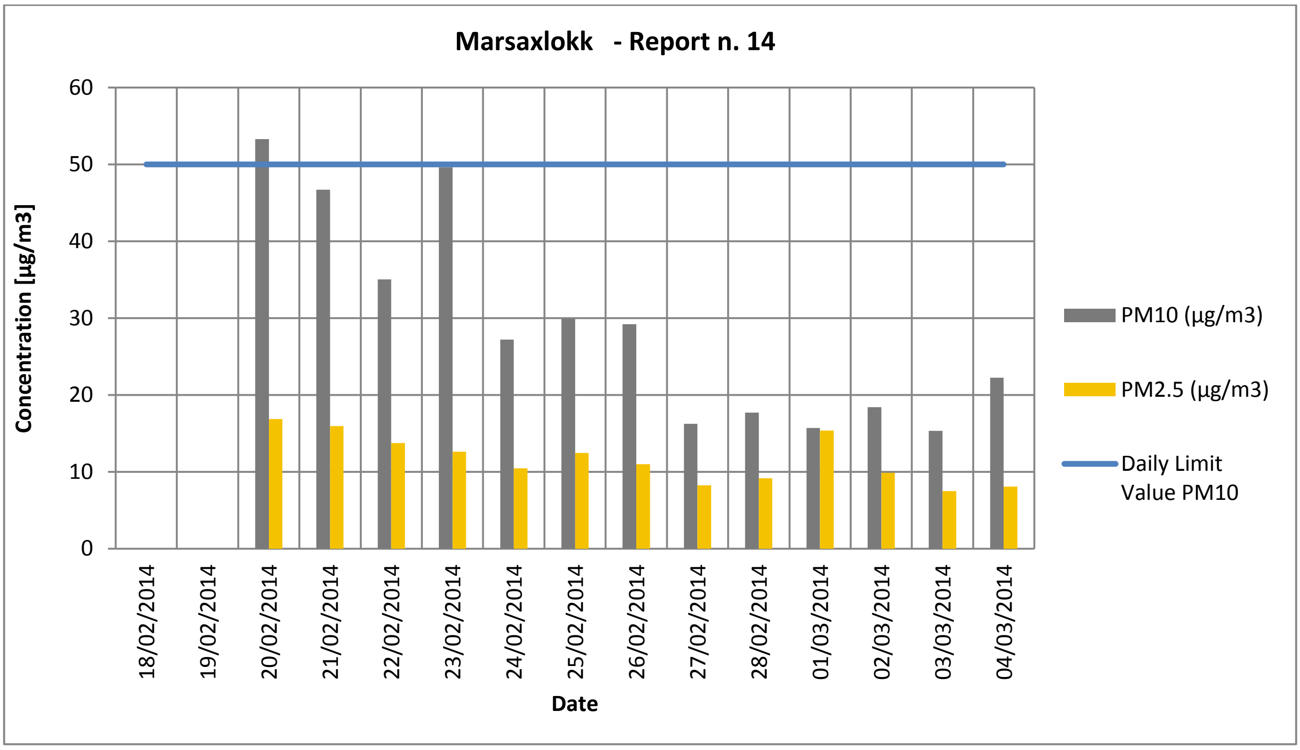


Figure 62: Marsaxlokk - PM_{10}vs$PM_{2.5}$ histogram plot – Report 14

2.15.4. Birżebbuġa – PM_{10}vs$PM_{2.5}$ histogram

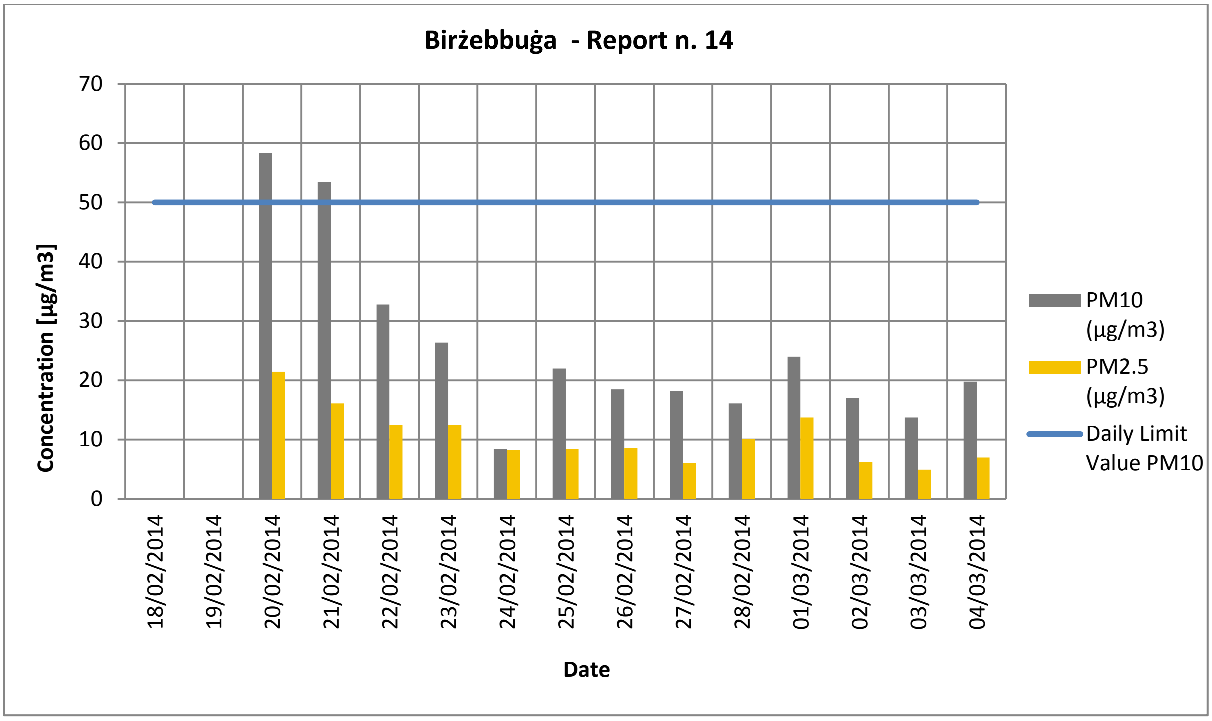


Figure 63: Birżebbuġa - PM_{10}vs$PM_{2.5}$ histogram plot – Report 14

2.15.5. PM_{10} comparison

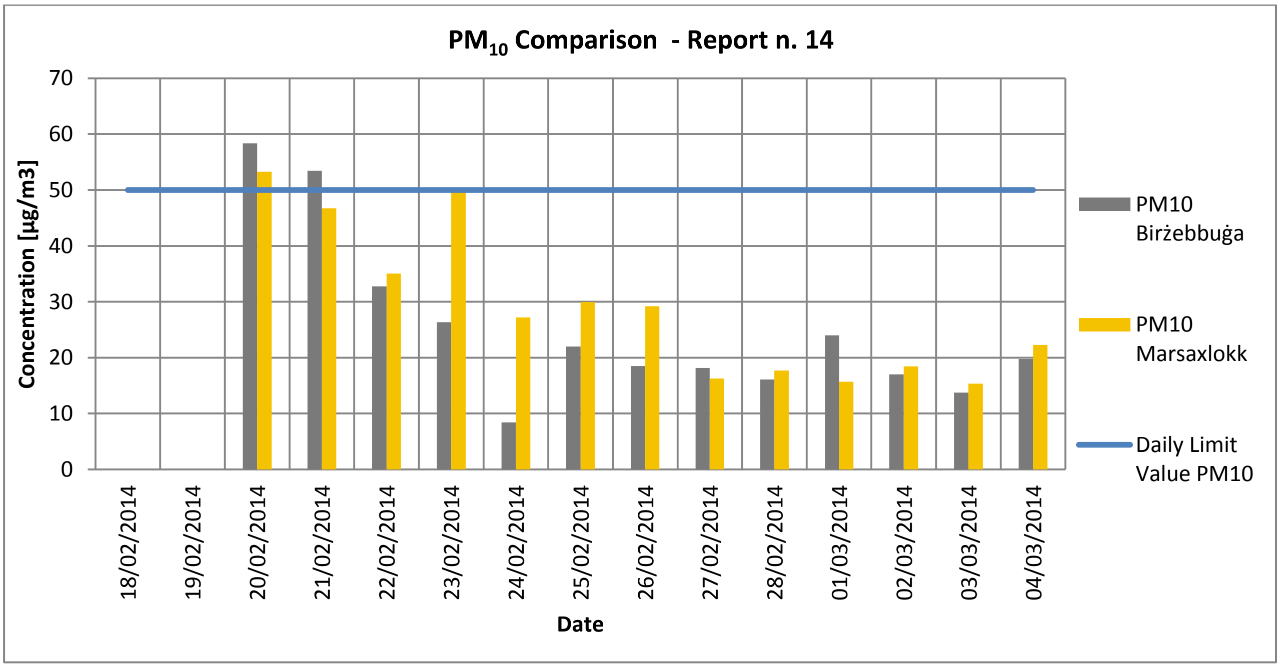


Figure 64: PM_{10} comparison - histogram plot – Report 14

2.15.6. $PM_{2.5}$ comparison

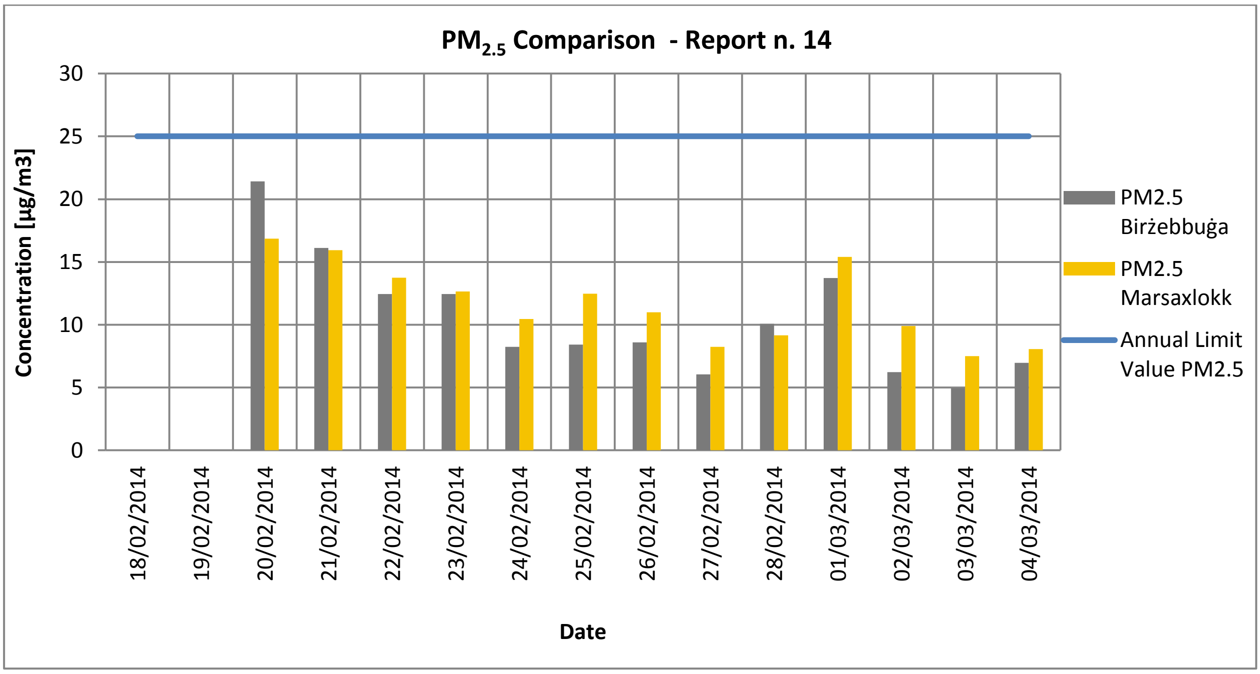


Figure 65: $PM_{2.5}$ comparison - histogram plot – Report 14

2.15.7. Quantification of African dust

The quantification of African dust has been determined only when exceedances of the daily limit value for PM_{10} were found. The method reported in paragraph 1.4 was applied, taking the data from the Għarb station (Note: the data from the Għarb station is still raw at this stage i.e. unverified data; should the verified data be different, revisions will be carried out), the following African dust loads were determined:

Days affected by African dust episodes	African dust load [µg/m^3]
2014/02/20	4.36
2014/02/21	4.36

Table 46: Determination of the African dust load

By subtracting the African dust load from the PM_{10} concentrations recorded in Marsaxlokk and Birżebbuġa, one can determine when the exceedances are due to natural (adjusted value <50 µg/m^3) or anthropogenic (adjusted value >50 µg/m^3) origin.

On the 20th February, the calculated African dust was 4.36 µg/m^3. As the data from the Għarb station was not available for the 21st February, the same African dust load of the previous day was taken into consideration. After adjusting the values, the PM_{10} concentrations at Marsaxlokk on the 20th February and in Birżebbuġa on the 21st February, were below the daily limit value. Based on this, and on the analysis performed in section 2.15.7, it was assumed that final PM_{10} concentrations registered were affected by Saharan dust episodes.

In Birżebbuġa on the 20th February, the PM_{10} concentration was still above the daily limit value after adjusting the values. Nevetherless, based on the analysis performed in section **Error! Reference source ot found.** and the instrinsict uncertainty of the measuring instruments, it was concluded that the final values could be attributed to natural sources as well.

Data	Adjusted value [µg/m^3]		Source	
	Marsaxlokk	Birżebbuġa	Marsaxlokk	Birżebbuġa
2014/02/20	48.93	53.64	Natural	Natural
2014/02/21		49.08		Natural

Table 47: Determination of the source for PM_{10} exceedances

The following table reports the PM_{10} concentration after subtracting Saharan dust contribution:

2.15.7.1. Marsaxlokk PM_{10} concentration after subtracting Saharan dust contribution

Day	Date	PM_{10} (µg/m^3)	$PM_{2.5}$ (µg/m^3)
Tuesday	14/02/18	*N.A.*[22]	*N.A.*
Wednesday	14/02/19	*N.A.*	*N.A.*
Thursday	14/02/20	48.93	16.86
Friday	14/02/21	46.71	15.94
Saturday	14/02/22	35.04	13.74
Sunday	14/02/23	49.64	12.64
Monday	14/02/24	27.19	10.45
Tuesday	14/02/25	29.93	12.46
Wednesday	14/02/26	29.20	11.00
Thursday	14/02/27	16.24	8.25
Friday	14/02/28	17.71	9.16
Saturday	14/03/01	15.69	15.39
Sunday	14/03/02	18.43	9.89
Monday	14/03/03	15.33	7.51
Tuesday	14/03/04	22.26	8.06
Average during reporting period		28.64	11.64
Average during calendar year (to date)		26.76	11.58

Table 48: PM_{10} adjusted values for Marsaxlokk station – Report 14

[22]Non Available due to maintenance operations carried out on the instrument. Same reason applicable to the rest of the *N.A.* data

2.15.7.2. Birżebbuġa-PM_{10} concentration after subtracting Saharan dust contribution

Day	Date	PM_{10} (μg/m^3)	$PM_{2.5}$ (μg/m^3)
Tuesday	14/02/18	*N.A.*[23]	*N.A.*
Wednesday	14/02/19	*N.A.*	*N.A.*
Thursday	14/02/20	53.64	21.42
Friday	14/02/21	49.08	16.11
Saturday	14/02/22	32.76	12.45
Sunday	14/02/23	26.35	12.45
Monday	14/02/24	8.42	8.24
Tuesday	14/02/25	21.96	8.42
Wednesday	14/02/26	18.49	8.60
Thursday	14/02/27	18.12	6.04
Friday	14/02/28	16.10	10.07
Saturday	14/03/01	23.98	13.73
Sunday	14/03/02	17.02	6.22
Monday	14/03/03	13.73	4.94
Tuesday	14/03/04	19.77	6.96
Average during reporting period		26.89	11.75
Average during calendar year (to date)		22.51	9.73

Table 49: PM_{10} adjusted values for Birżebbuġa station – Report 14

[23]Non Available due to maintenance operations carried out on the instrument. Same reason applicable to the rest of the *N.A.* data

2.15.7.3. Marsaxlokk – PM_{10} concentration after substracting Saharan dust contribution

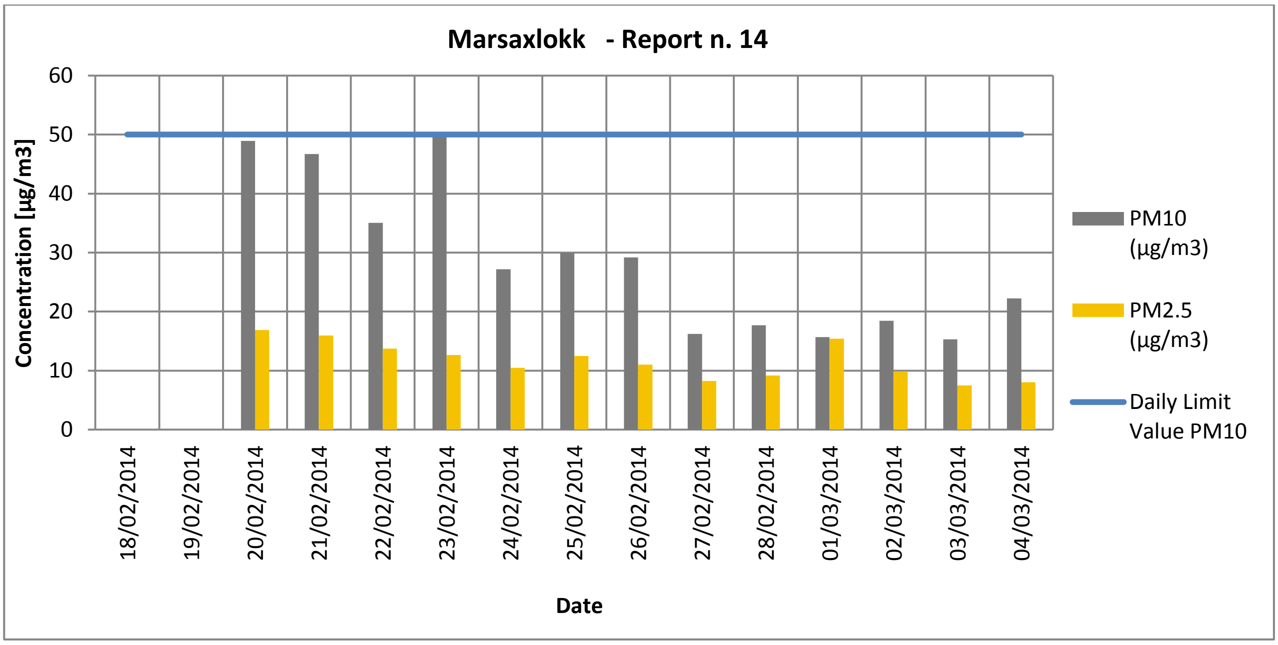


Figure 66: Marsaxlokk – PM_{10} concentrations after subtracting Saharan dust contribution

2.15.7.4. Birżebbuġa – PM_{10} concentration after substracting Saharan dust contribution

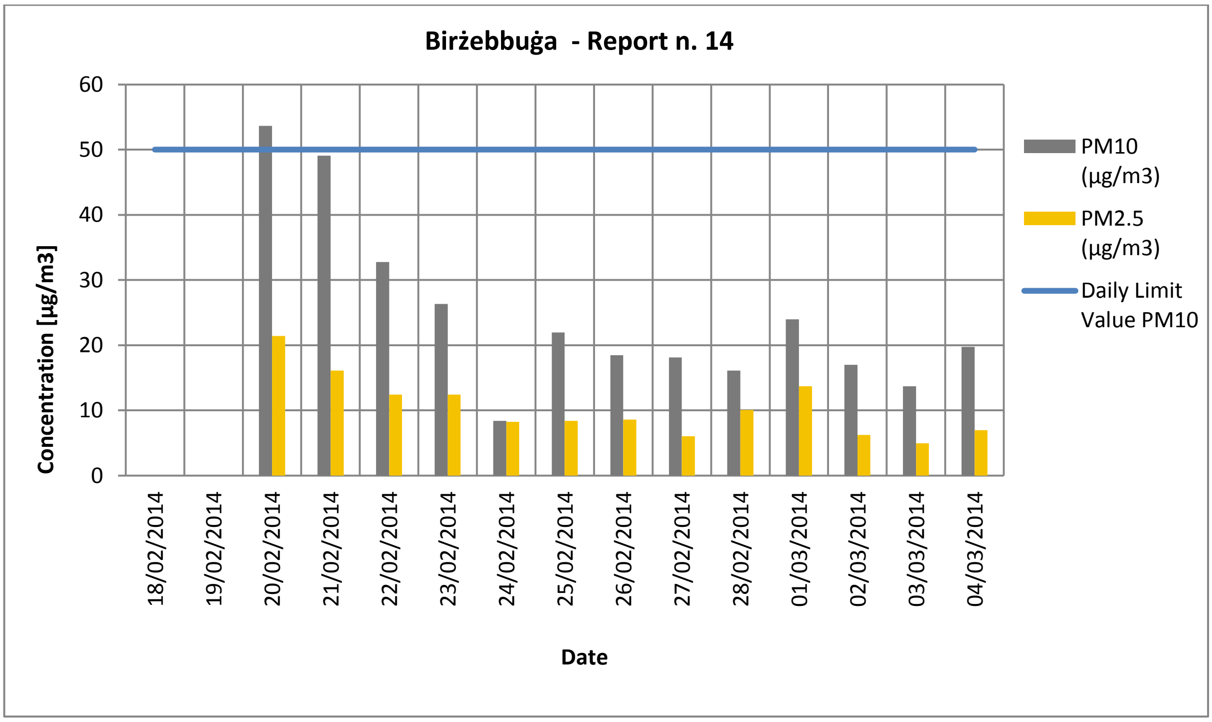


Figure 67: Birżebbuġa – PM_{10} concentrations after subtracting Saharan dust contribution

2.16. Metal Analysis

Metal analysis followed the procedures described in earlier sections. The limit values for Arsenic, Cadmium, Nickel and Lead listed in the table below are annual limit values according to the L.N. 478/2010. Therefore the interpretation of the results achieved from the analysis of metals will be drawn up following the completion of the monitoring program which spans over one calendar year.

2.16.1. February 2014

2.16.1.1. Marsaxlokk Metals

Day	Date	Arsenic	Cadmium	Nickel	Lead	Vanadium
		ng/mc	ng/mc	ng/mc	ng/mc	ng/mc
Saturday	01/02/2014	<1.83	<1.83	9.16	3.66	12.82
Sunday	02/02/2014	<1.83	<1.83	3.66	7.33	3.66
Monday	03/02/2014	<1.83	<1.83	1.83	3.66	1.83
Tuesday	04/02/2014	<1.83	<1.83	1.83	3.66	1.83
Wednesday	05/02/2014	<1.83	<1.83	1.83	5.49	3.66
Thursday	06/02/2014					
Friday	07/02/2014	<1.83	<1.83	1.83	5.49	1.83
Saturday	08/02/2014	<1.83	<1.83	3.66	3.66	5.49
Sunday	09/02/2014	<1.83	<1.83	1.83	3.66	3.66
Monday	10/02/2014	<1.83	<1.83	5.49	9.15	10.98
Tuesday	11/02/2014	<1.83	<1.83	7.32	3.66	14.64
Wednesday	12/02/2014	<1.83	<1.83	1.83	3.66	1.83
Thursday	13/02/2014	<1.83	<1.83	1.83	3.66	3.66
Friday	14/02/2014	<1.83	<1.83	3.66	3.66	7.32
Saturday	15/02/2014	<1.83	<1.83	3.66	18.30	5.49
Sunday	16/02/2014	<1.83	<1.83	12.81	3.66	23.79
Monday	17/02/2014	<1.83	<1.83	5.49	5.49	10.98

Table 50. Metals data for Marsaxlokk station – February

2.16.1.2. Birżebbuġa Metals

Day	***Date***	***Arsenic***	***Cadmium***	***Nickel***	***Lead***	***Vanadium***
		ng/mc	**ng/mc**	**ng/mc**	**ng/mc**	**ng/mc**
Saturday	01/02/2014	<1.83	<1.83	7.32	5.49	16.47
Sunday	02/02/2014	<1.83	<1.83	5.53	1.84	11.07
Monday	03/02/2014	<1.83	<1.83	1.83	12.81	1.83
Tuesday	04/02/2014	<1.83	<1.83	3.66	3.66	1.83
Wednesday	05/02/2014	<1.83	<1.83	1.83	5.49	1.83
Thursday	06/02/2014					
Friday	07/02/2014	<1.83	<1.83	3.66	5.49	5.49
Saturday	08/02/2014	<1.83	<1.83	1.83	7.33	1.83
Sunday	09/02/2014	<1.83	<1.83	5.49	14.65	9.16
Monday	10/02/2014	<1.83	<1.83	3.66	3.66	7.33
Tuesday	11/02/2014	<1.83	<1.83	1.83	3.66	1.83
Wednesday	12/02/2014	<1.83	<1.83	1.83	3.66	3.66
Thursday	13/02/2014	<1.83	<1.83	1.83	5.49	5.49
Friday	14/02/2014	<1.83	<1.83	3.66	9.16	9.16
Saturday	15/02/2014	<1.83	<1.83	7.33	20.15	20.15
Sunday	16/02/2014	<1.83	<1.83	7.32	3.66	14.65
Monday	17/02/2014	<1.83	<1.83	1.83	3.66	1.83

Table 51. Metals data for Birżebbuġa station – February

2.17. Report 15

The data period of this report is between the 5th March and the 19th March 2014 for an effective duration of 15 sampling days.

The results of this monitoring period are given in the next paragraphs, which are first presented in tabular format in the following order:

1. Marsaxlokk station: PM_{10} & $PM_{2.5}$;
2. Birżebbuġa station: PM_{10} & $PM_{2.5}$;

Then, a series of significant plot comparisons are reported:

- PM_{10} *vs* $PM_{2.5}$ at Marsaxlokk station;
- PM_{10} *vs* $PM_{2.5}$ at Birżebbuġa station;
- PM_{10} *vs* PM_{10};
- $PM_{2.5}$ *vs* $PM_{2.5}$;

2.17.1. Marsaxlokk - PM_{10} and $PM_{2.5}$

Day	Date	PM_{10} (µg/m^3)	$PM_{2.5}$ (µg/m^3)
Wednesday	14/03/05	*N.A*[24]	*N.A*
Thursday	14/03/06	*N.A*	*N.A*
Friday	14/03/07	24.18	9.90
Saturday	14/03/08	17.22	3.12
Sunday	14/03/09	15.39	7.15
Monday	14/03/10	22.17	1.83
Tuesday	14/03/11	32.06	12.64
Wednesday	14/03/12	20.70	12.09
Thursday	14/03/13	20.88	4.03
Friday	14/03/14	39.56	15.58
Saturday	14/03/15	28.39	9.16
Sunday	14/03/16	38.64	19.80
Monday	14/03/17	42.87	5.32
Tuesday	14/03/18	45.61	22.92
Wednesday	14/03/19	34.80	17.60
Average during reporting period		29.42	10.86
Average during calendar year (to date)		26.99	11.51

Table 52: PM_{10} and $PM_{2.5}$ data for Marsaxlokk station – Report 15

[24] *Non Available* filters broken during shipment.

2.17.2. Birżebbuġa - PM_{10} and $PM_{2.5}$

Day	Date	PM_{10} (µg/m^3)	$PM_{2.5}$ (µg/m^3)
Wednesday	14/03/05	*N.A*[25]	*N.A*
Thursday	14/03/06	*N.A*	*N.A*
Friday	14/03/07	23.97	11.17
Saturday	14/03/08	18.48	<1.83
Sunday	14/03/09	15.01	10.25
Monday	14/03/10	25.25	9.15
Tuesday	14/03/11	25.26	11.35
Wednesday	14/03/12	18.66	9.52
Thursday	14/03/13	25.08	5.31
Friday	14/03/14	55.47	17.21
Saturday	14/03/15	38.07	11.90
Sunday	14/03/16	37.52	20.69
Monday	14/03/17	41.73	19.59
Tuesday	14/03/18	41.00	9.88
Wednesday	14/03/19	17.14	16.77
Average during reporting period		29.43	12.73
Average during calendar year (to date)		23.25	9.95

Table 53: PM_{10} and $PM_{2.5}$ data for Birżebbuġa station – Report 15

[25] *Non Available* filters broken during shipment.

2.17.3. Marsaxlokk – PM_{10}vs$PM_{2.5}$ histogram

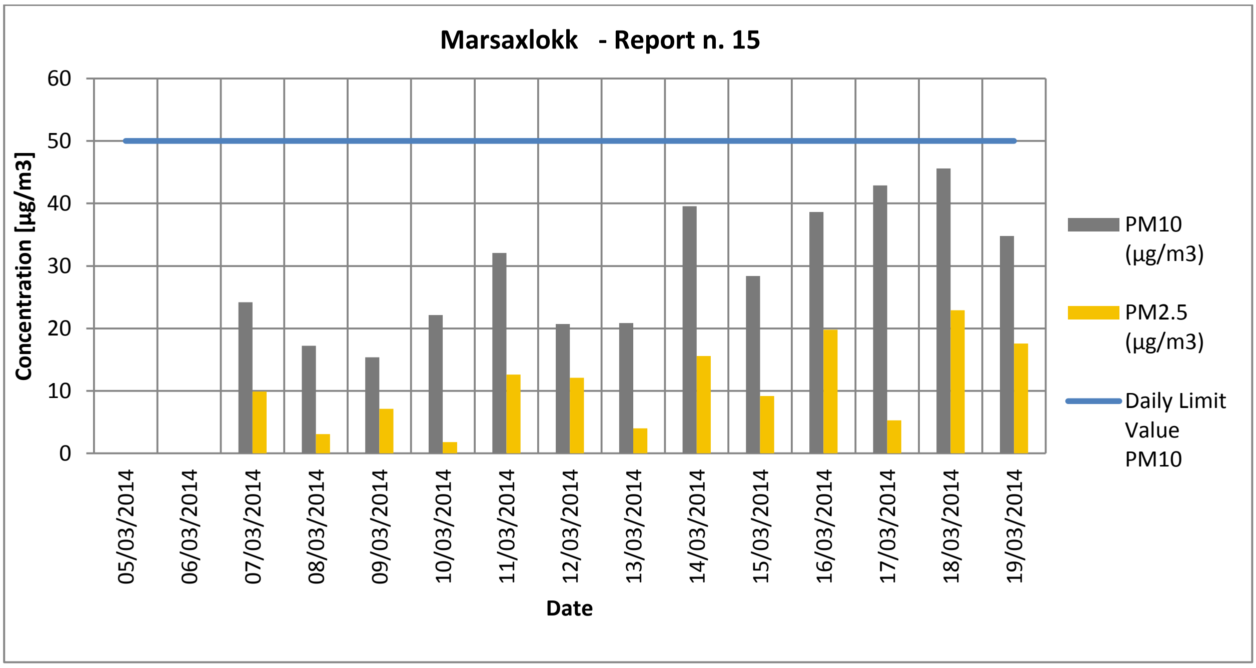


Figure 68: Marsaxlokk - PM_{10}vs$PM_{2.5}$ histogram plot – Report 15

2.17.4. Birżebbuġa – PM_{10}vs$PM_{2.5}$ histogram

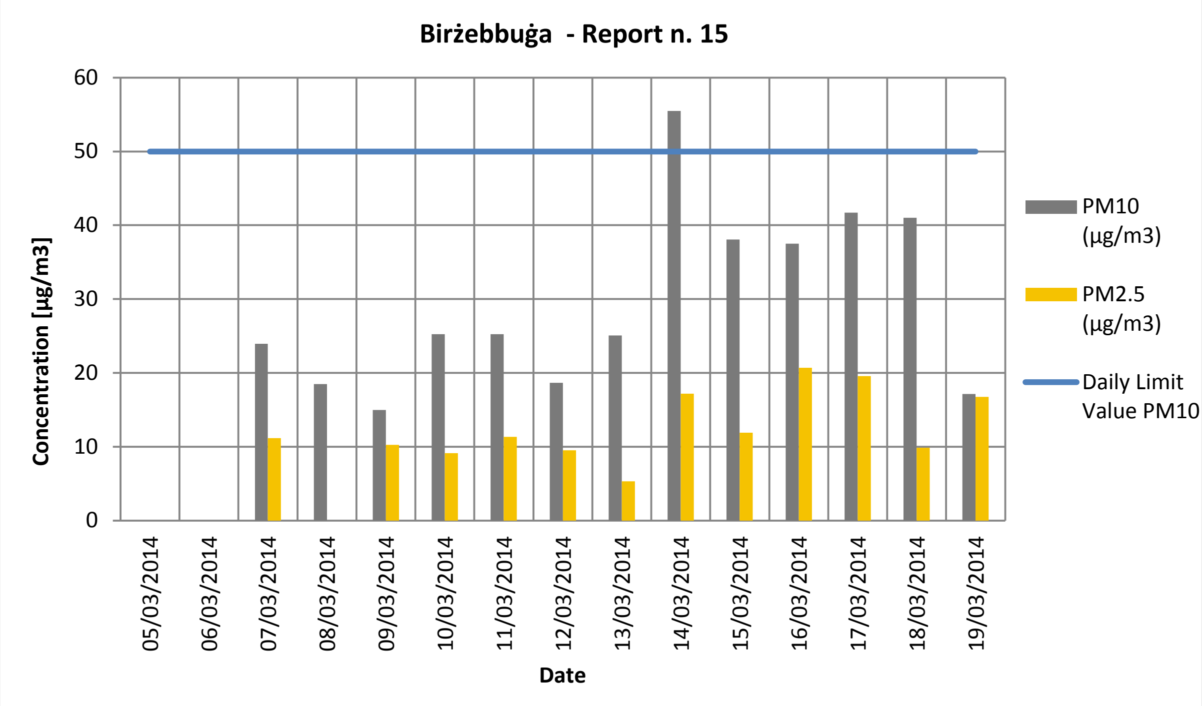


Figure 69: Birżebbuġa - PM_{10}vs$PM_{2.5}$ histogram plot – Report 15

2.17.1. PM_{10} comparison

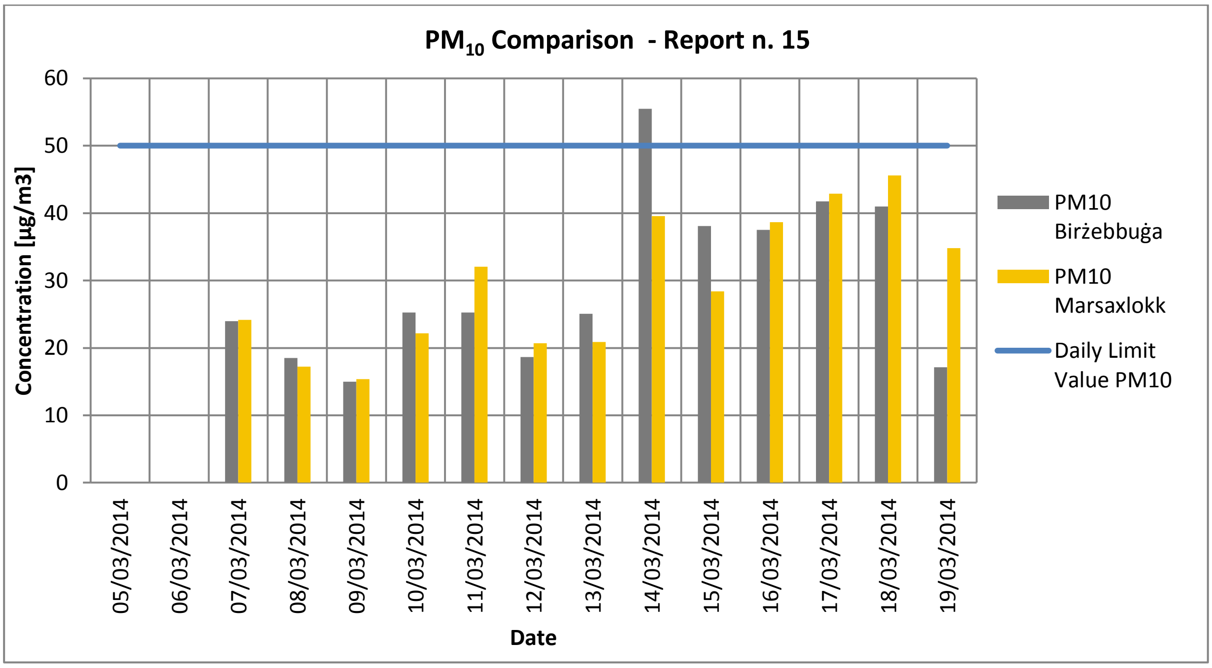


Figure 70: PM_{10} comparison - histogram plot – Report 15

2.17.2. $PM_{2.5}$ comparison

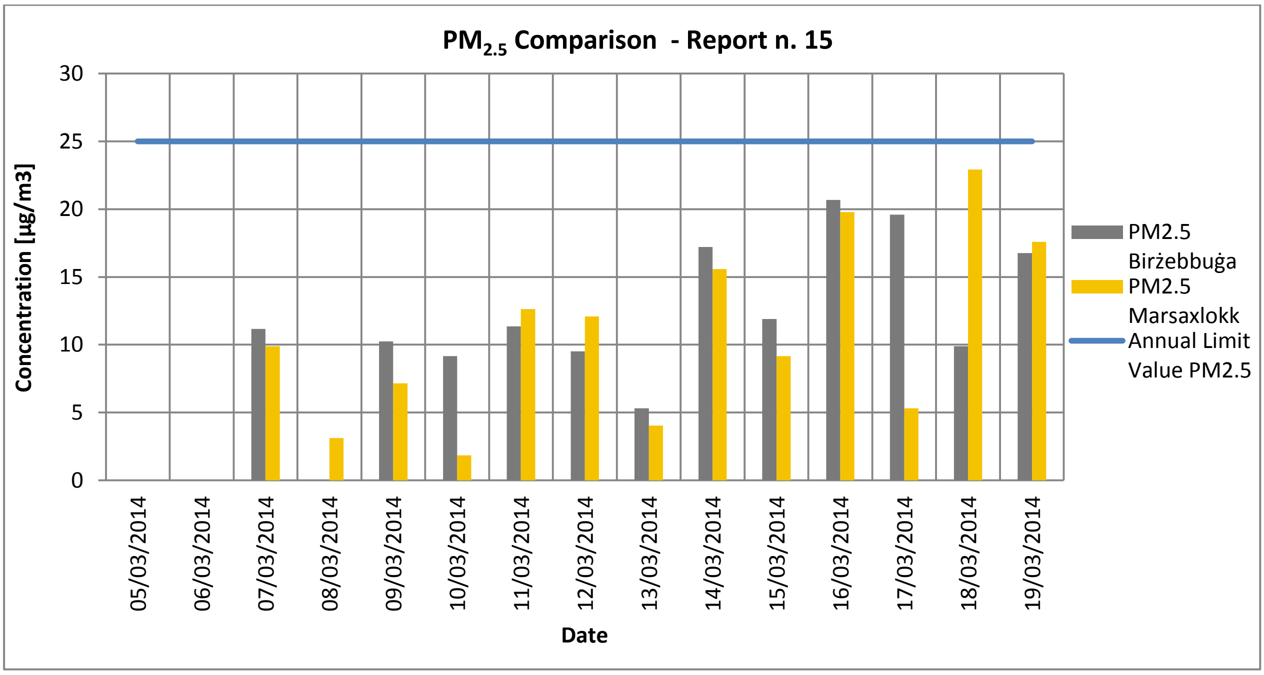


Figure 71: $PM_{2.5}$ comparison - histogram plot – Report 15

2.18. Report 16

The data period of this report is between the 20th March and the 2nd April 2014 for an effective duration of 14 sampling days.

The results of this monitoring period are given in the next paragraphs, which are first presented in tabular format in the following order:

1. Marsaxlokk station: PM_{10} & $PM_{2.5}$;
2. Birżebbuġa station: PM_{10} & $PM_{2.5}$;

Then, a series of significant plot comparisons are reported:

- PM_{10} *vs* $PM_{2.5}$ at Marsaxlokk station;
- PM_{10} *vs* $PM_{2.5}$ at Birżebbuġa station;
- PM_{10} *vs* PM_{10};
- $PM_{2.5}$ *vs* $PM_{2.5}$;

2.18.1. Marsaxlokk - PM_{10} and $PM_{2.5}$

Day	Date	PM_{10} (μg/m^3)	$PM_{2.5}$ (μg/m^3)
Thursday	14/03/20	33.68	16.90
Friday	14/03/21	24.18	15.77
Saturday	14/03/22	25.83	8.98
Sunday	14/03/23	23.99	<1.83
Monday	14/03/24	24.92	8.99
Tuesday	14/03/25	25.09	8.25
Wednesday	14/03/26	24.73	7.33
Thursday	14/03/27	27.46	5.68
Friday	14/03/28	25.46	8.44
Saturday	14/03/29	17.77	6.78
Sunday	14/03/30	25.09	11.00
Monday	14/03/31	26.75	13.94
Tuesday	14/04/01	26.74	16.51
Wednesday	14/04/02	33.69	16.13
Average during reporting period		26.10	11.13
Average during calendar year (to date)		26.92	11.48

Table 54: PM_{10} and $PM_{2.5}$ data for Marsaxlokk station – Report 16

2.18.2. Birżebbuġa - PM_{10} and $PM_{2.5}$

Day	Date	PM_{10} (µg/m^3)	$PM_{2.5}$ (µg/m^3)
Thursday	14/03/20	29.77	25.01
Friday	14/03/21	23.07	14.65
Saturday	14/03/22	25.26	12.81
Sunday	14/03/23	27.82	10.80
Monday	14/03/24	27.08	7.32
Tuesday	14/03/25	25.92	7.91
Wednesday	14/03/26	23.98	6.77
Thursday	14/03/27	40.44	10.81
Friday	14/03/28	21.78	<1.83
Saturday	14/03/29	6.59	5.86
Sunday	14/03/30	34.59	11.17
Monday	14/03/31	32.40	13.36
Tuesday	14/04/01	26.90	14.09
Wednesday	14/04/02	34.23	20.50
Average during reporting period		27.13	12.39
Average during calendar year (to date)		23.61	10.13

Table 55: PM_{10} and $PM_{2.5}$ data for Birżebbuġa station – Report 16

2.18.3. Marsaxlokk – PM_{10}vs$PM_{2.5}$ histogram

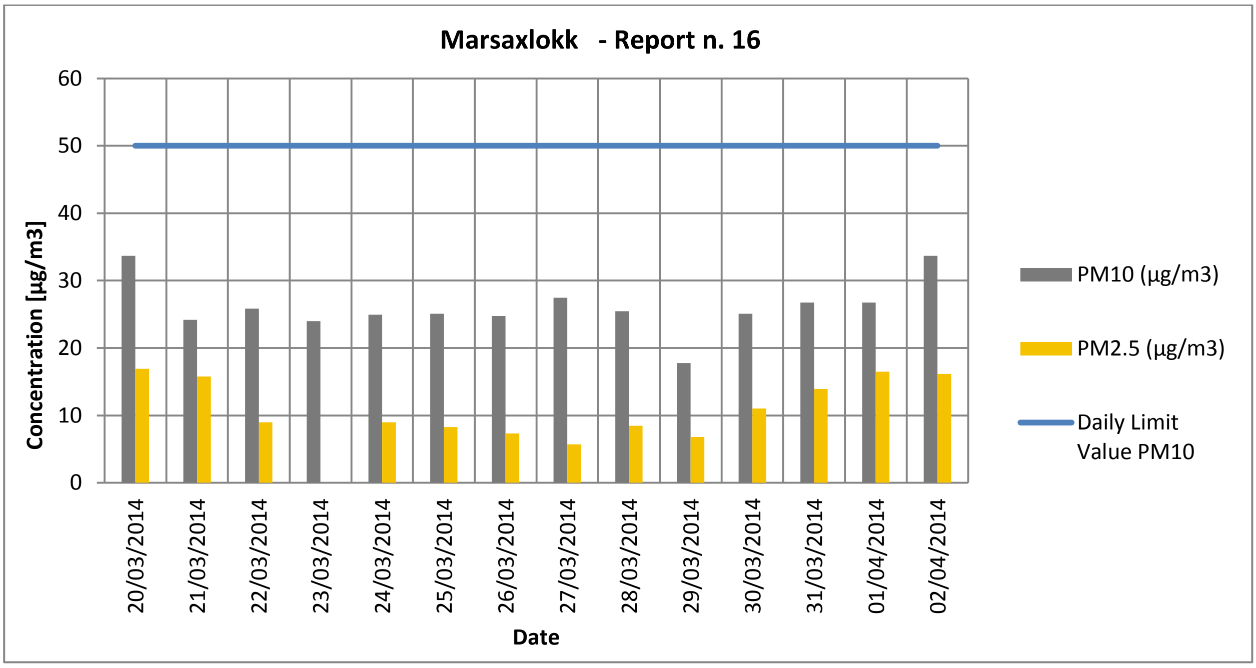


Figure 72: Marsaxlokk - PM_{10}vs$PM_{2.5}$ histogram plot – Report 16

2.18.4. Birżebbuġa – PM_{10}vs$PM_{2.5}$ histogram

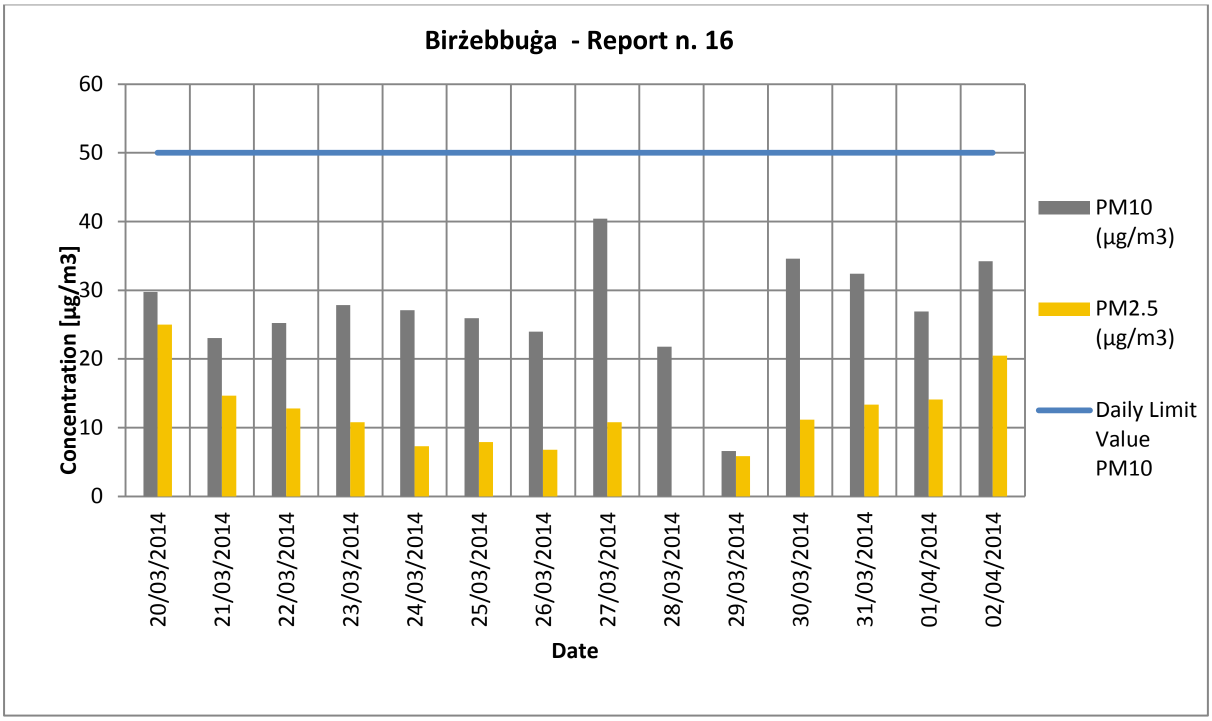


Figure 73: Birżebbuġa - PM_{10}vs$PM_{2.5}$ histogram plot – Report 16

2.18.1. PM_{10} comparison

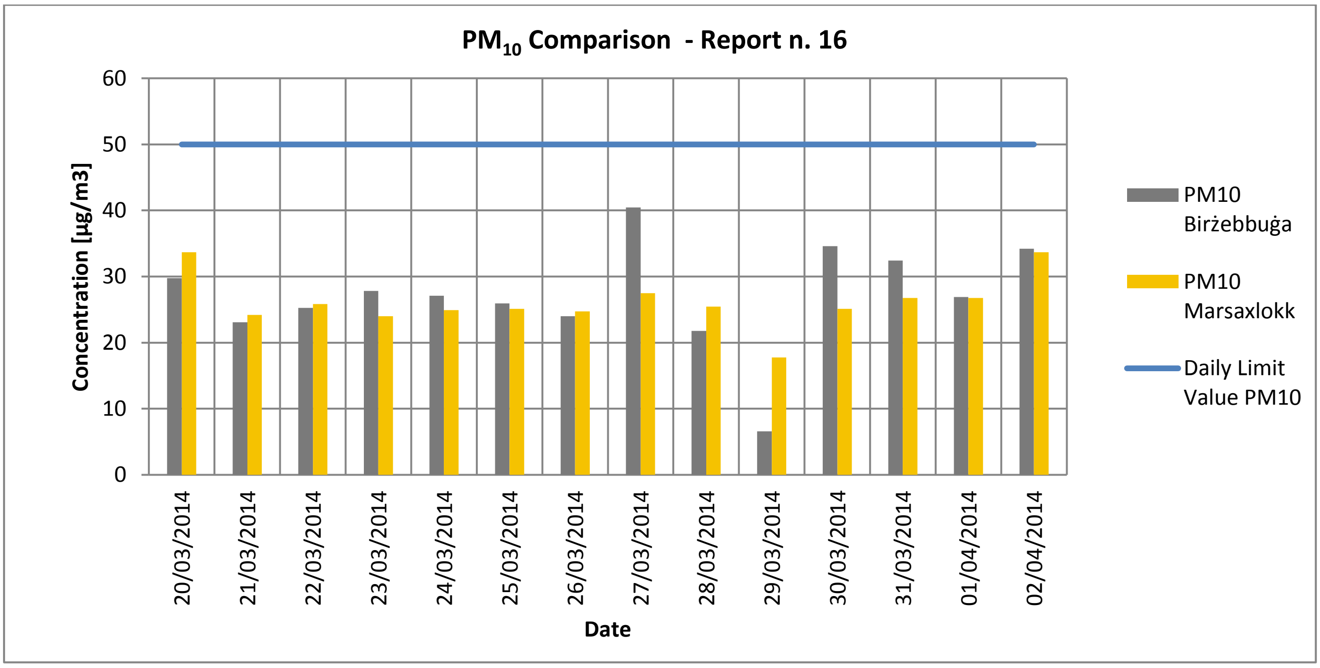


Figure 74: PM_{10} comparison - histogram plot – Report 16

2.18.2. $PM_{2.5}$ comparison

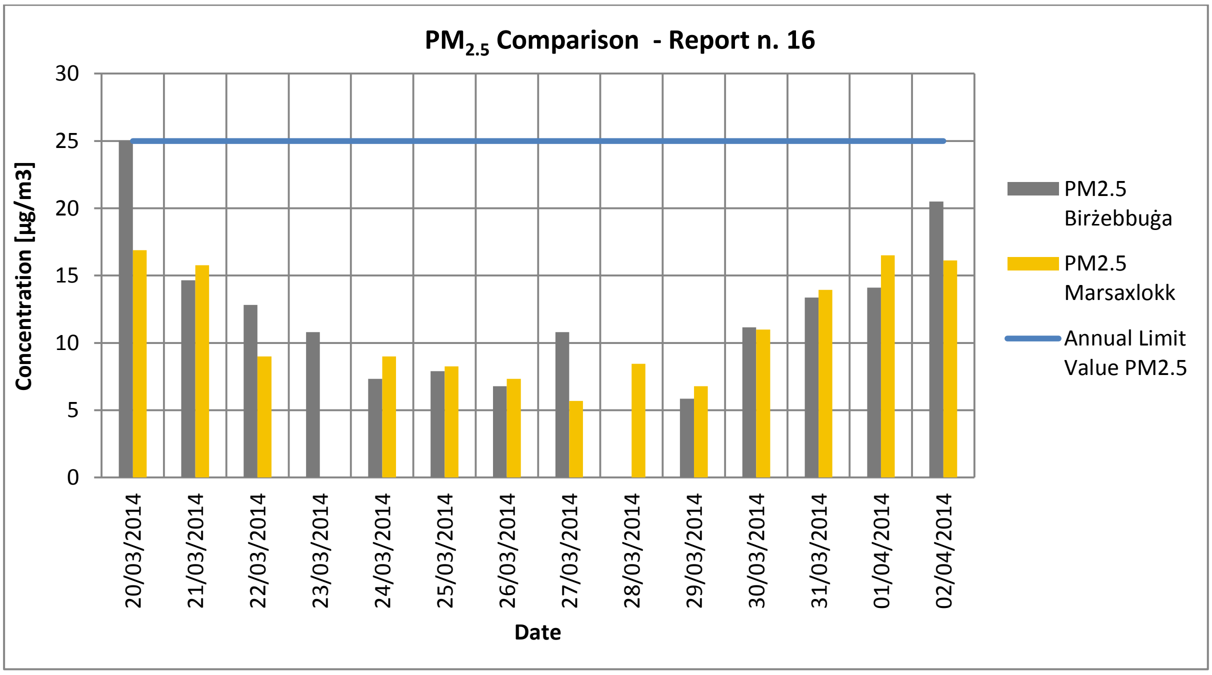


Figure 75: $PM_{2.5}$ comparison - histogram plot – Report 16

ANNEX A – SAHARAN DUST

2.19. SEPTEMBER

2.19.1. Analysis for the Identification of Saharan Dust

Step 1: MEPA data analysis

The analysis of the air monitoring data during the period between the 27th September and the 2nd October determined the following exceedances:

- at Marsaxlokk site, exceedance of daily limit value of PM_{10}, occurred on
  - September 29 - daily concentration of 53.50 µg/m^3 against daily limit value of 50.0 µg/m^3
  - September 30 - daily concentration of 61.36 µg/m^3 against daily limit value of 50.0 µg/m^3

Therefore, the days to be investigated are the: 29 and 30 of September.

For the above days, the available information from MEPA air monitoring network was related to:

- Għarb station
- Msida station
- Żejtun station
- Kordin station

The PM_{10} daily mean values were:

- Għarb station:
  - September 29- daily concentration of 36.91 µg/m^3 against daily limit value of 50.0 µg/m^3
  - September 30 -daily concentration of 35.04 µg/m^3 against daily limit value of 50.0 µg/m^3
- Msida station:
  - September 29- daily concentration of 41.08 µg/m^3 against daily limit value of 50.0 µg/m^3
  - September 30 -daily concentration of 41.08 µg/m^3 against daily limit value of 50.0 µg/m^3

- Żejtun station:
  - September 29- daily concentration of 9.05 µg/m^3 against daily limit value of 50.0 µg/m^3
  - September 30 -daily concentration of 10.24 µg/m^3 against daily limit value of 50.0 µg/m^3
- Kordin station
  - September 29- daily concentration of 31.01 µg/m^3 against daily limit value of 50.0 µg/m^3
  - September 30 -daily concentration of 34.08 µg/m^3 against daily limit value of 50.0 µg/m^3

The following table summarizes the above information:

Date	Enemalta air monitoring stations		MEPA air monitoring network stations			
	Marsaxlokk	Birżebbuġa	Għarb	Msida*	Kordin*	Żejtun*
September 29	53.50	*N.V*	36.91	41.08	31.01	9.05
September 30	61.36	*N.V*	35	41.08	34.08	10.24

Table 56: PM_{10} measurements on the 29 and 30 September

The following figure shows the above information:

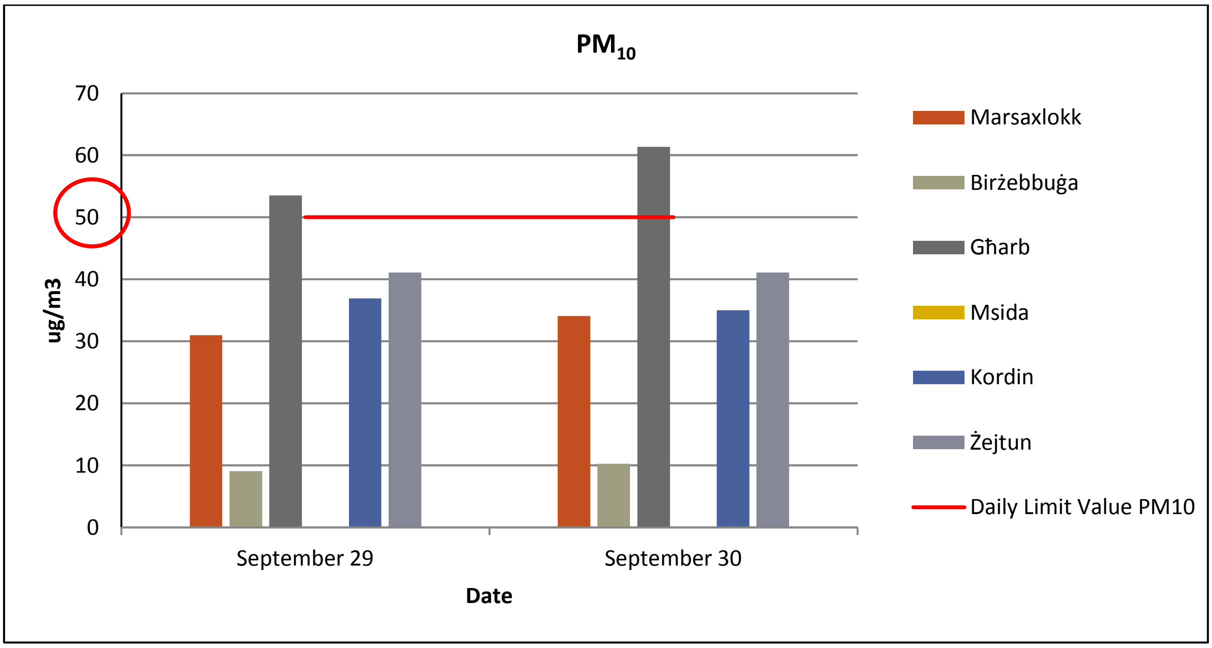


Figure 76: Air monitoring data plot on the days of exceedance

Hourly measures for the 29th and the 30th September 2013.

The mean values extracted from MEPA data base for the 29th and 30th September did not provide a conclusive clarification about the possibility of a Saharan event in those days; hence the hourly values in the Maltese fixed stations were obtained and analysed.

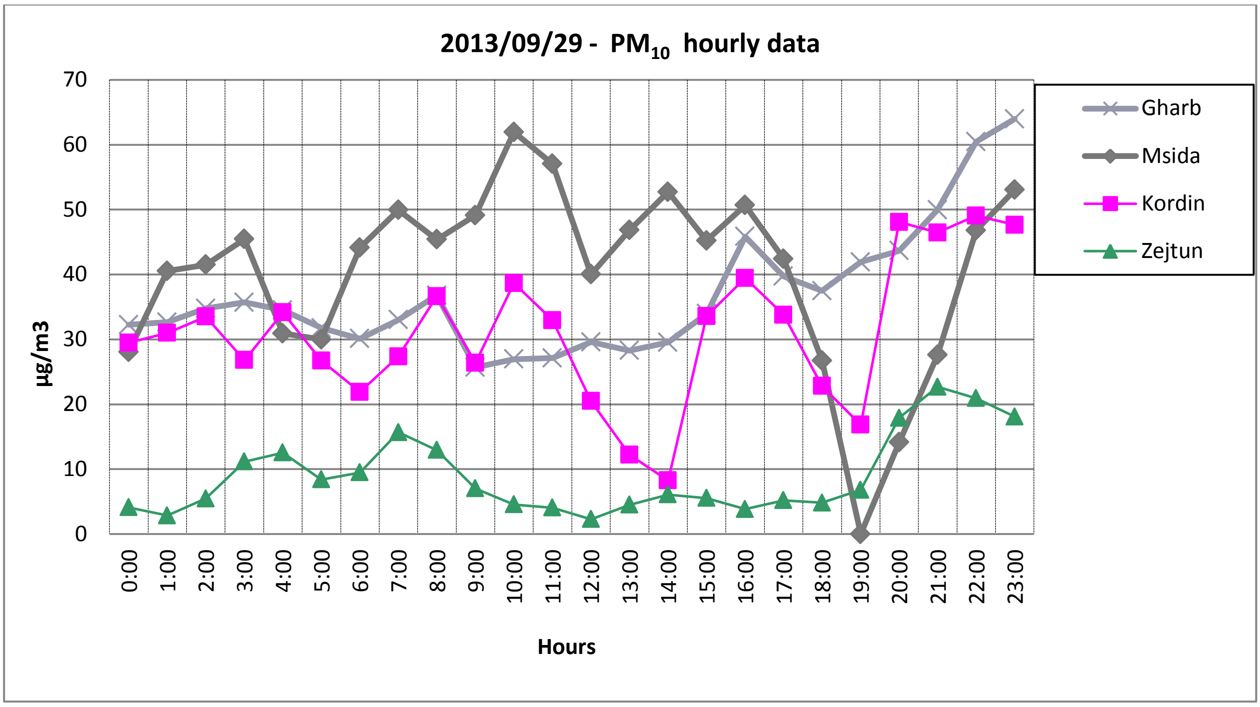


Figure 77: PM_{10} hourly data for the 29 September

From the above figure we could assume the possibility of a Saharan event from 21:00hrs onwards on the 29th as the concentration of PM_{10} shows and accurately increase which it is not considered to correspond with a high night traffic density. This data interpretation could be supported by the daily values of the following day as in the first hours of the 30th , the PM_{10} concentrations are significantly high (85 µg/m^3 Msida station at 1:00 hrs).

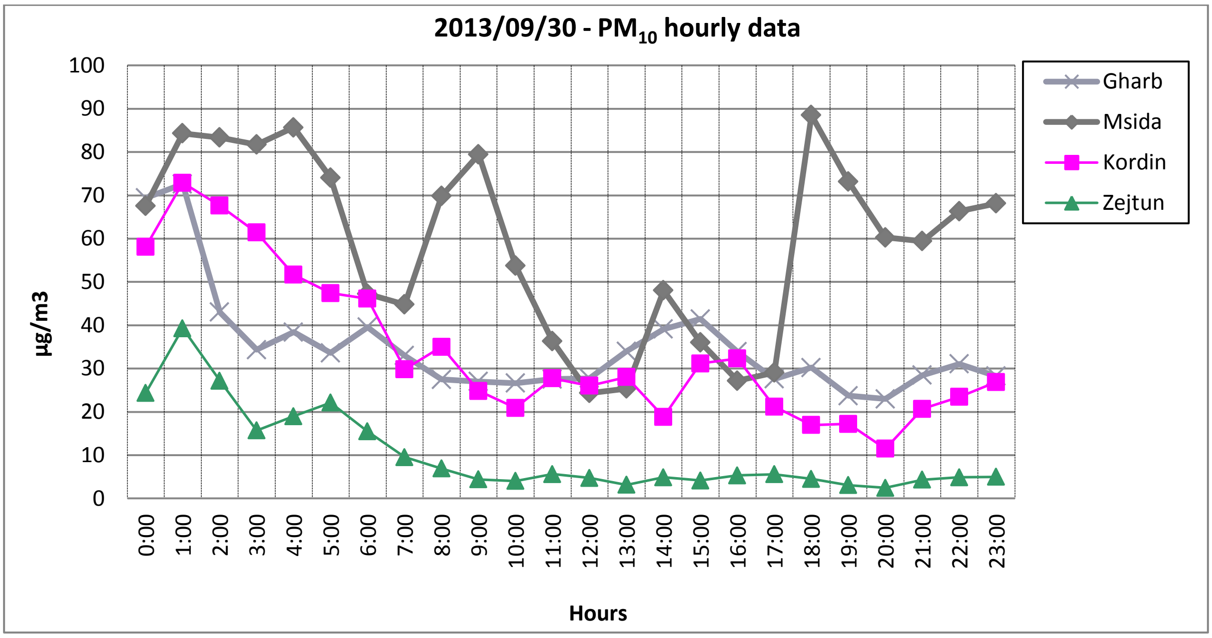


Figure 78: PM_{10} hourly data for the 30 September

In order to confirm this hypothesis, satellite images were evaluated as well as the BSC-Dream and HYSPLIT model outputs for the 29th and 30th September.

Step 2 – Satellite images

The exceedance in January has to be correlated with satellite imagery. The satellite images consulted were downloaded from the AERONET network which produces data available on the NASA website: http://rapidfire.sci.gsfc.nasa.gov/subsets/?subset=AERONET_ETNA.

The belowimages represent satellite images of 250m bands for Aqua and 250m bands for Terra.

Step 3 – Mathematical Modelling

The data available was analysed using the BSC-DREAM dust model (with concentration and deposition indicated) and HYSPLIT 4 model with a printout at heights of 100, 500 and 1500 metres above ground level, that show also mixing heights, taken over a period of 3 days prior to the day when the exceedance were recorded. BSC-DREAM dust model is helpful because it provides information not only on dust aerosols, but also because it provides the reconstruction of the wind field that is essential to better evaluate the HYSPLIT 4 model outputs. The BSC-DREAM outputs used are related to the Dust Loading (expressed in g/m^2) and to the Lowest Level Dust Concentrations (expressed in $\mu g/m^3$).

Step 4 - Satellite data

In cases where satellite images and mathematical modelling outputs were not enough to verify whether on the identified day, Saharan dust episodes really took place, satellite data from three different instruments: the MODIS sensor and AERONET data were analysed for the identified day.

- ***29 September***

AERONET images

The below images represent satellite images of 250m bands for Aqua and 250m bands for Terra.

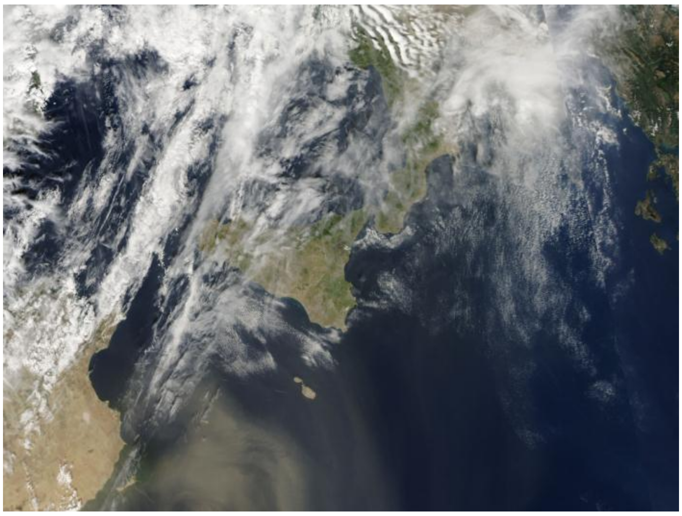


Figure 79: AERONET_ETNA 250m _AQUA

Figure 80: AERONET_ETNA 250 m _TERRA

The images above show the possible presence of a dust aerosol related to the Saharan region.

BSC-DREAM model

The figure below represents the BSC-DREAM prediction of total dust, expressed in terms of the lowest model level dust concentration (in µg m^3) and of dust load (in g m^2). The dust load is in size classes between 0.1 and 10 µm over Europe at 12:00 UTC and superimposed on the same figure are the corresponding hourly forecasted wind vectors at 3000 m height level.

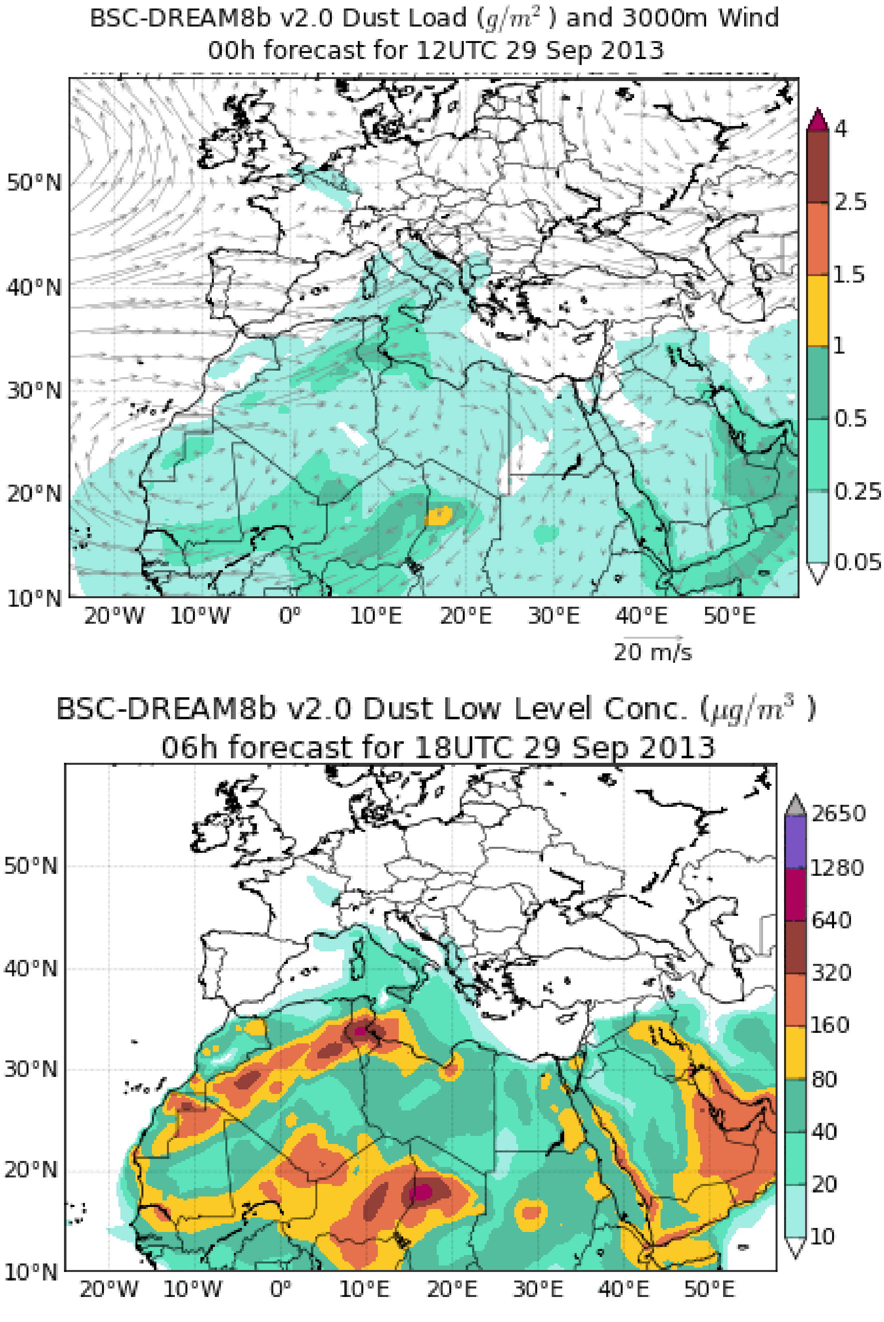


Figure 81: BSC-DREAM outputs on the 29 September

From the dust loading image it can be noted that on the 29th September, Malta was influenced by dust loading from Saharan region of medium intensity, through wind vectors that describe a wind vortex that travelled from the North-Western side of Africa and reaching Malta and the Southern part of Italy.

The dust concentration image also shows that Malta could have been influenced by dust loading from Saharan region.

HYSPLIT model

The following figure shows the application of HYSPLIT on the Maltese islands on the 29th of September. The HYSPLIT output is related to 20:00 UTC, defined as the moment of maximum peak of the possible dust event.

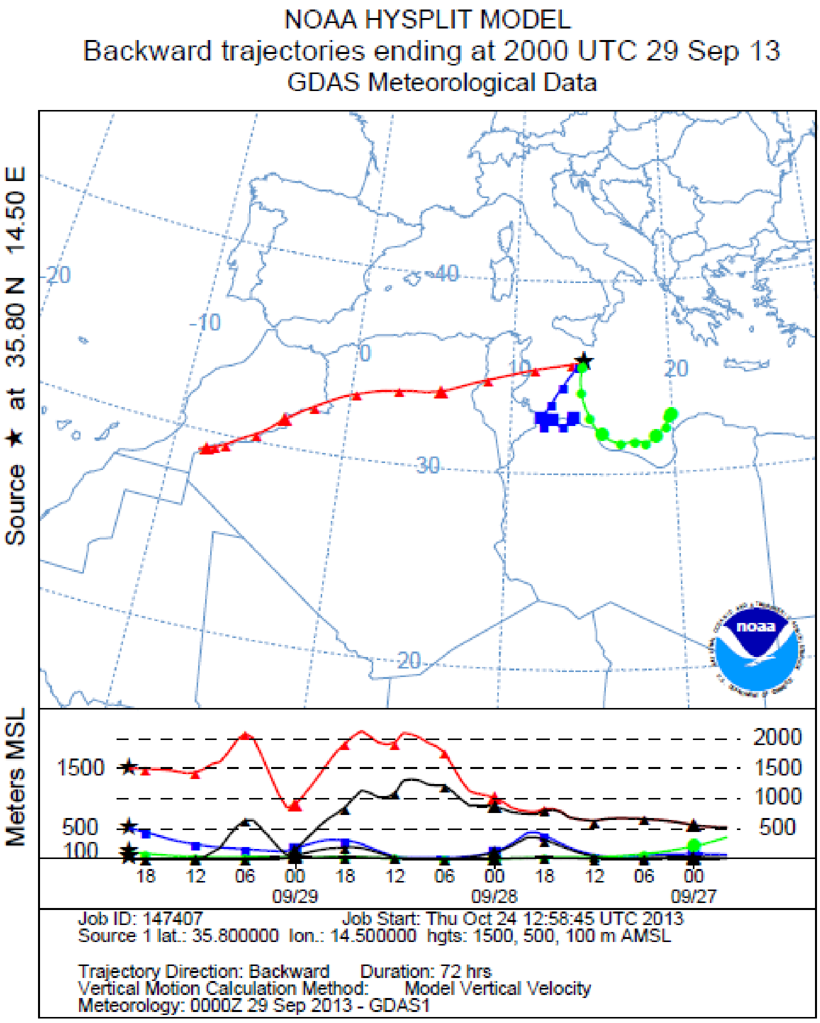


Figure 82: HYSPLIT model output on the Maltese islands on the 29 September taken over a period of 3 days

The above image confirms that the backward trajectories at 1500 high and ending over the air monitoring zone come from Saharan regions, which is in accordance to the BSC-DREAM output. The following figures show, for each backward trajectory, the variation of the parameters "Terrain height" and "Mixed layer depth", along the path. This information allows some further assessment about the probable intensity of the event at the arriving-point of this trajectory:

- reduced distance from the backward trajectory level and the terrain height is considered to be an indicator of a higher intensity event, due to a major implication of the lower level of the atmosphere;
- the presence, along the path, of many points at which the trajectory level is above the mixed layer depth is considered an indicator of a possible decrease of the intensity of the dust aerosol, even if the trajectory being always under the mixed layer depth may be affected by higher level of dust deposition along the path, with minor intensity at the ending-point of the backward trajectory;
- a mixed layer depth higher than the ending-level of each backward trajectory is an indicator of a higher level of intensity of the event;

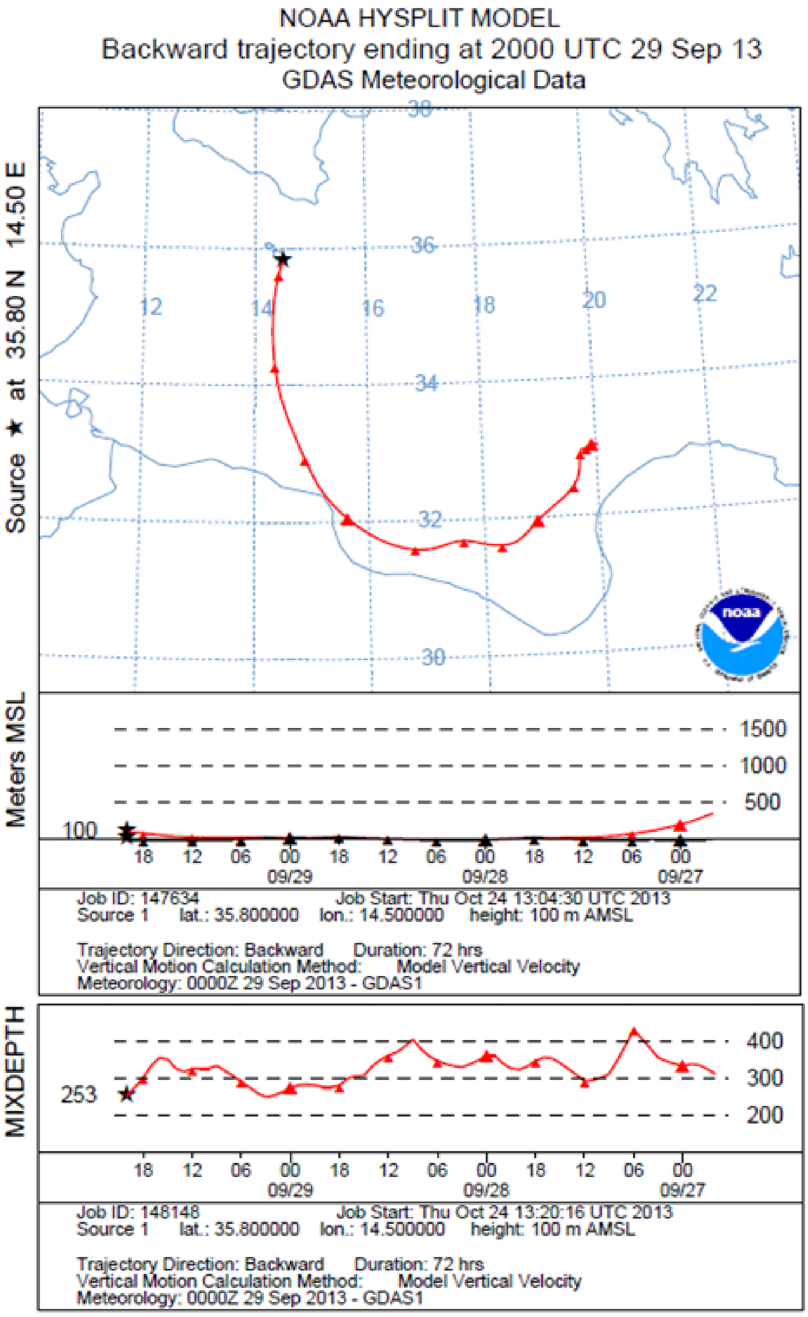


Figure 83: **HYSPLIT backward trajectory at 100 m on the 29 September**

The backward trajectory at 100 meters above ground level is from the Southern Mediterranean area but did not pass over Saharan regions.

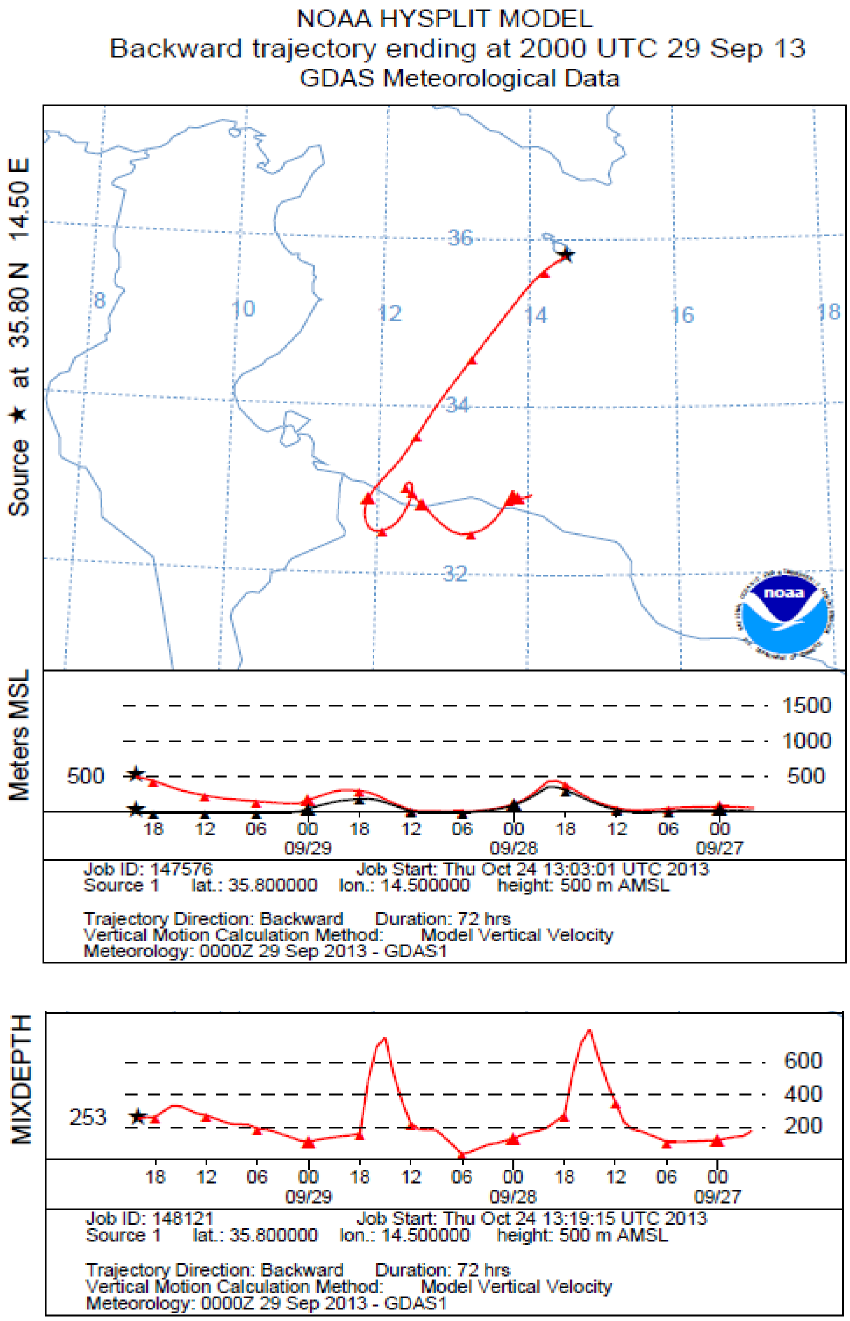


Figure 84: HYSPLIT backward trajectory at 500 m on the 29 September

The backward trajectory related to 500 meters level travelled during a short period over the North of Libya.

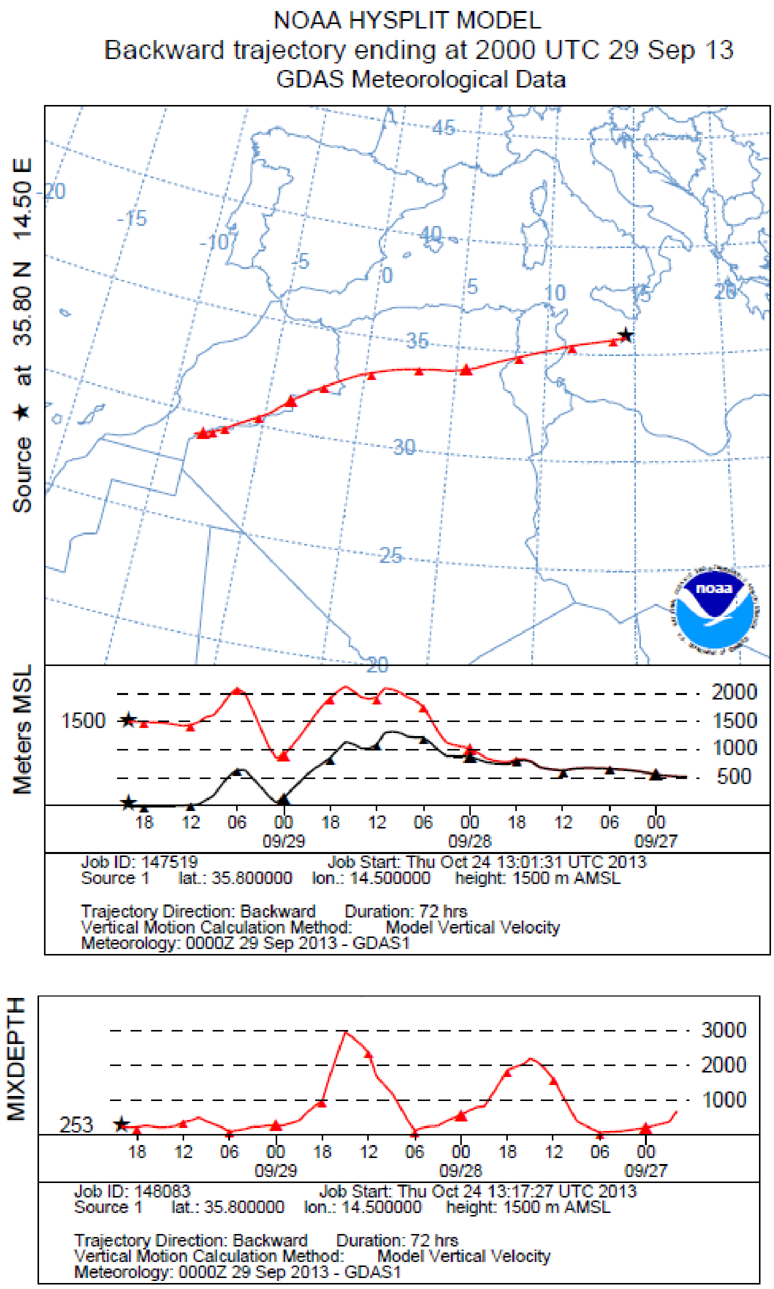


Figure 85: HYSPLIT backward trajectory at 1500 m on the 29 September

The above figures show that the mixed layer depth over Malta on the 29th September was 253 m, lower than the backward trajectory at 500 m and 1500 levels ending-point. The backward trajectory at 1500 m was the only one certainly coming from Saharan regions, but the high quote of its whole path and the low quote of the mixed layer depth over Malta seem not that the wind at this height does not indicated the presence of a Saharan dust episode on that day.

MODIS sensors

The MODIS data available show the absence of a dust aerosol over the Maltese islands (see the following images of the Aerosol Optical Depth and Mass concentration).

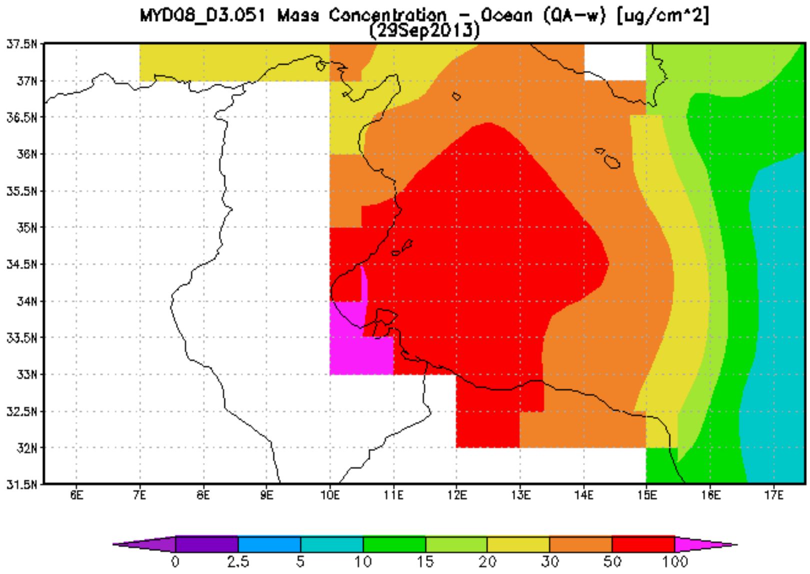


Figure 86: MODIS Terra and Aqua Level 3-Data on the 29 September

- ***30 September***

AERONET images

The below images represent satellite images of 250m bands for Aqua and 250m bands for Terra.

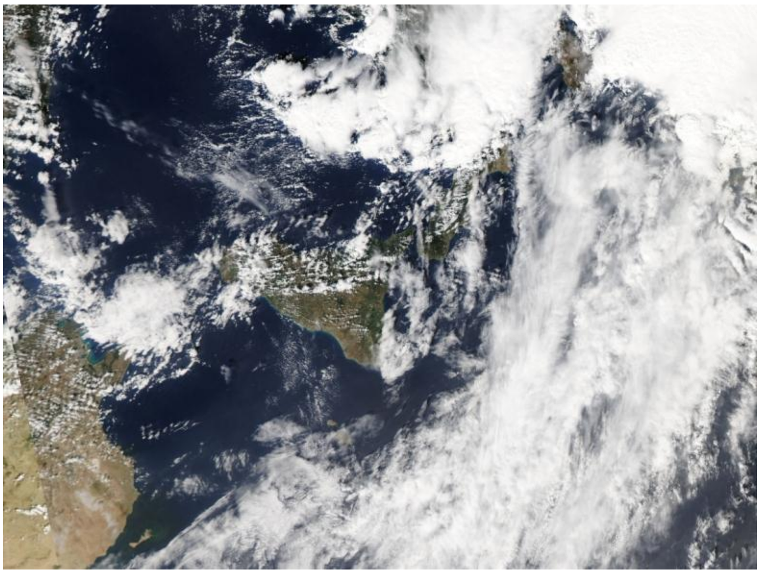


Figure 87: AERONET_ETNA 250m _AQUA

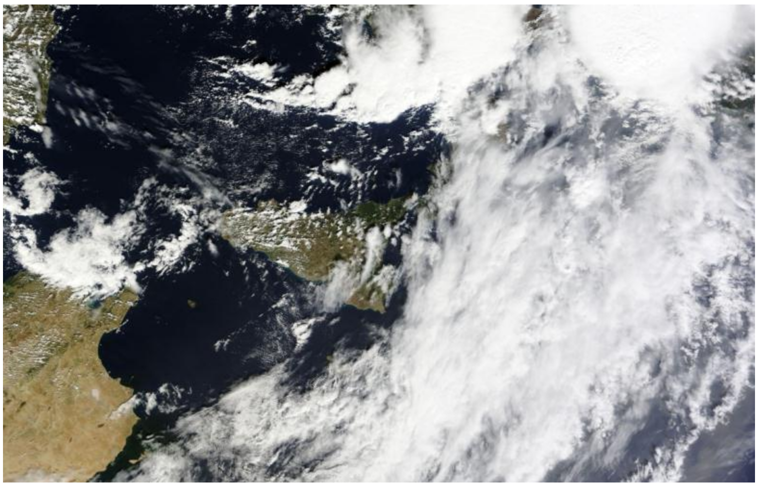


Figure 88: AERONET_ETNA 250 m _TERRA

The images above show the possible presence of a dust aerosol related to the Saharan region. In this occasion the images above do not show the clear presence of a dust aerosol related to the Saharan region.

BSC-DREAM model

The figure below represents the BSC-DREAM prediction of total dust, expressed in terms of the lowest model level dust concentration (in µg m^3) and of dust load (in g m^2). The dust load is in size classes between 0.1 and 10 µm over Europe at 12:00 UTC and superimposed on the same figure are the corresponding hourly fore casted wind vectors at 3000 m height level.

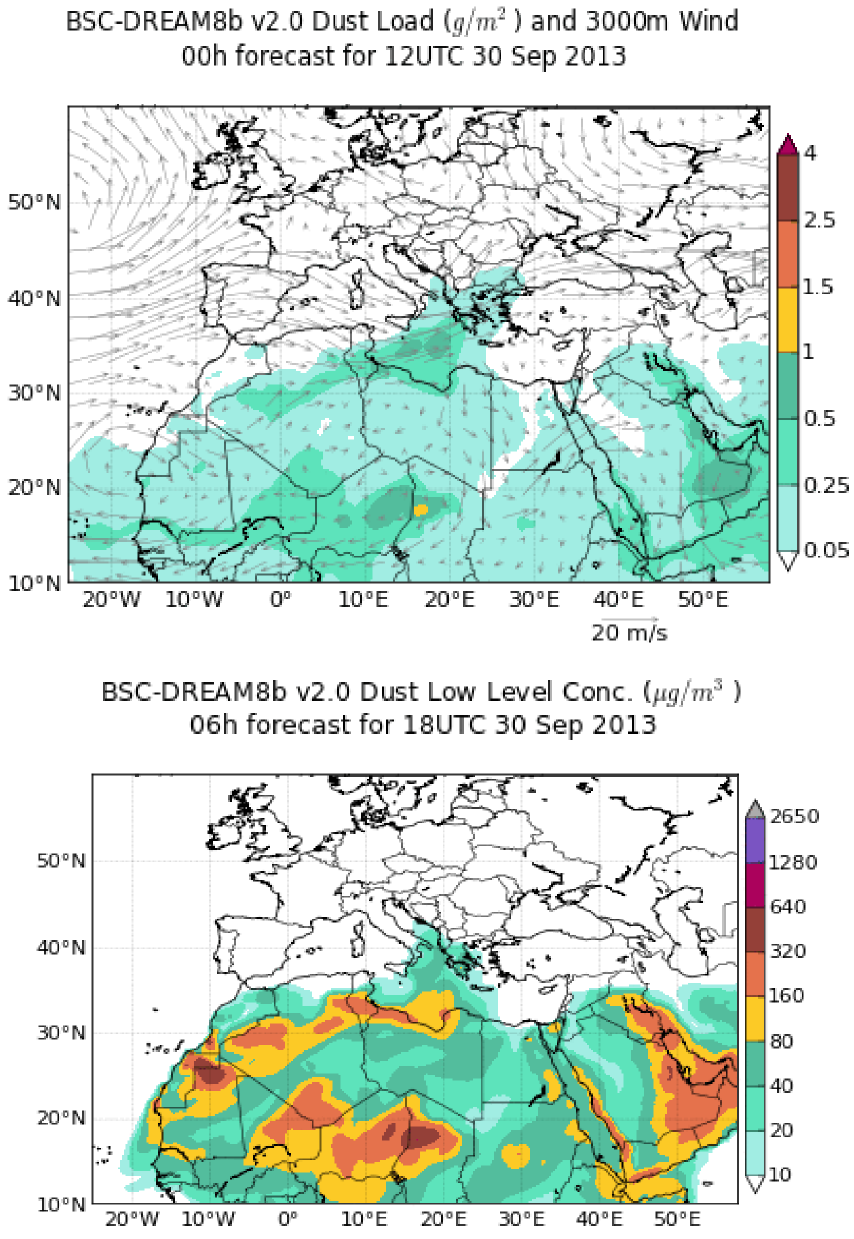


Figure 89: BSC-DREAM outputs on the 30 September

From the dust loading image, it can be noted that on the 30th September, Malta was as not strongly influenced by dust loading from the Saharan region as in the previous day. The image describes wind vectors which come from the West and go through Spain, reaching Malta and afterwards going up to the Turkish region. Nevertheless wind vectors which medium-low intensity coming from North-West African region also reached The Maltese islands in this day.

The following figure shows the application of HYSPLIT on the Maltese islands on the 30th of September. The HYSPLIT output is related to 00:00 UTC, defined as the moment of maximum peak of the possible dust event.

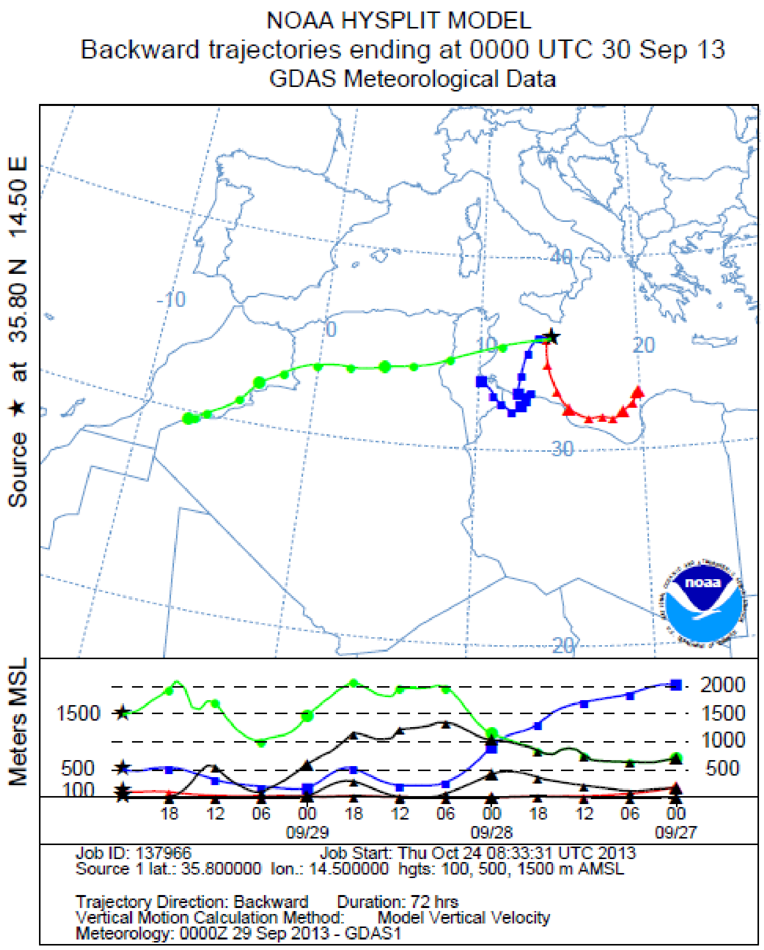


Figure 90: HYSPLIT model output on the Maltese islands on the 30 September taken over a period of 3 days

As in the 29th September, the above image confirms that the backward trajectories at 1500 high and ending over the air monitoring zone are from Southern zones and from Saharan regions, which is in accordance to the BSC-DREAM output. The similar results as from the day before are explained due to the fact that the hourly difference is only few hours. The following figures show, for each backward trajectory, the variation of the parameters "Terrain height" and "Mixed layer depth", along the path. This information allows some further assessment about the probable intensity of the event at the arriving-point of this trajectory:

- reduced distance from the backward trajectory level and the terrain height is considered to be an indicator of a higher intensity event, due to a major implication of the lower level of the atmosphere;
- the presence, along the path, of many points at which the trajectory level is above the mixed layer depth is considered an indicator of a possible decrease of the intensity of the dust aerosol, even if the trajectory being always under the mixed layer depth may be affected by higher level of dust deposition along the path, with minor intensity at the ending-point of the backward trajectory;
- a mixed layer depth higher than the ending-level of each backward trajectory is an indicator of a higher level of intensity of the event;

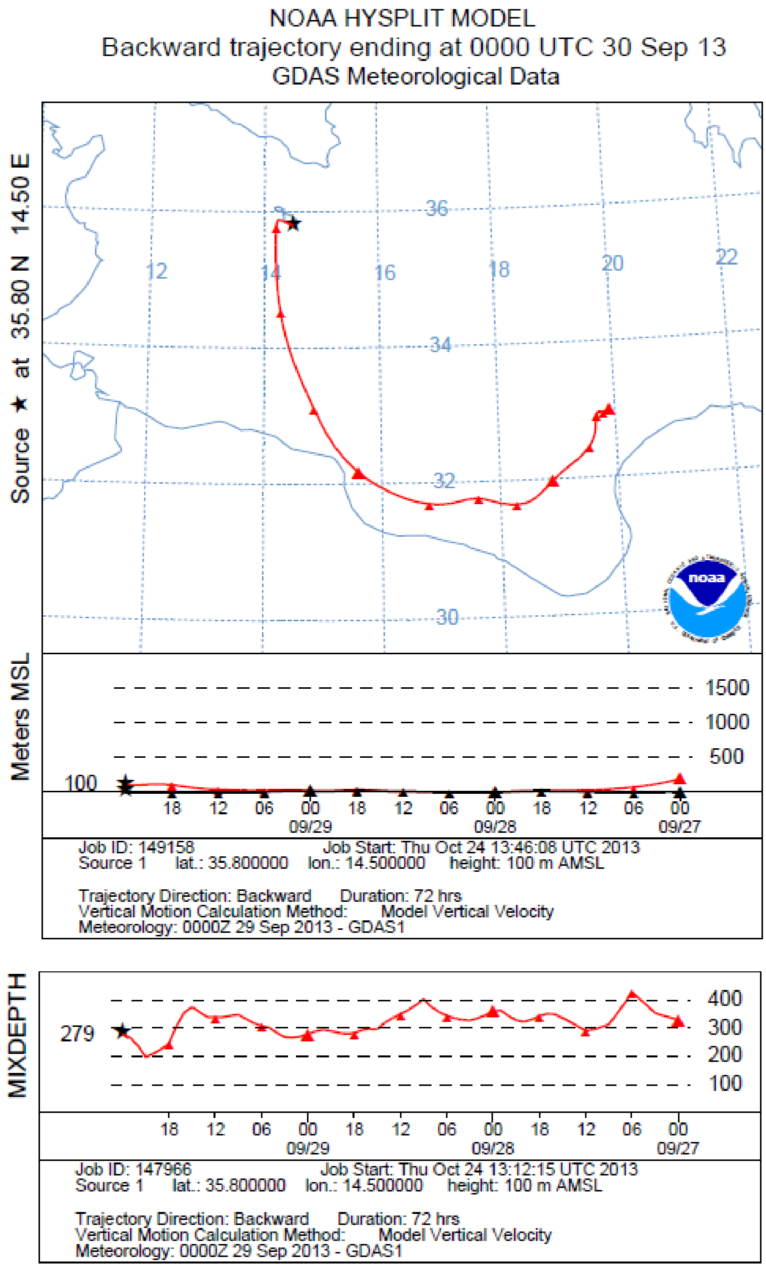


Figure 91: HYSPLIT backward trajectory at 100 m on the 30 September

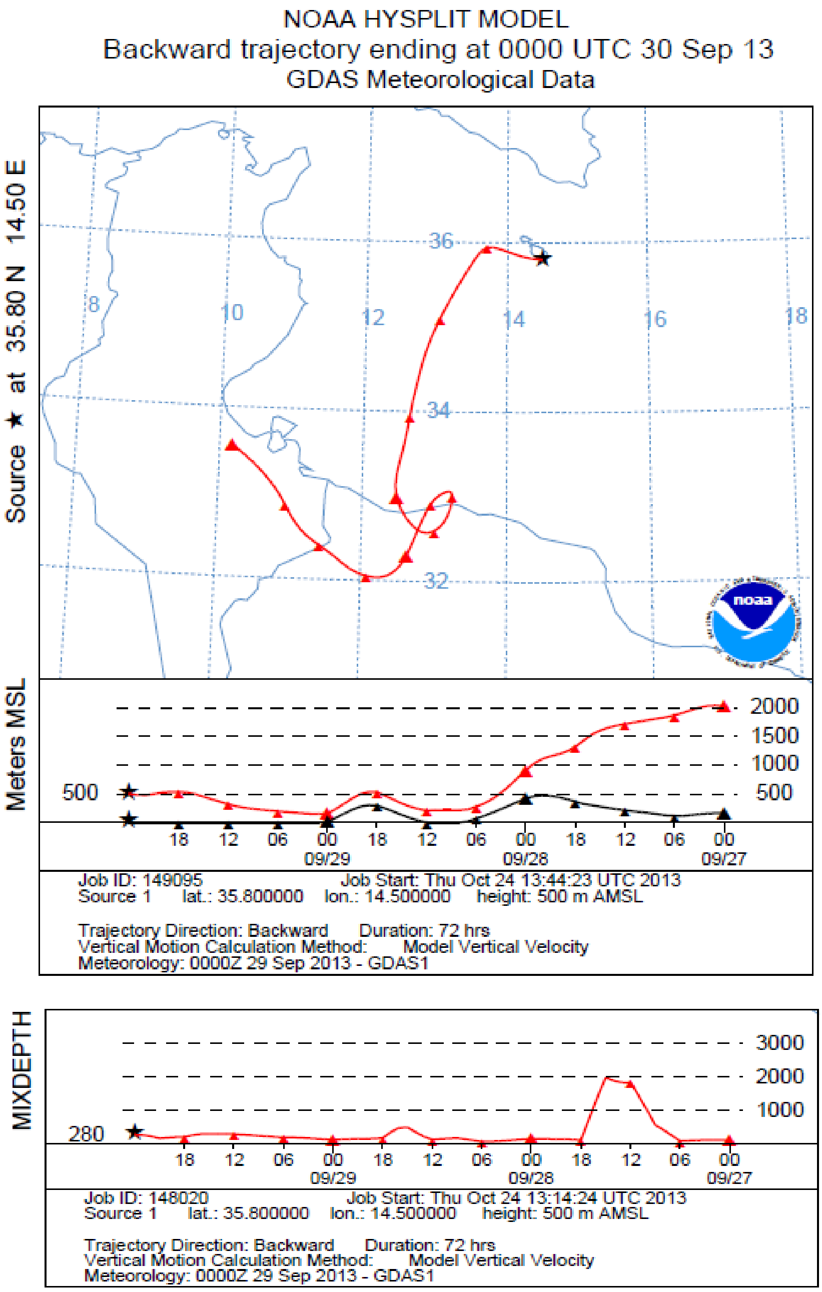


Figure 92: HYSPLIT backward trajectory at 500 m on the 30 September

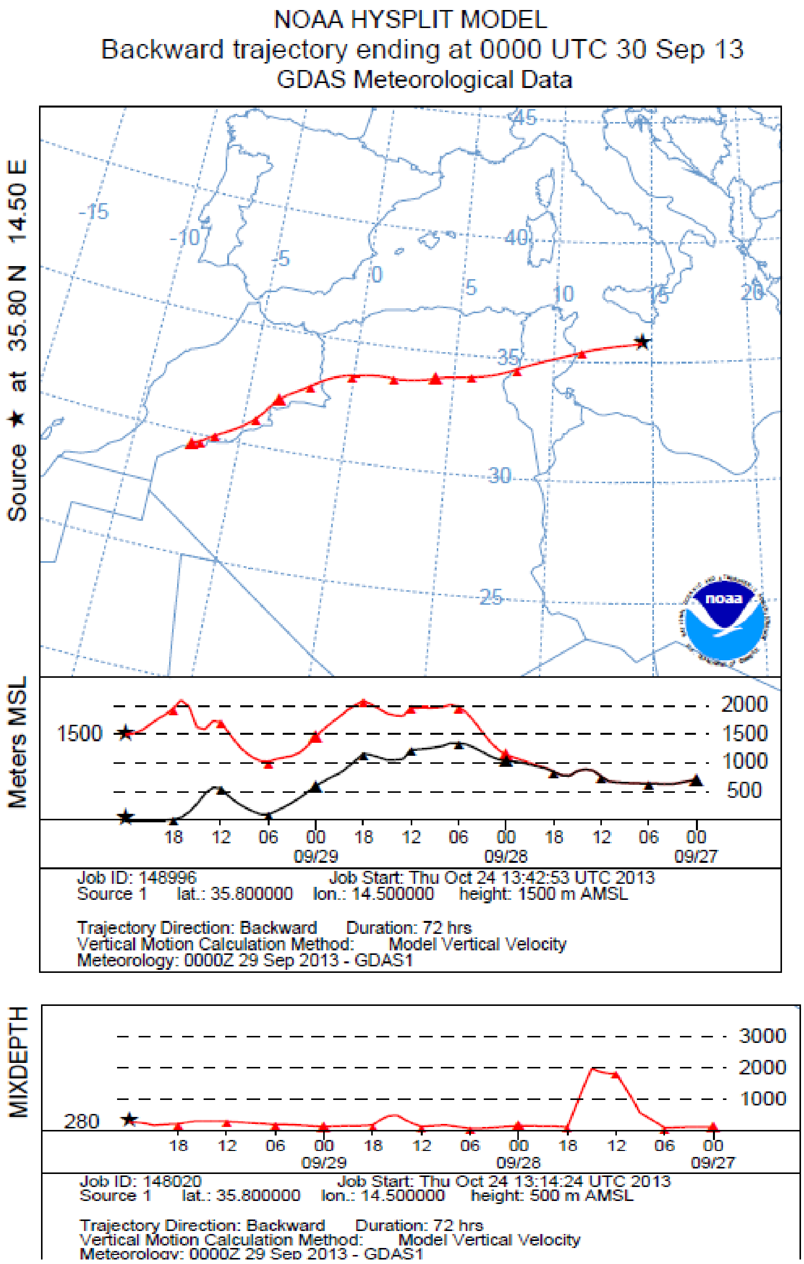


Figure 93: HYSPLIT backward trajectory at 1500 m on the 30 September

The above figures show that the mixed layer depth over Malta on 30th September was 280 m, hence lower than the backward trajectory at 500 m and 1500 levels ending-points. Therefore, the contribution of the dust aerosol from Saharan regions appears to be limited to the lower level (100 meters above ground level), which did not travelled along the Saharan regions during the period studied.

MODIS sensors

The MODIS data available show the absence of a dust aerosol over the Maltese islands (see the following images of the Aerosol Optical Depth and Mass concentration).

The MODIS data available shows a quite low value referred to the presence of dust aerosols over Malta on 30 September 2013. Both the Aerosol optical depth and the mass concentration map shows values not significantly high to confirm the presence of dust aerosol.

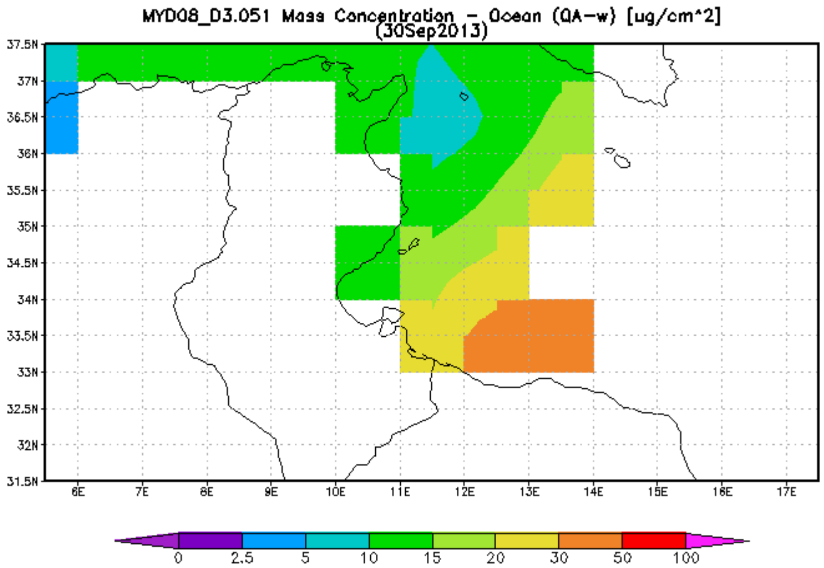
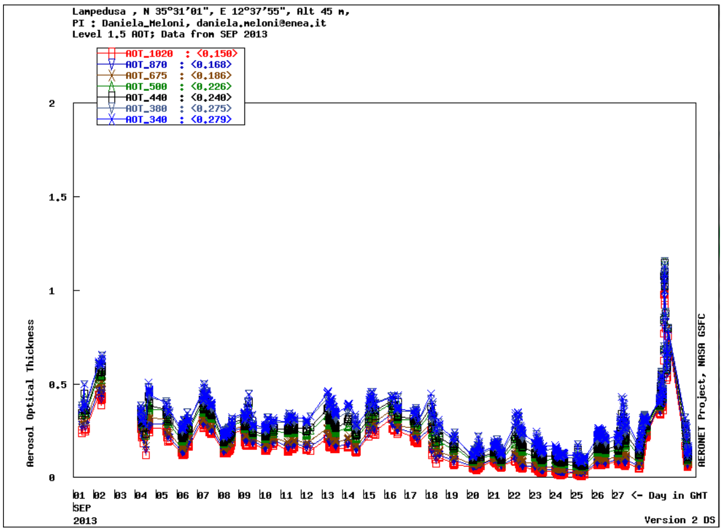


Figure 94: MODIS Terra and Aqua Level 3-Data on the 30 September

AERONET Data

The available data, related to the Lampedusa site where the sun photometer is located and managed by ENEA (Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile, Italy), is plotted in the following figures:

- ***29 September & 30 September***



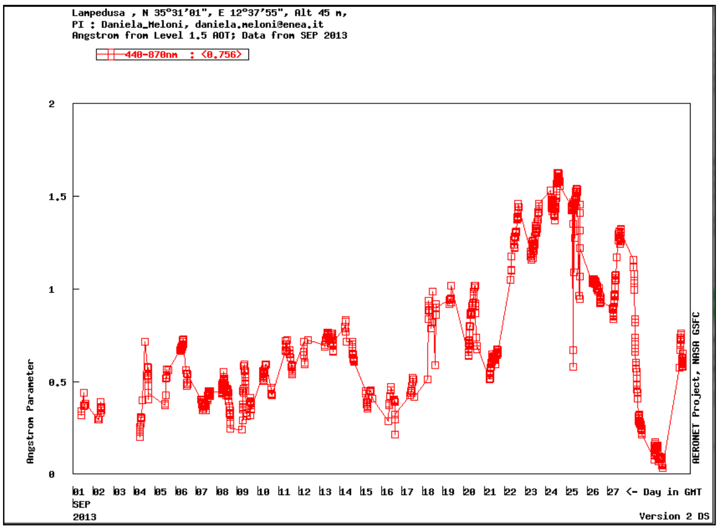


Figure 95: AERONET data from Lampedusa on September

The above images show the presence of a Saharan dust episode over Lampedusa on the latest days of September (such episode is defined by high AOT values and low Angrstrom parameter values).

This episode probably reached the Maltese Islands in the following hours which could explain the PM 10 exceedance on the 29th and on the 30th September

Conclusions

The BSC-DREAM model outputs show a wind field between from Saharan regions (Algeria, Tunisia and Libya) toward Southern Italy and Greece, that could be in compliance with the presence of a dust aerosol over the Libyan coasts.

On the contrary, the HYSPLIT backward trajectories at the lower levels (at 100 and 500 meters above ground level) are from Aegean area and not from Saharan regions. Only the upper backward trajectory (at 1500 meter above ground level) is directly from Southern Libya.

The MODIS data available confirms the presence of medium to high mass concentration in the area on the 29^{th} and 30^{th} of September.

The AERONET data from Lampedusa site confirms the presence of a dust aerosol on the 29^{th} was significantly higher than the previous days of the month.

In conclusion, the PM10-exceedance at Marsaxlokk on the 29^{th} and 30^{th} of September is attributed to a Saharan dust episode. The limited intensity of this episode is probably due to the fact the dust aerosol was transported by a wind vortex that didn't reach directly the Maltese islands but along a longer path with higher energy dissipations and depositions.

2.20. OCTOBER

2.20.1. Analysis for the Identification of Saharan Dust

Step 1: MEPA data analysis

The analysis of the air monitoring data during the period between the 3rd October and the 16th October determined the following exceedances:

- At Marsaxlokk site. exceedance of daily limit value of PM10. occurred on
    - October 10 - daily concentration of 56.58 µg/m^3 against daily limit value of 50.0 µg/m^3
    - October 16 - daily concentration of 52.38 µg/m^3 against daily limit value of 50.0 µg/m^3

Therefore. the days to be investigated are the: 10 and 16 of October.

For the above days. the available information from MEPA air monitoring network was related to:

- Għarb station
- Msida station
- Żejtun station
- Kordin station

The PM10 daily mean values were:

- Għarb station:
    - October 10 - daily concentration of 35.02 µg/m^3 against daily limit value of 50.0 µg/m^3
    - October 16 - daily concentration of 34.1 µg/m^3 against daily limit value of 50.0 µg/m^3
- Msida station:
    - October 10 - daily concentration of 62.15 µg/m^3 against daily limit value of 50.0 µg/m^3
    -
    - October 16 - daily concentration of 36.81 µg/m^3 against daily limit value of 50.0 µg/m^3

- ○
- Żejtun station:
    - October 10 - daily concentration of 10.69 µg/m^3 against daily limit value of 50.0 µg/m^3
    - October 16 - daily concentration of 28.29 µg/m^3 against daily limit value of 50.0 µg/m^3
- Kordin station
    - October 10 - daily concentration of 37.59 µg/m^3 against daily limit value of 50.0 µg/m^3
    - October 16 - daily concentration of 27.49 µg/m^3 against daily limit value of 50.0 µg/m^3

The following table summarizes the above information:

Date	Enemalta air monitoring stations		MEPA air monitoring network stations			
	Marsaxlokk	Birżebbuġa	Għarb	Msida*	Kordin*	Żejtun*
October 10	56.58	*N.V*	35.02	62.15	37.59	10.69
October 16	52.38	*N.V*	34.1	36.81	27.49	28.29

Table 57: PM_{10} measurements on the 10 and 16 of October

The following figure shows the above information:

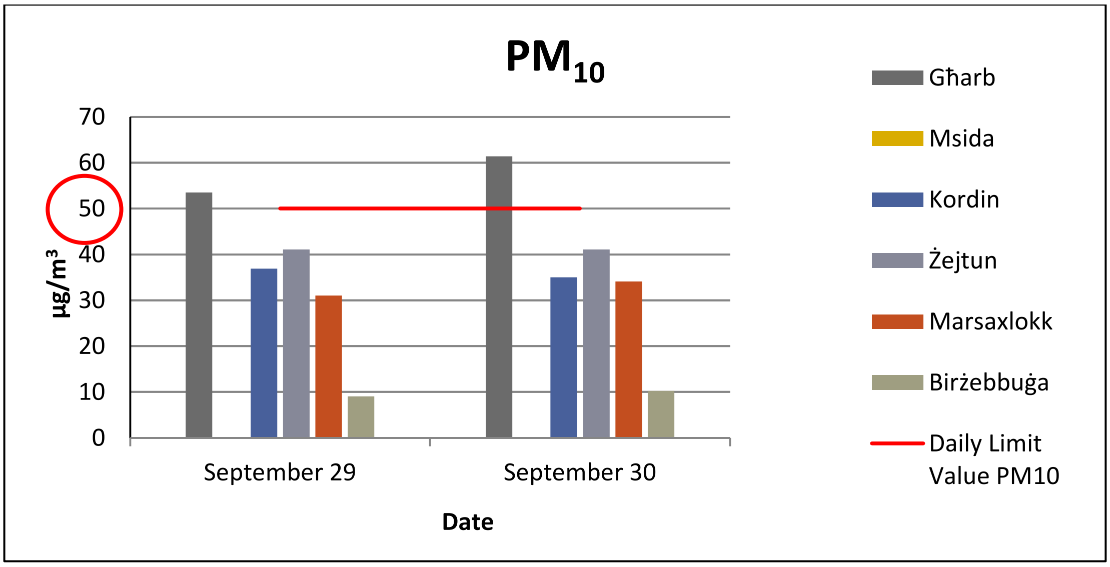


Figure 96: Air monitoring data plot on the days of exceedance

The data indicating the daily mean PM_{10} concentration at the different MEPA stations was extracted from the database and represented in the figure above. On the 10th of October the Msida station also experienced an exceedance in the daily limit value; while on the 16th only Marsaxlokk station experienced a high concentration. As this data does not provide any clear clarification the mean hourly values reached in MEPA station on the 10th and 16th of October were analyzed as well.

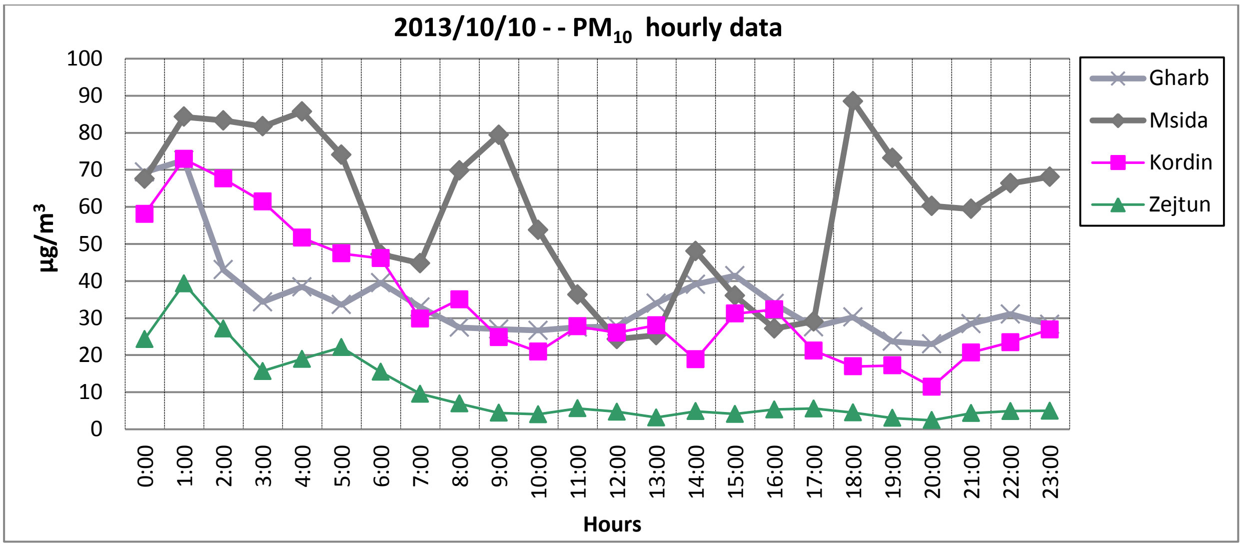


Figure 97: - PM_{10} hourly data for the 10th of October 2013

On the 10th of October the figure above shows a gradual PM_{10} concentration increase in the stations of Msida, Kordin and Għarb from seven in the morning until eleven in the night. Based on this observation a Saharan event could have occurred on the Maltese Islands on this day.

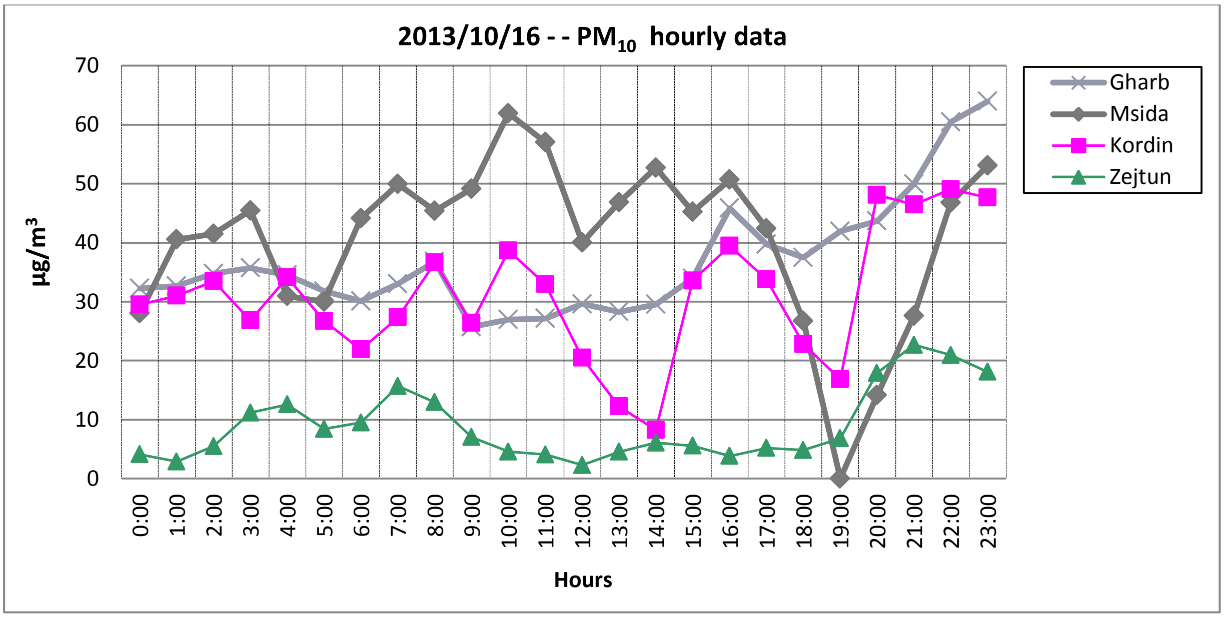


Figure 98: - PM_{10} hourly data for the 16th of October

In this case, there is no clear trend on the PM_{10} values as it occurred on the 16th, nevertheless form the 18:00hrs onwards the figure above shows and increment in the concentration recorded on the Għarb MEPA stations.

Step 2 – Satellite images

The exceedance in January has to be correlated with satellite imagery. The satellite images consulted were downloaded from the AERONET network which produces data available on the NASA website: http://rapidfire.sci.gsfc.nasa.gov/subsets/?subset=AERONET_ETNA.

The belowimages represent satellite images of 250m bands for Aqua and 250m bands for Terra.

Step 3 – Mathematical Modelling

The data available was analysed using the BSC-DREAM dust model (with concentration and deposition indicated) and HYSPLIT 4 model with a printout at heights of 100, 500 and 1500 metres above ground level, that show also mixing heights, taken over a period of 3 days prior to the day when the exceedance were recorded. BSC-DREAM dust model is helpful because it provides information not only on dust aerosols, but also because it provides the reconstruction of the wind field that is essential to better evaluate the HYSPLIT 4 model outputs. The BSC-DREAM outputs used are related to the Dust Loading (expressed in g/m^2) and to the Lowest Level Dust Concentrations (expressed in $\mu g/m^3$).

Step 4 - Satellite data

In cases where satellite images and mathematical modelling outputs were not enough to verify whether on the identified day, Saharan dust episodes really took place, satellite data from three different instruments: the MODIS sensor and AERONET data were analysed for the identified day.

- ***<u>10 October</u>***

AERONET images

The below images represent satellite images of 250m bands for Aqua and 250m bands for Terra.

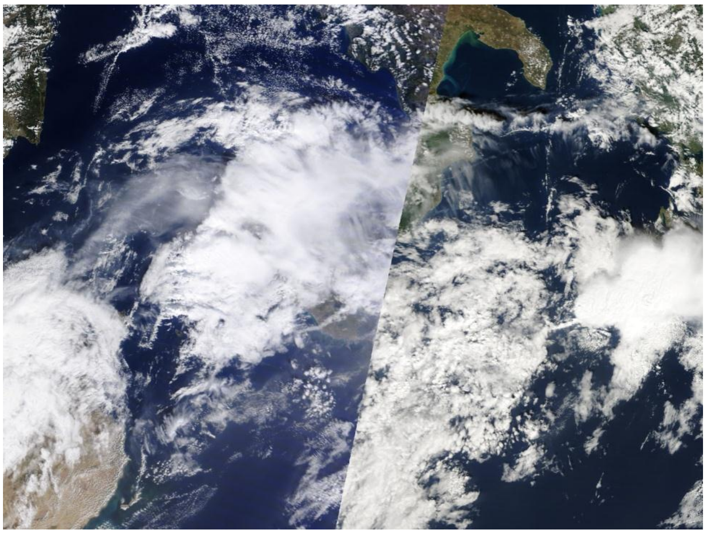


Figure 99: AERONET_ETNA 250 m _TERRA

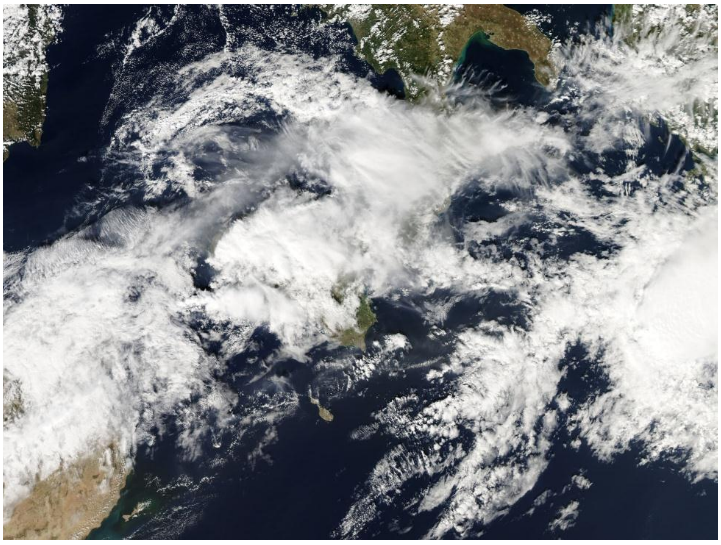
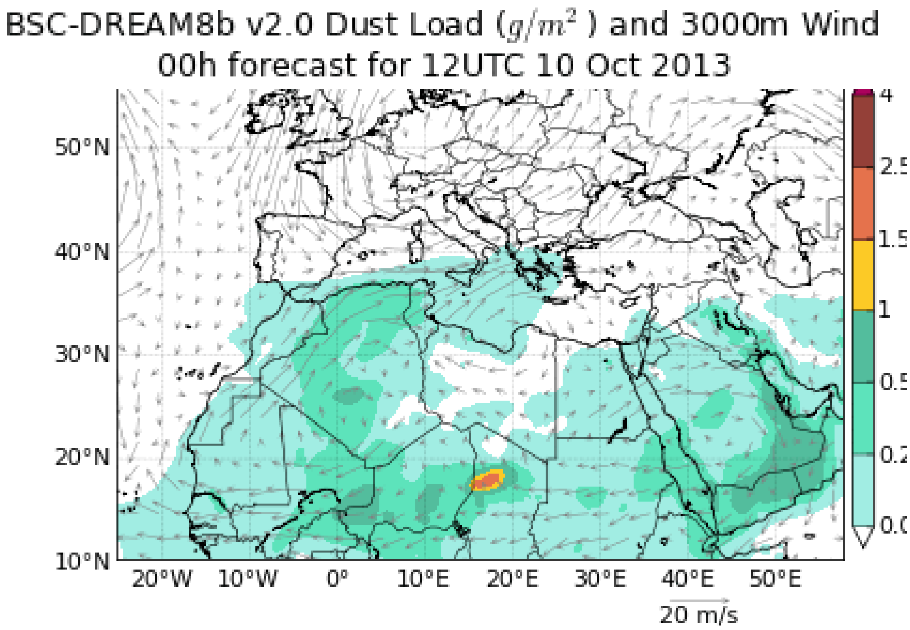


Figure 100: AERONET_ETNA 250 m _AQUA

These images provided by the satellite did not provide any clear indication of a Saharan event.for the 10th October.

BSC-DREAM model

The figure below represents the BSC-DREAM prediction of total dust, expressed in terms of the lowest model level dust concentration (in µg m^3) and of dust load (in g m^2). The dust load is in size classes between 0.1 and 10 µm over Europe at 12:00 UTC and superimposed on the same figure are the corresponding hourly forecasted wind vectors at 3000 m height level.



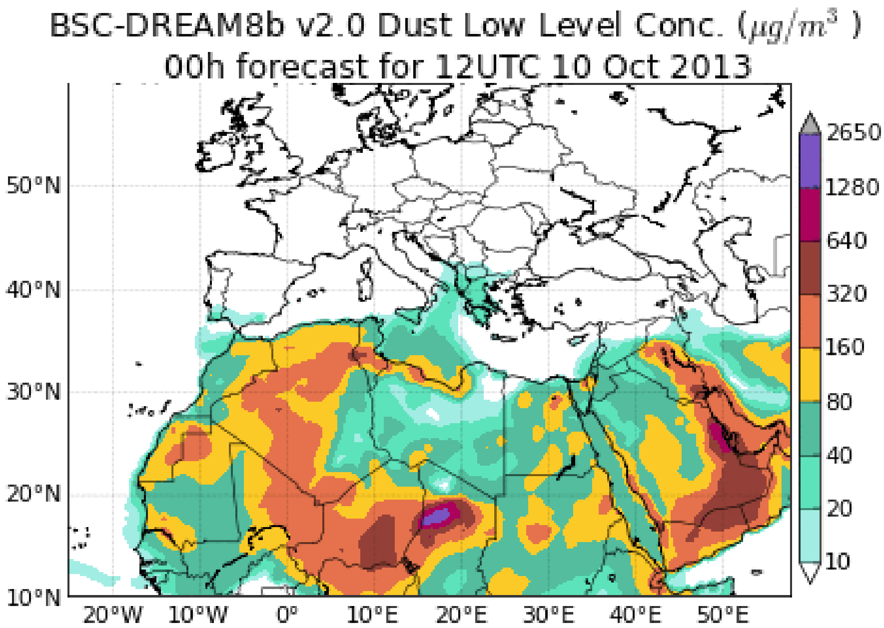


Figure 101: BSC-DREAM outputs on the 10 October

In the dust loading image it can be noted that on the 10th October the regions of Southern Europe and North Africa experienced a series of wind vortices of medium to high intensity. Malta was mainly influenced by a wind vortex originated from the coast of Libya.

The dust concentration image also shows that in this vortex the concentration was higher in Libya and lower in Malta.

HYSPLIT model

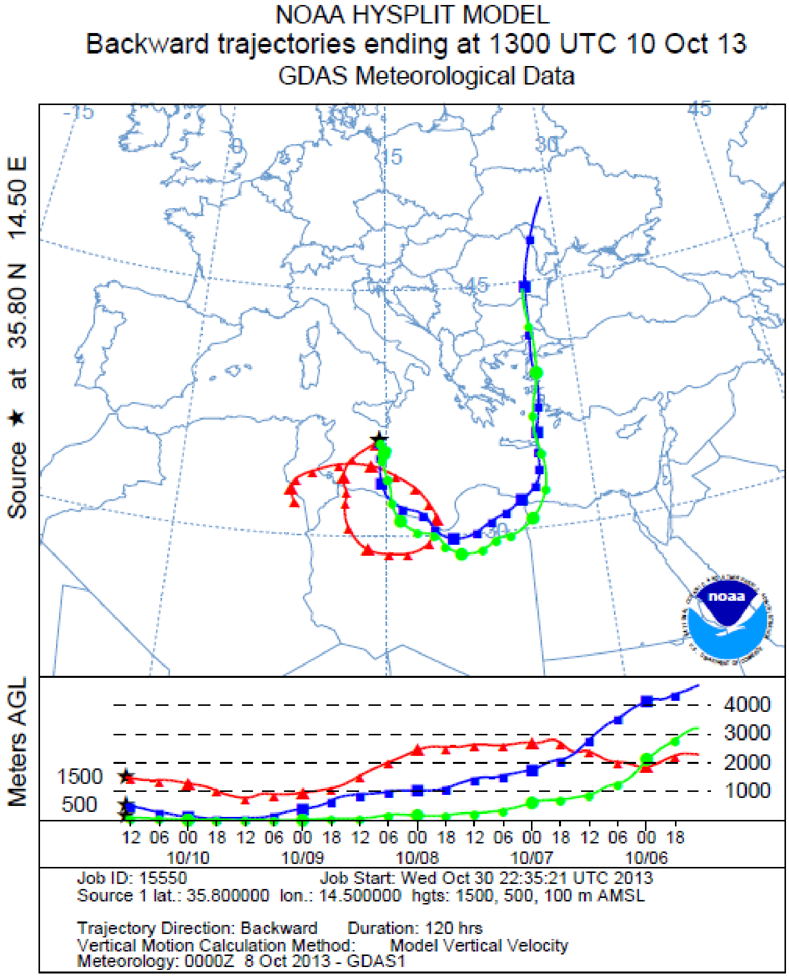


Figure 102: HYSPLIT backward trajectory at 1500m. 500m and 100 m on the 10 October

The image above confirms the information provided by the BSC-DREAM model' as it can be seen from the backward trajectory. Malta was influenced by a wind vortex coming from the North of Libya.

The Mix Depth layer on this date occurred at 372 height; hence the highest wind layer which passed through a Saharan region the longest time, probably did not have an influence on the PM 10 concentration.

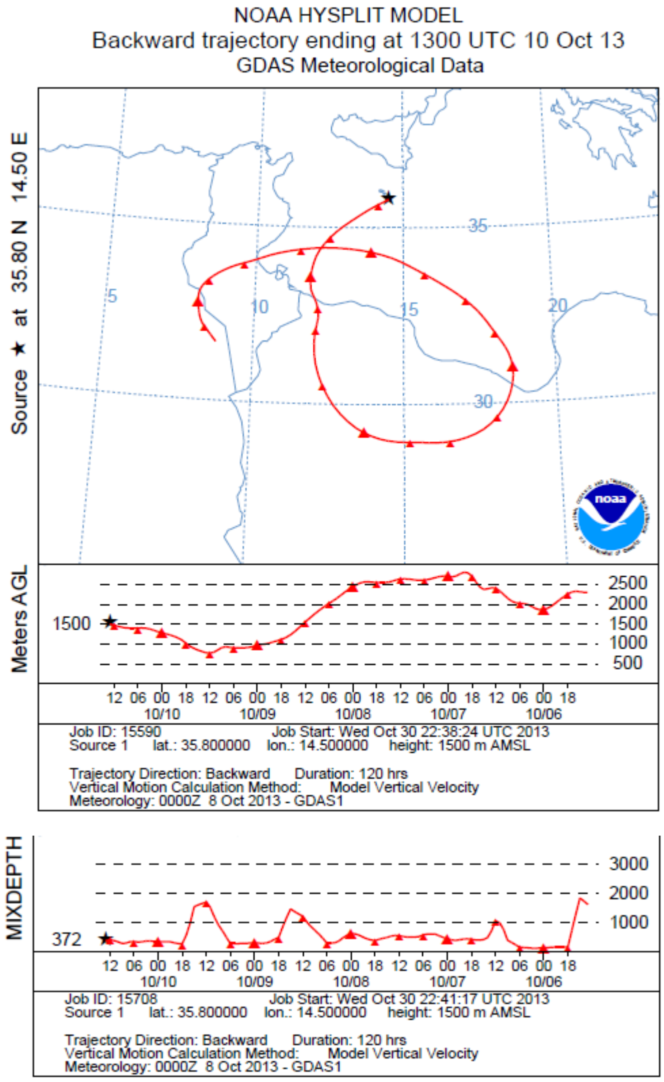


Figure 103: HYSPLIT backward trajectory at 1500m on the 10 October

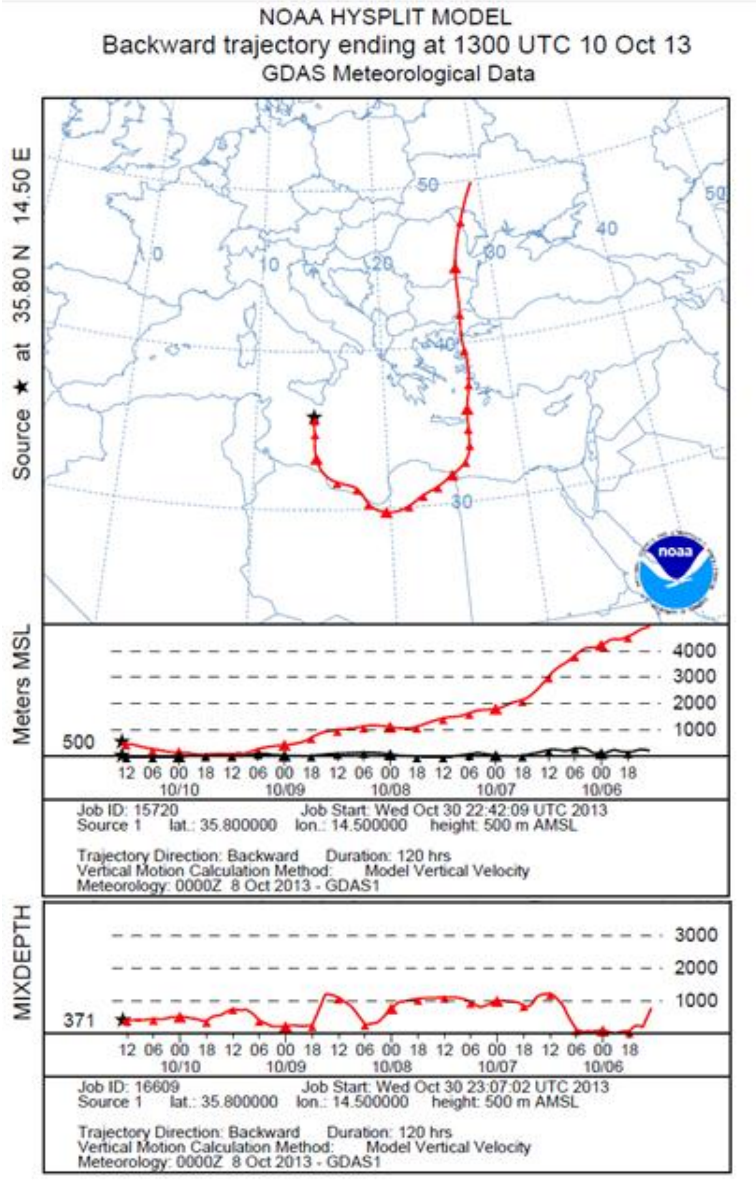


Figure 104: HYSPLIT backward trajectory at 500m on the 10 October

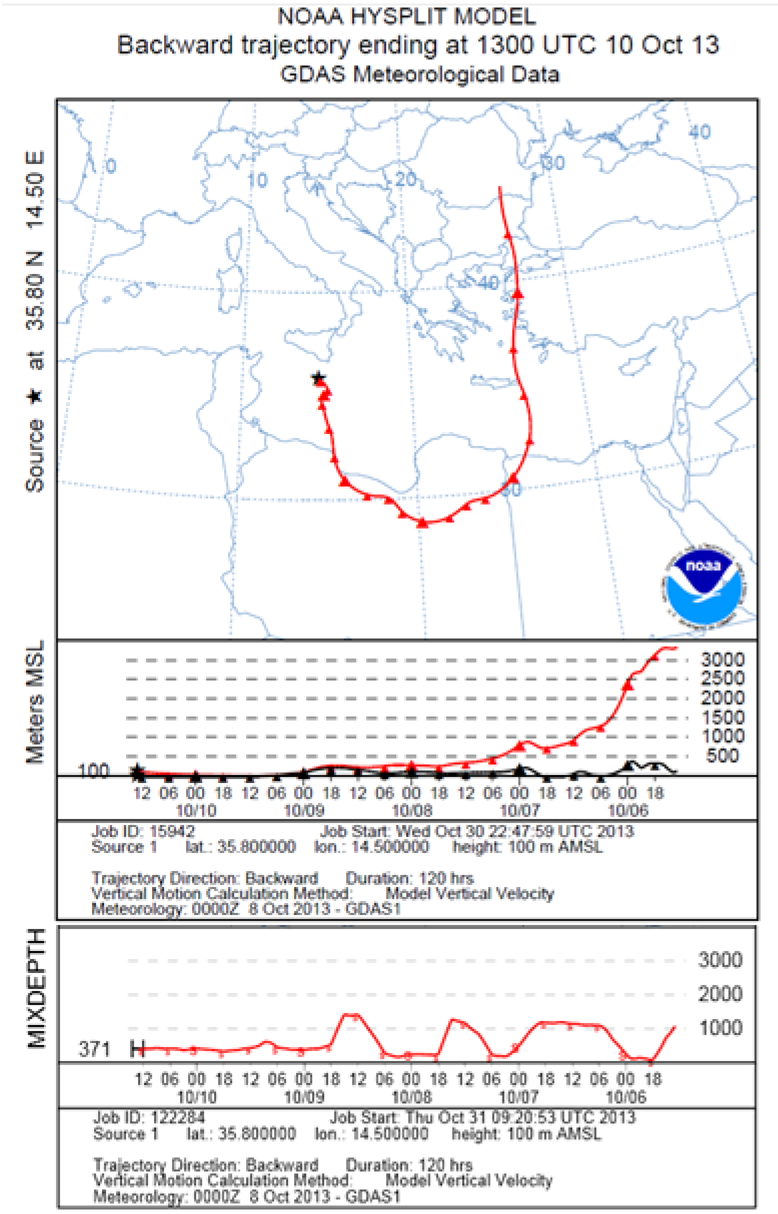


Figure 105: HYSPLIT backward trajectory at 500m on the 10 October

The fact that wind layers of 500 and 100 m passed through Saharan regions on the previous hours reached Malta and were blowing at low heights on the 10th could have influenced the PM10 concentrations on Malta . Nevertheless this influence was most certainly not very strong as the exceedance was only by 6.3 μg/m^3.

MODIS sensor

The MODIS data available does not report information and values over Maltese islands.

The only detailed information available over the Maltese Islands relates to the SMF value indicating that Malta was not affected by dust aerosols.

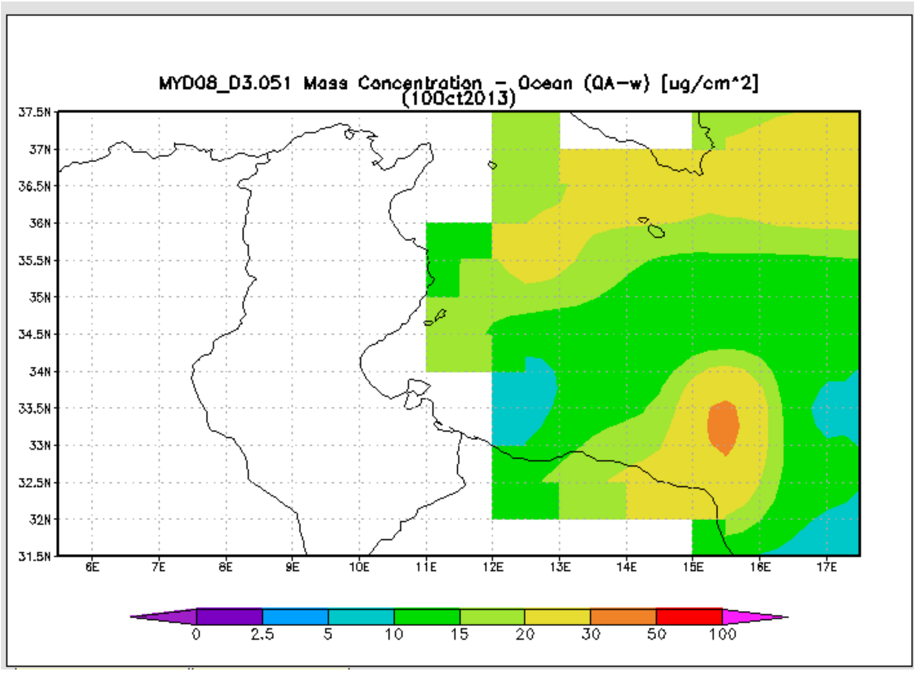


Figure 106: MODIS Terra and Aqua images on the 10 October

The image above shows that the mass concentration around the Maltese Islands reached medium values and higher ones in the center of the wind vortex affecting the Islands. close to the North Coast of Libya. This information could confirm an influence in the PM_{10} concentration coming from the Saharan region but again of low intensity due to the low exceedance reached.

- ***16 October***

AERONET images

he below images represent satellite images of 250m bands for Aqua and 250m bands for Terra.

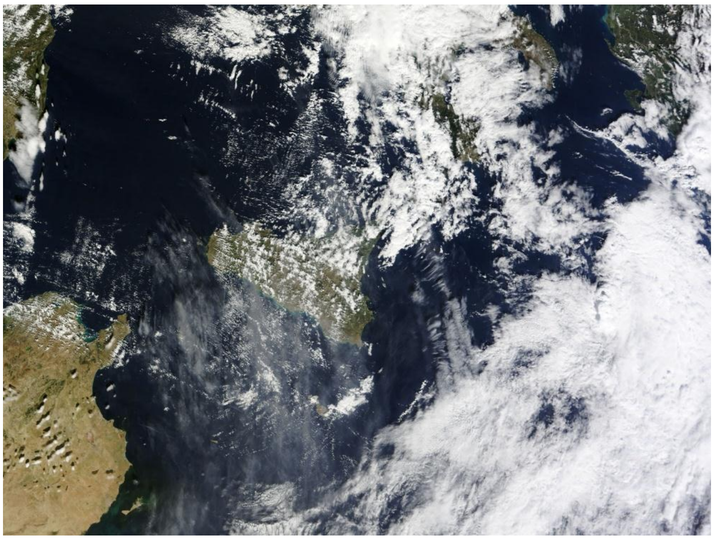
- 

Figure 107: AERONET_ETNA 250 m _TERRA

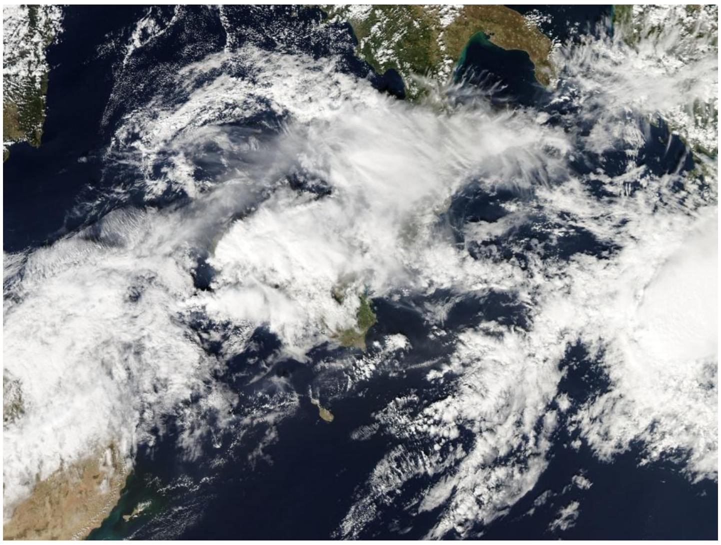
- 

Figure 108: AERONET_ETNA 250 m _AQUA

These images provided by the satellite did not provide any clear indication of a Saharan event.for the 16th October.

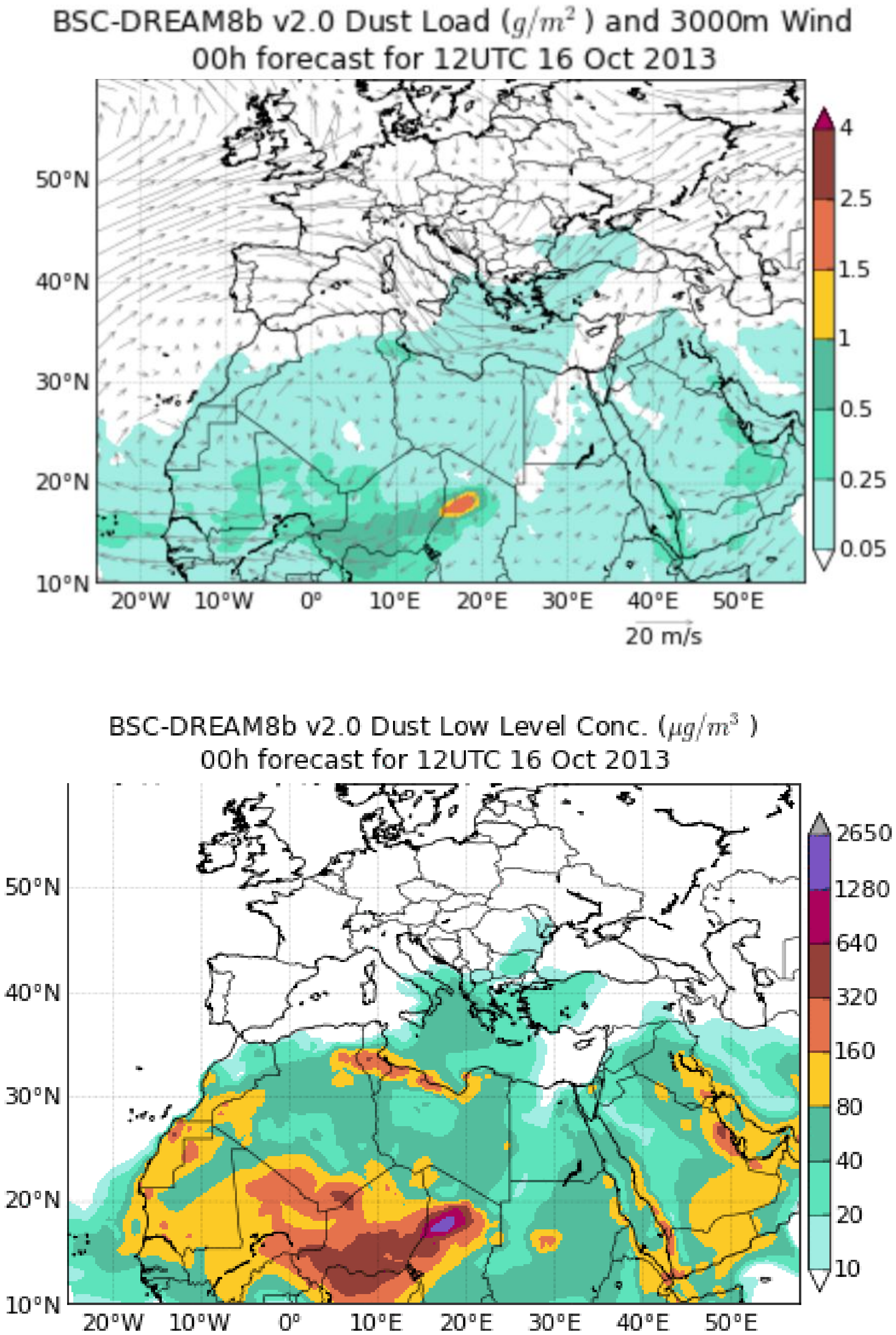


Figure 109: BSC-DREAM outputs on the 16 October

From the dust loading image, it can be noted that on the 16th October, Malta was affected by a wind field from medium to low intensity which originated in the North-West which passed through Spain, Corsica and Sicily, before reaching the islands; therefore no wind fields from the Saharan region reached Malta that day.

HYSPLIT model

The following figures show the application of HYSPLIT on the Maltese islands on the 16th of October

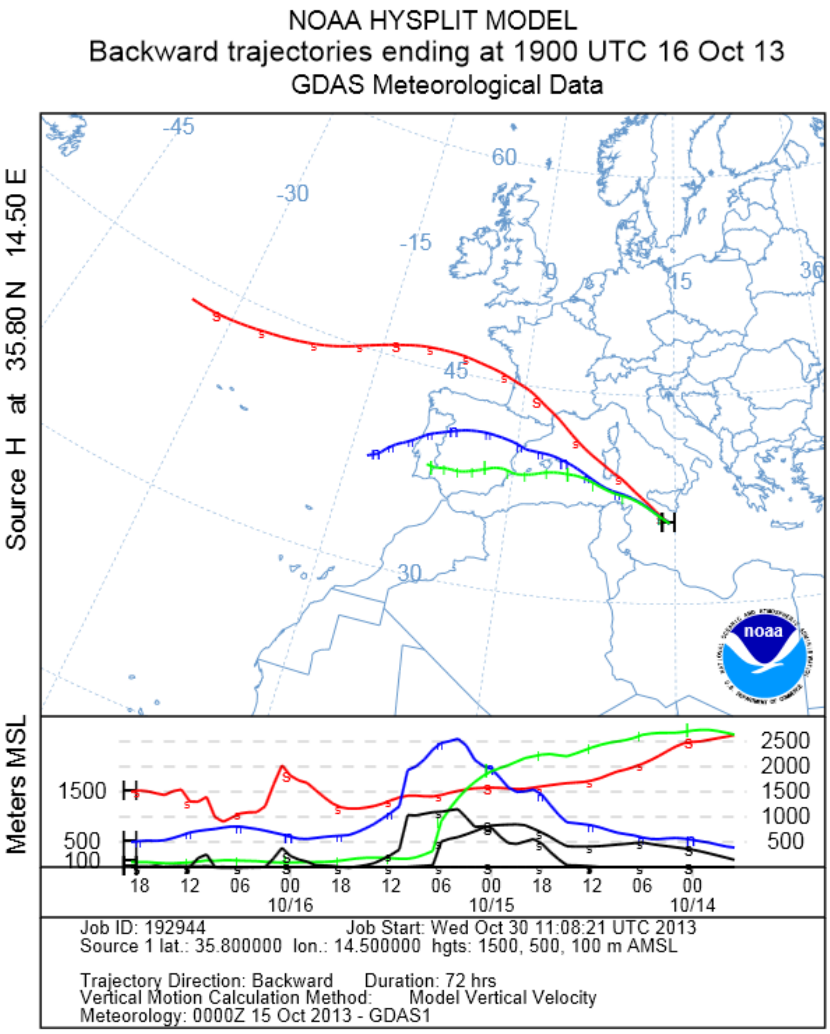


Figure 110: HYSPLIT backward trajectory at 1500. 500. 100m on the 16 October

As in the 10th of October, the information provided by the BSC-model is consistent with the one given by the HYSPLIT Model in the 16th. The wind fields at 1500m. 500m. and 100m height came from the North-West passing through Spain, Corisca and Sicily reaching finally Malta, hence not from Saharan regions.

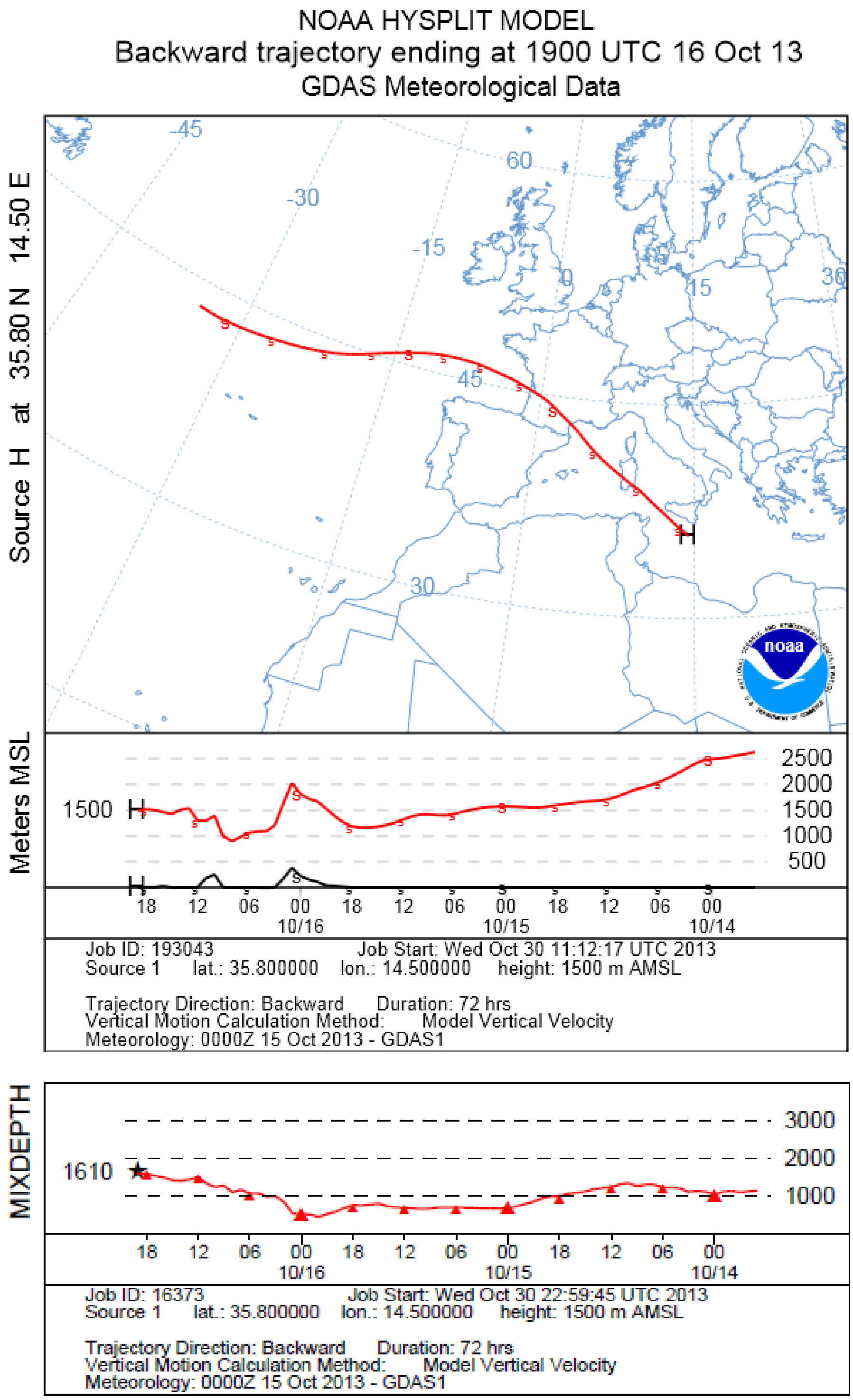


Figure 111: HYSPLIT backward trajectory at 1500m on the 16 October

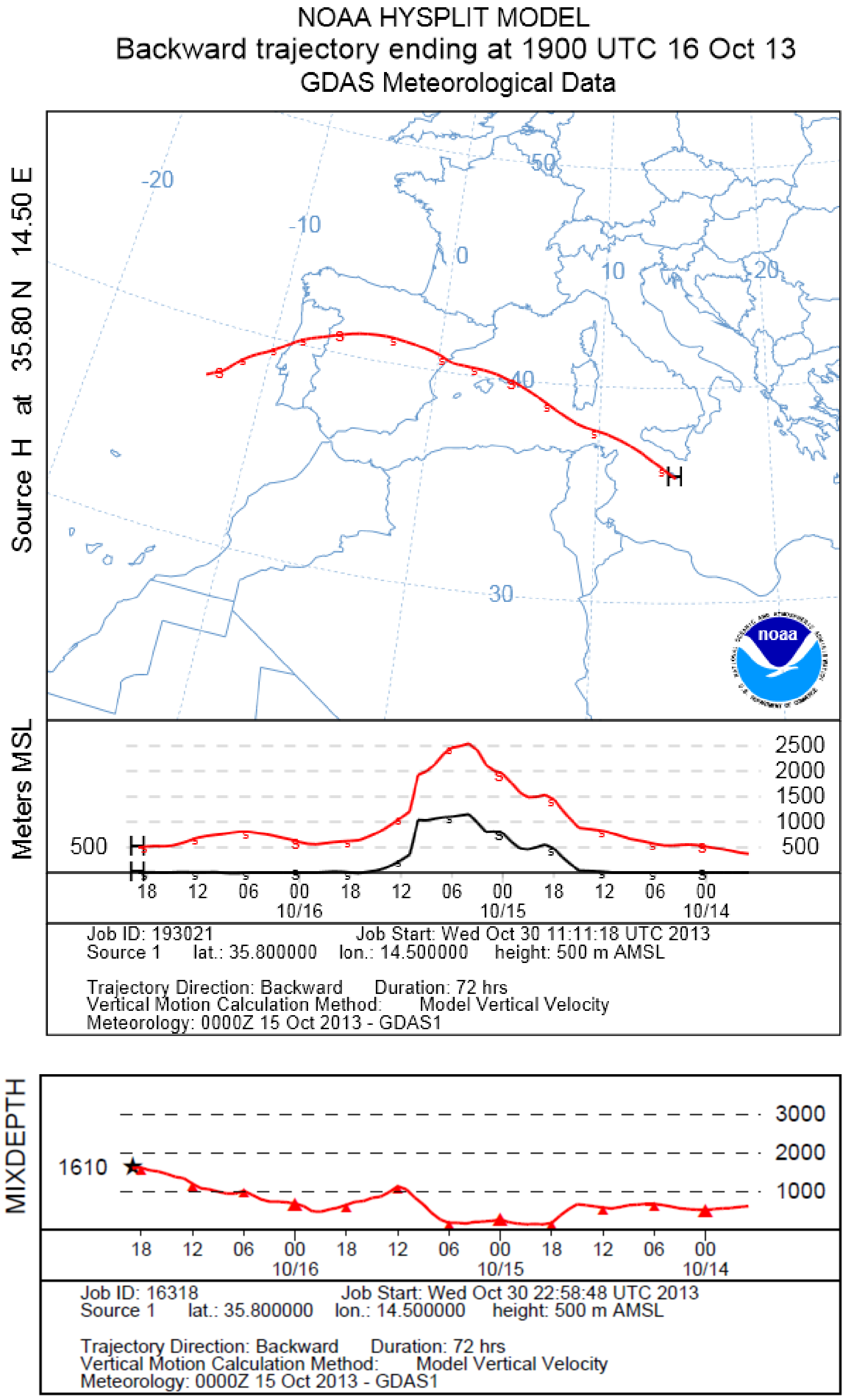


Figure 112: HYSPLIT backward trajectory at 500m on the 16 October

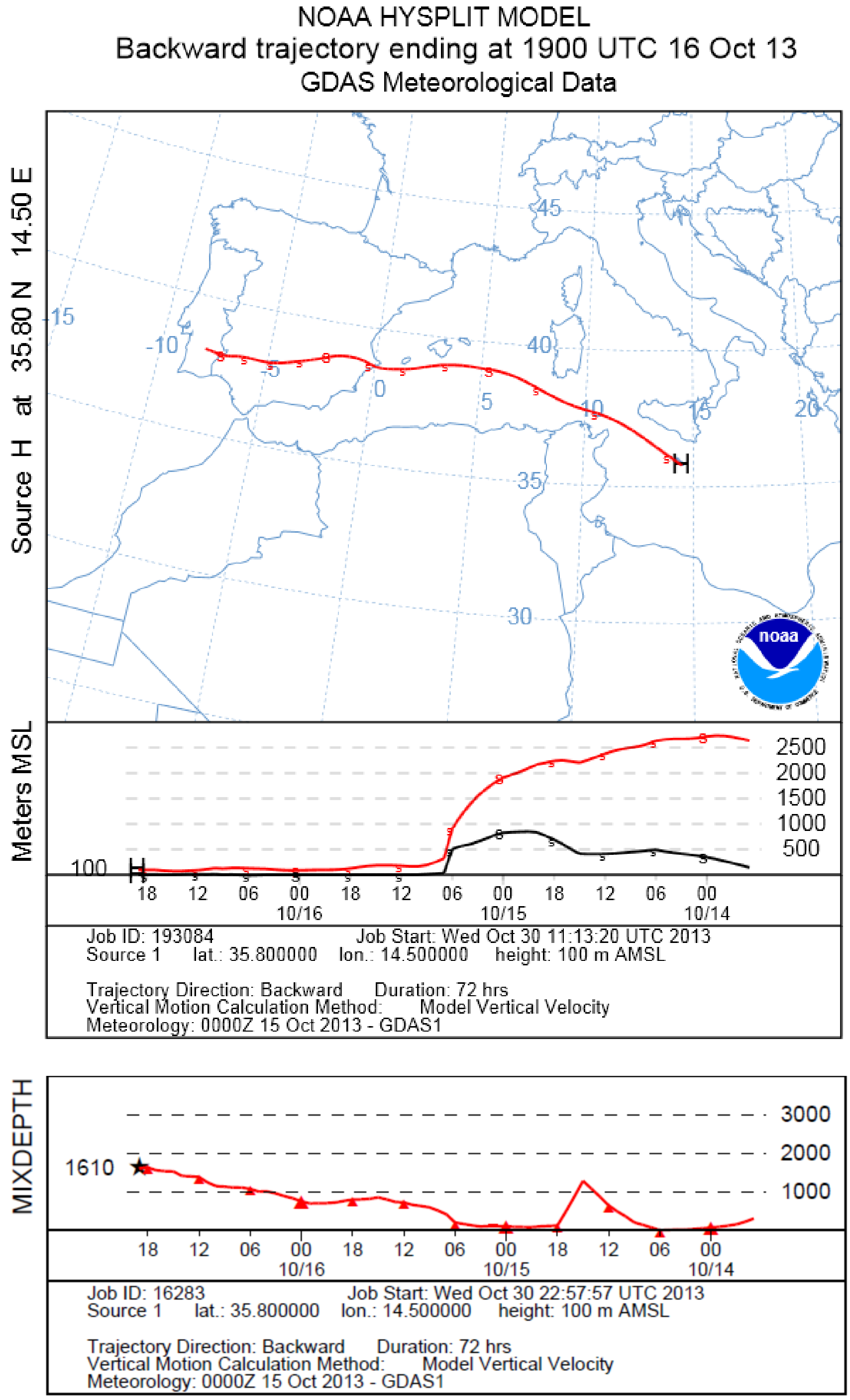


Figure 113: HYSPLIT backward trajectory at 100m on the 16 October

Conclusions

Based on the analysis performed, it could be concluded that on the 10^{th} October the exceedance reached could be attributed to a dust loading episode of low intensity from the Saharan region; while on the 16^{th} October the exceedance could not have been due to a Saharan dust episode hence anthropogenic activities might have been the cause.

2.21. NOVEMBER

2.21.1. Analysis for the Identification of Saharan Dust

The analysis of the air monitoring data during the period between 14th and the 27th November determined the following exceedances:

- At Marsaxlokk site an exceedance of daily limit value of PM_{10} occurred on:
  - November 19 daily concentration of 67.20 µg/m^3 against daily limit value of 50.0 µg/m^3
- At Birżebbuġa an exceedance of the daily limit value of PM_{10}, occurred on:
  - November 19 daily concentration of 74.12 µg/m3 against daily limit value of 50.0 µg/m3

Step 1: MEPA data analysis

The mean PM_{10} concentration at the different MEPA stations on the 19th November was extracted from the database.

The PM_{10} daily mean values were:

- Għarb station:
  - November 19 daily concentration of 61.12 µg/m^3 against daily limit value of 50.0 µg/m^3
- Msida station:
  - November 19 daily concentration of 70.76 µg/m^3 against daily limit value of 50.0 µg/m^3
- Żejtun station:
  - November 19 daily concentration of 52.3 µg/m^3 against daily limit value of 50.0 µg/m^3
- Kordin station
  - November 19 daily concentration of 59.63 µg/m^3 against daily limit value of 50.0 µg/m^3

The following table summarizes the above information:

Date	Enemalta air monitoring stations		MEPA air monitoring network stations			
	Marsaxlokk	Birżebbuġa	Għarb	Msida	Żejtun	Kordin
November 19	67.20	74.12	61.12	70.76	52.3	59.63

Table 58: PM_{10} measurements on the 19 November

The data indicating the daily mean PM_{10} concentration at the different MEPA stations was extracted from the database and represented in the figure below:

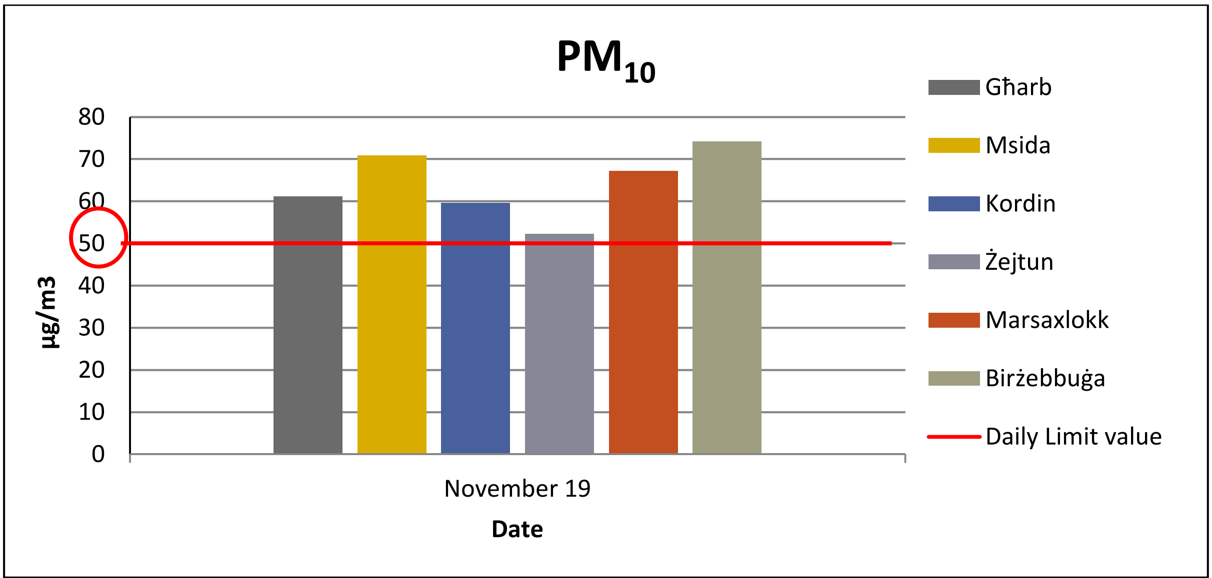


Figure 114: Air monitoring data plot on the days of exceedance

During the 19th November the four stations experienced an exeedance of the daily Limit value which could indicate the possibility of a Saharan event.

In order to assess whether or not a Saharan event took place, a detailed analysis was carried out based on the EU guidelines in Steps 2 and 3 below. Satellite images were evaluated and the mathematical model tools applied in order to reach a conclusion.

For setting up the model variables in Step 3, a PM_{10} hourly concentration analysis was applied. This information is then used to best fit the modelling with HYSPLIT and run simulations at the specific hours that present the maximum probability of the eventual episode under investigation.

The following figure shows the variation of the PM_{10} hourly concentrations on 19 November for all the MEPA fixed stations.

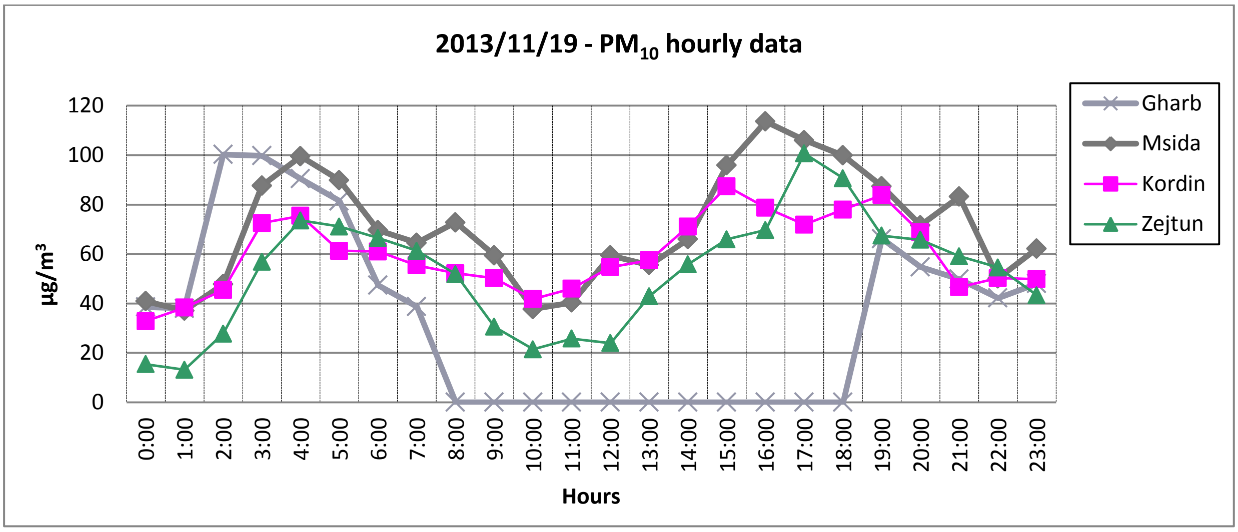


Figure 115: PM_{10} hourly data for the 19 November

The figure above shows that during the 19th November the four MEPA stations followed the same pattern in the PM_{10} concentration trend. Two picks can be clearly distinguished, both significantly above the daily limit value. The first one started before 3:00hrs and lasted until 7:00hrs, followed by the second one, from 14:00hrs until 20:00hrs. The fact that the first peak concentration occurred during the first hours of the day, when no high traffic density takes place, indicates the possibility that a Saharan event occurred.

According this data, the HYSPLIT model will be specified at 02.00 UTC (corresponding to 4.00hrs in Malta) on November 19th, defined as the moment of maximum peak of the possible dust event.

Step 2 – Satellite images

There were no satellite images available.

Step 3 – Mathematical Modelling

The data available was analysed using the BSC-DREAM dust model (with concentration and deposition indicated) and HYSPLIT 4 model with a printout at heights of 100, 500 and 1500 metres above ground level, that show also mixing heights, taken over a period of 3 days prior to the day when the exceedance were recorded. BSC-DREAM dust model is helpful because it provides information not only on dust aerosols, but also because it provides the reconstruction of the wind field that is essential to better evaluate the HYSPLIT 4 model outputs. The BSC-DREAM outputs used are related to the Dust Loading (expressed in g/m^2) and to the Lowest Level Dust Concentrations (expressed in $\mu g/m^3$).

Step 4 - Satellite data

In cases where satellite images and mathematical modelling outputs were not enough to verify whether on the identified day, Saharan dust episodes really took place, satellite data from three different instruments: the MODIS sensor and AERONET data were analysed for the identified day.

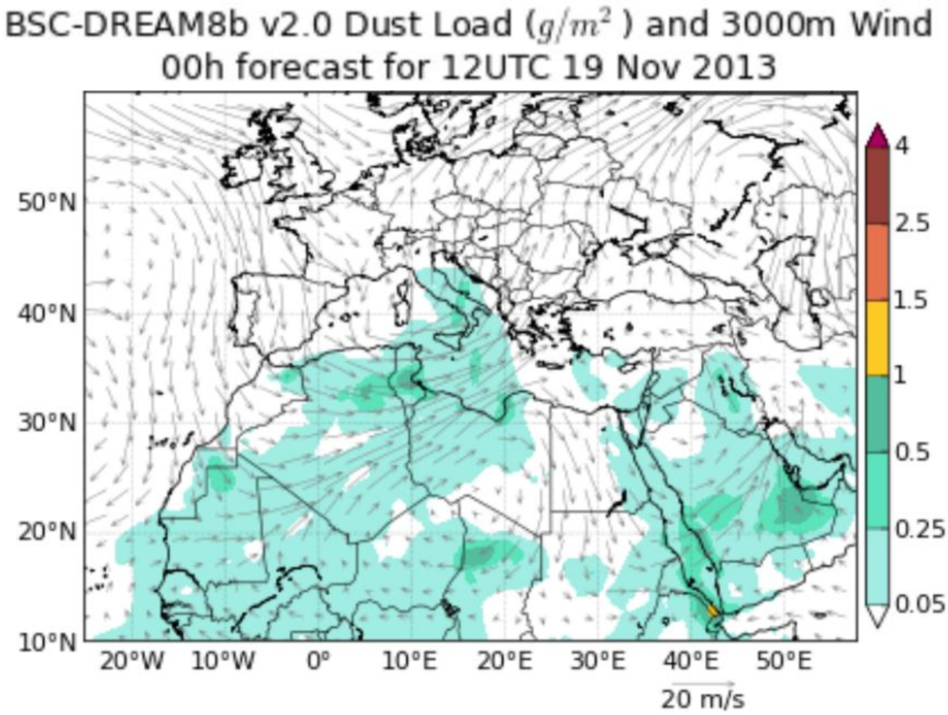
<u>19 November</u>

AERONET images

There were no satellite images available for this day.

BSC-DREAM dust model

The figure below represents the BSC-DREAM prediction of total dust, expressed in terms of lowest model level dust concentration (in µg/m^3) and of dust load (in g/m^2). The dust load is in size classes between 0.1 and 10 µm over Europe at 12:00 UTC and 18.00 UTC, and superimposed on the same figure are the corresponding hourly forecasted wind vectors at 3000m height level.



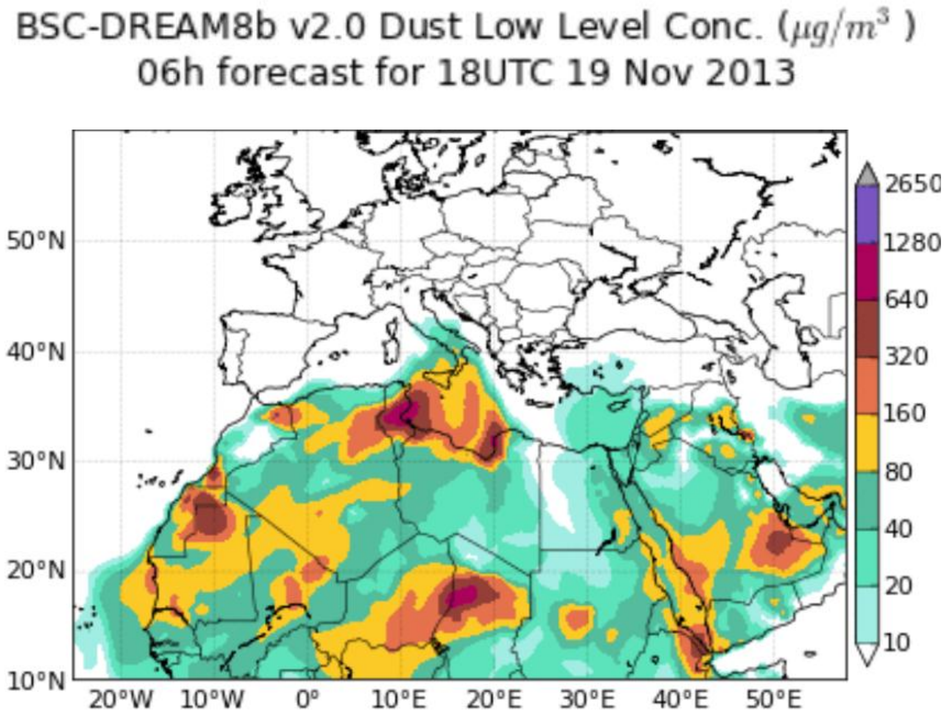


Figure 116: BSC-DREAM outputs on the 19 November

The BSC-DREAM output expressed in terms of dust load, shows a wind field coming from the Northern Atlantic areas descending until North Africa and passing through the Saharan region before reaching Malta and Southern Italy.

The dust concentration image shows several areas affected by dust aerosol including West Sahara, Morocco, Tunisia, the coast of Libya as well as Malta and the South of Italy. This high concentration is likely due to the wind field present above this region, therefore, there is a correlation between the two BSC-DREAM outputs.

HYSPLIT model

The following figure shows the application of HYSPLIT on the Maltese islands on the 19th of November. The HYSPLIT output is related to 02:00 UTC, defined as the moment of maximum peak of the possible dust event.

The HYSPLIT model output related to the conditions on the 19th November shows that the backward trajectories at the level of 100, 500 and 1500 meters above ground level, transited over Saharan regions, even for large segments, before reaching the Maltese Islands. Of special interest is the backward trajectory at 100m height, which passed through Libya and Tunisia, where the BSC-DREAM outputs showed presence of high dust low level concentration.

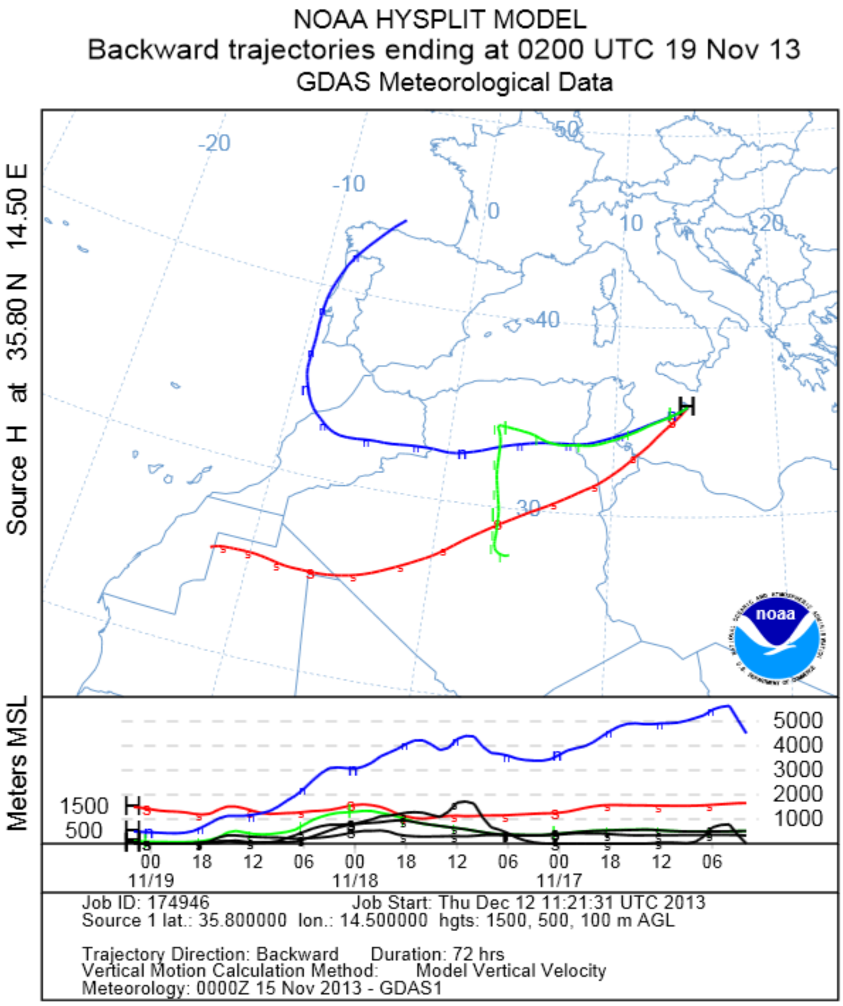


Figure 117: HYSPLIT backward trajectory at 1500m, 500m and 100 m on the 19 November

The data provided by the HYSPLIT model is in coherence with the images provided by the BSC-Model. The wind backwards trajectories at a 1500, 500 and 100m height, passed through Saharan regions during more than a day before they reached the Maltese islands, possibly bringing with them high dust concentrations.

The following figures show, for each backward trajectory, the variation of the parameters “Terrain height” and “Mixed layer depth”, along the path. This information allows some further assessment about the probable intensity of the event at the arriving-point of this trajectory:

- a reduced distance from the backward trajectory level and the terrain height is considered to be an indicator of a higher intensity event, due to a major implication of the lower level of the atmosphere;
- the presence, along the path, of many points at which the trajectory level is above the mixed layer depth is considered an indicator of a possible decrease of the intensity of the dust aerosol, even if the trajectory being always under the mixed layer depth may be affected by

higher level of dust deposition along the path, with minor intensity at the ending-point of the backward trajectory;

- a mixed layer depth higher than the ending-level of each backward trajectory is an indicator of a higher level of intensity of the event;
-

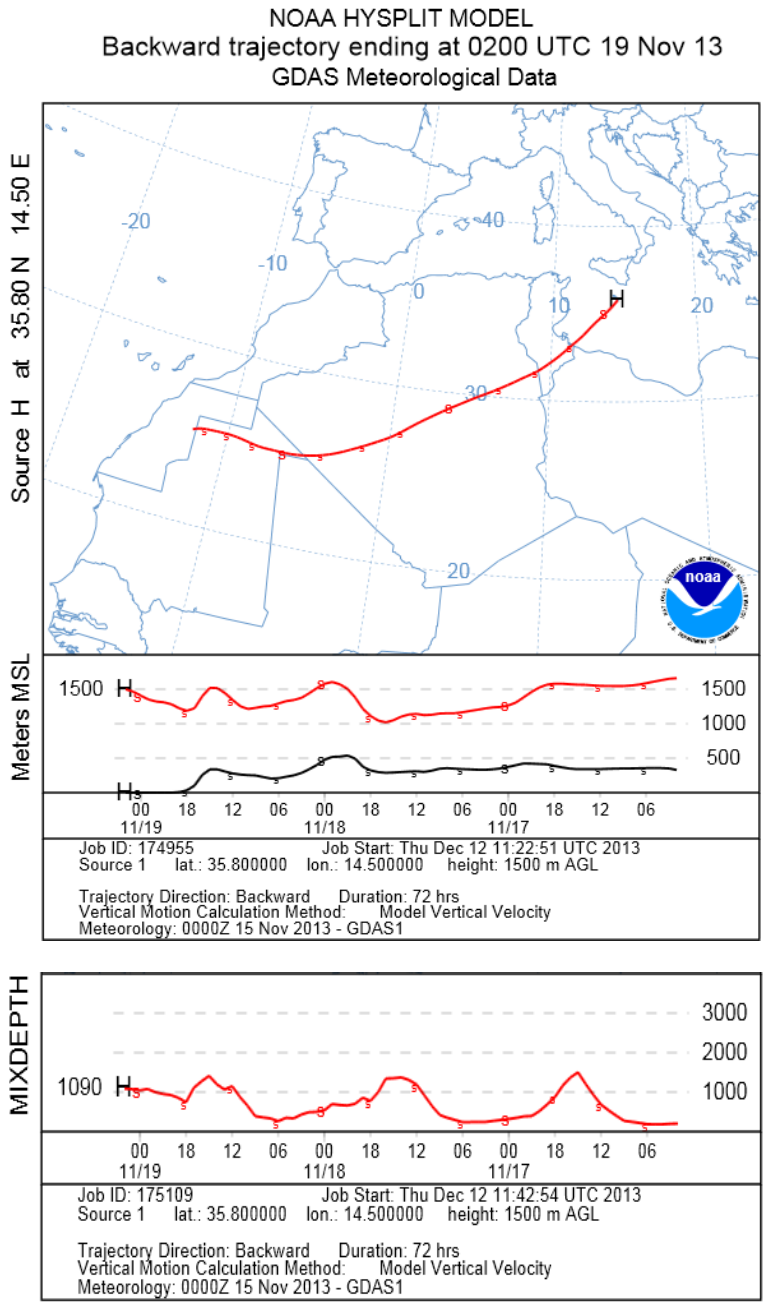


Figure 118: HYSPLIT backward trajectory at 1500 m on the 19 November

The path of the backward trajectory at 1500 meters, originated in Mauritania and arrived to Malta after passing over Algeria and Tunisia. The mix depth quote over Malta was 1090 meters, lower than the arriving quote of this backward trajectory.

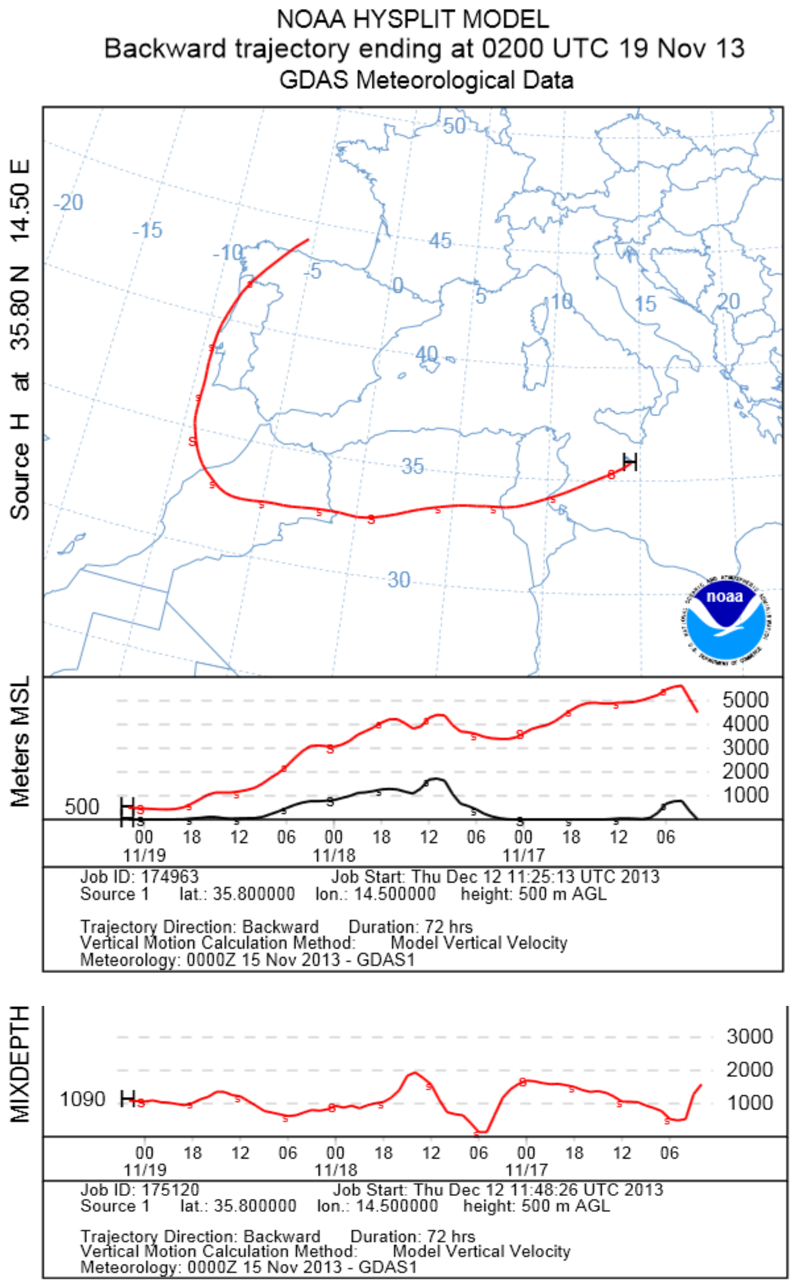


Figure 119: HYSPLIT backward trajectory at 500 m on the 19 November

The

backward trajectory at 500 meters above ground level, came from North-West Spain and reached the Maltese Islands after passing over the Saharan regions of Morocco, Algeria and Tunisia. This trajectory is compliant with the wind field calculated by BSC-DREAM model. The mixdepth quote over Malta was higher than the arriving quote of this backward trajectory.

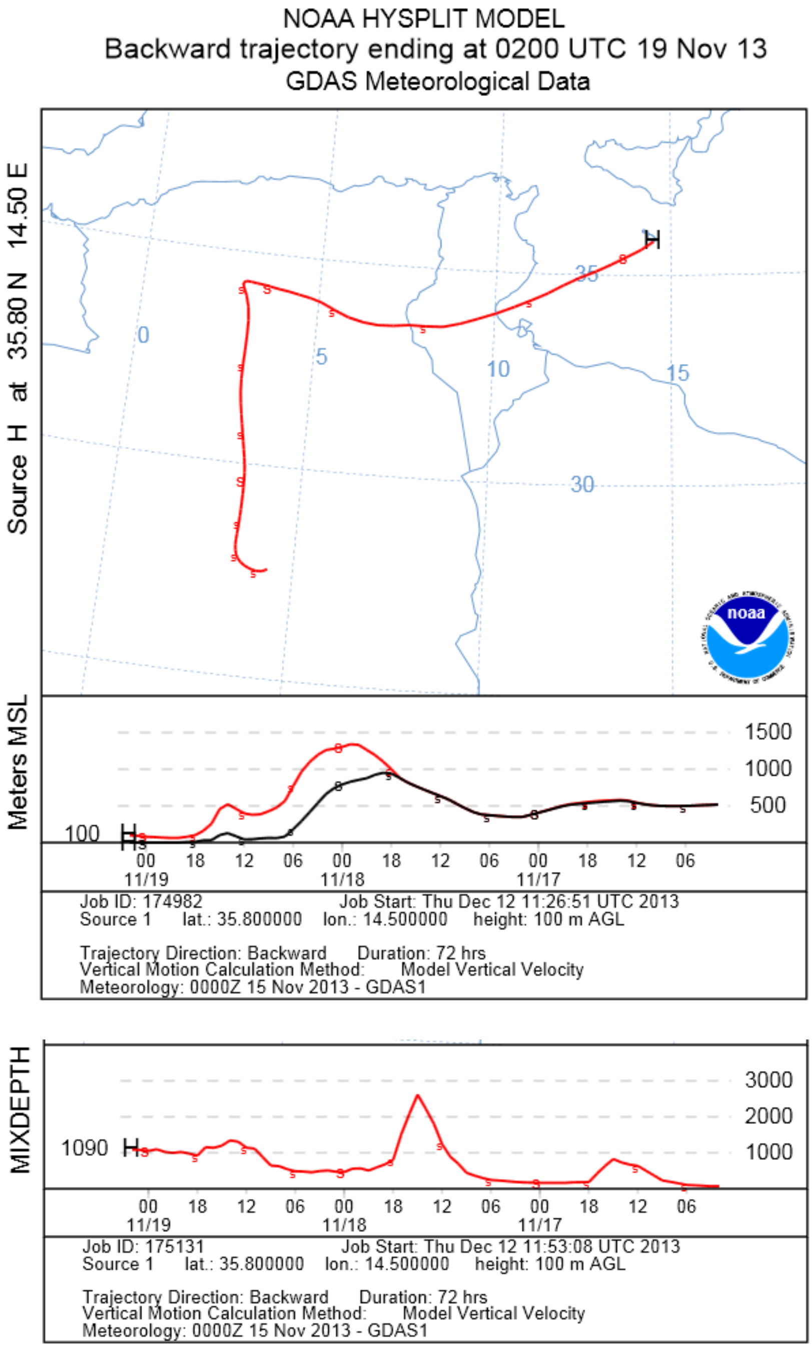


Figure 120: HYSPLIT backward trajectory at 100 m on the 19 November

The backward trajectory related to 100 meters level passed across Libya and Tunisia before reaching Malta. The mixdepth quote over Malta was 1090 meters, higher than the arriving quote of this backward trajectory.

Conclusions

Regarding the situation on the 19th November over the Maltese islands, there were no satellite images available to make a visual analysis, but the BSC-DREAM and HYSPLIT models provided information which showed a strong correlation between each other.

The BSC-DREAM output regarding dust load showed a wind field coming from the North Atlantic area that at the arrival to the Northern Africa coast splitted in two, passing both through Saharan regions and converting afterwards before arriving to the Maltese islands. The BSC-DREAM model output related to the dust concentration shows that the areas affected by dust aerosols were along the Libyan and Tunisian coasts and Mediterranean area, specifically between the African coasts and the Maltese Islands.

The HYSPLIT outputs were in coherence with the BSC-DREAM outputs as the backward trajectories at 1500, 500 and 100 m above ground level passed across Saharan regions before reaching Malta.

MODIS sensor outputs did not provide any further clarification on the situation over Malta the 19th, hence the data was not included in the final analysis.

On the basis of the above considerations, it was assessed that on the 19th November a Saharan dust event took place over Malta which influenced the final PM_{10} concentrations registered in the monitoring stations.

2.22. JANUARY

2.22.1. Analysis for the Identification of Saharan Dust

Step 1: MEPA data analysis

The analysis of the air monitoring data during the period between the 7th and the 31st January 2014 determined the following exceedances:

- at Marsaxlokk site, exceedance of daily limit value of PM_{10}, occurred on
  - January 18 - daily concentration of 79.86 μg/m^3 against daily limit value of 50.0 μg/m^3
  - January 19 - daily concentration of 102.62 μg/m^3 against daily limit value of 50.0 μg/m^3
  - January 20 - daily concentration of 149.62 μg/m^3 against daily limit value of 50.0 μg/m^3
  - January 30 - daily concentration of 64.45 μg/m^3 against daily limit value of 50.0 μg/m^3
  - January 31 - daily concentration of 127.61 μg/m^3 against daily limit value of 50.0 μg/m^3
- at Birżebbuġa site, exceedance of daily limit value of PM_{10}, occurred on
  - January 18 - daily concentration of 95.73 μg/m^3 against daily limit value of 50.0 μg/m^3
  - January 19 - daily concentration of 99.94 μg/m^3 against daily limit value of 50.0 μg/m^3
  - January 20 - daily concentration of 150.25 μg/m^3 against daily limit value of 50.0 μg/m^3
  - January 30 - daily concentration of 74.88 μg/m^3 against daily limit value of 50.0 μg/m^3
  - January 31 - daily concentration of 144.19 μg/m^3 against daily limit value of 50.0 μg/m^3

For the above days, the available information from MEPA air monitoring network was related to:

- Għarb station
- Msida station
- Żejtun station
- Kordin station

The PM_{10} daily mean values were:

- Għarb station:
  - January 18 - daily concentration of 80.98 µg/m^3 against daily limit value of 50.0 µg/m^3
  - January 19 - daily concentration of 98.53 µg/m^3 against daily limit value of 50.0 µg/m^3
  - January 20 - daily concentration of 120.05 µg/m^3 against daily limit value of 50.0 µg/m^3
  - January 30 - daily concentration of 55.94 µg/m^3 against daily limit value of 50.0 µg/m^3
  - January 31 - daily concentration of 97.42 µg/m^3 against daily limit value of 50.0 µg/m^3
- Msida station:
  - January 18 - daily concentration of 74.61 µg/m^3 against daily limit value of 50.0 µg/m^3
  - January 19 - daily concentration of 101.43 µg/m^3 against daily limit value of 50.0 µg/m^3
  - January 20 - daily concentration of 148.15 µg/m^3 against daily limit value of 50.0 µg/m^3
  - January 30 - daily concentration of 70.88 µg/m^3 against daily limit value of 50.0 µg/m^3
  - January 31 - daily concentration of 130.50 µg/m^3 against daily limit value of 50.0 µg/m^3
- Żejtun station:
  - January 18 - daily concentration of 50.02 µg/m^3 against daily limit value of 50.0 µg/m^3

- January 19 - daily concentration of 76.48 µg/m^3 against daily limit value of 50.0 µg/m^3
- January 20 - daily concentration of 129.38 µg/m^3 against daily limit value of 50.0 µg/m^3
- January 30 - daily concentration of 47.87 µg/m^3 against daily limit value of 50.0 µg/m^3
- January 31 - daily concentration of 107.97 µg/m^3 against daily limit value of 50.0 µg/m^3

- Kordin station
  - January 18 - daily concentration of 68.93 µg/m^3 against daily limit value of 50.0 µg/m^3
  - January 19 - daily concentration of 92.22 µg/m^3 against daily limit value of 50.0 µg/m^3
  - January 20 - daily concentration of 141.91 µg/m^3 against daily limit value of 50.0 µg/m^3
  - January 30 - daily concentration of 62.43 µg/m^3 against daily limit value of 50.0 µg/m^3
  - January 31 - daily concentration of 124.45 µg/m^3 against daily limit value of 50.0 µg/m^3

The following table summarizes the above information:

Date	Enemalta air monitoring stations		MEPA air monitoring network stations			
	Marsaxlokk	Birżebbuġa	Għarb	Msida	Kordin	Żejtun
January 18	79.86	95.73	80.98	74.61	68.93	50.02
January 19	102.62	99.94	98.53	101.43	92.22	76.48
January 20	149.62	150.25	120.05	148.15	141.91	129.38
January 30	64.46	74.89	55.94	70.88	62.43	47.87
January 31	127.61	144.19	97.42	130.5	124.45	107.97

Table 59: PM_{10} measurements on the 18, 19 and 20 January 2014

The following figure shows the above information:

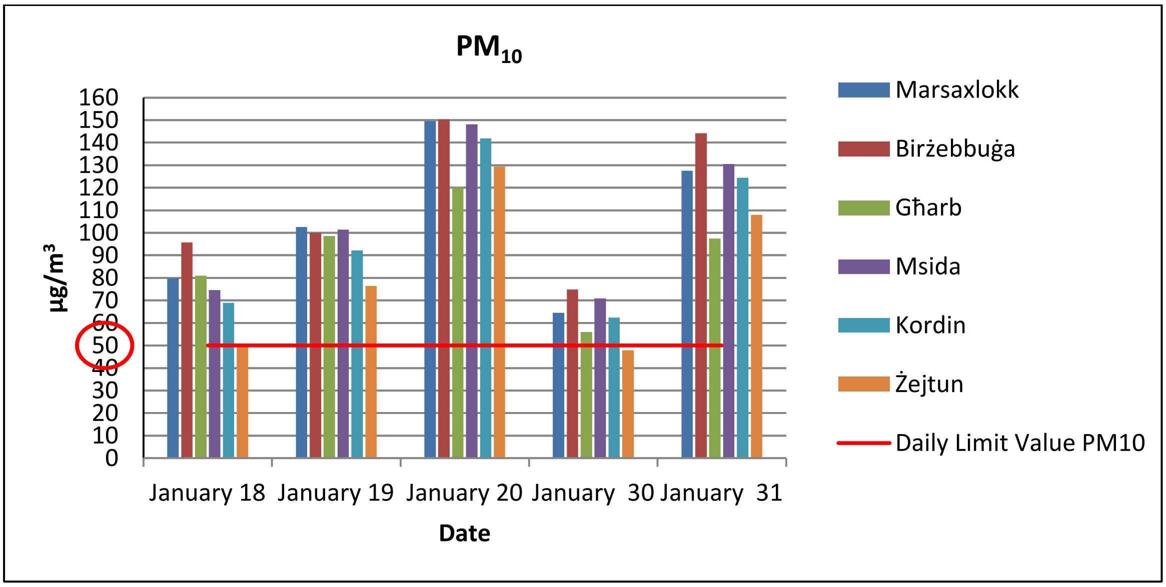


Figure 121: Air monitoring data plot on the days of exceedance

During the 18th, 19th, 20th , 30th and 31st of January the four stations experienced an exeedance of the Daily Limit value, which could indicate the possibility of a Saharan event.

In order to assess whether or not a Saharan event took place, a detailed analysis was carried out based on the EU guidelines in Steps 2 and 3 below. Satellite images were evaluated and the mathematical model tools applied in order to reach a conclusion.

For setting up the model variables in Step 3, a PM_{10} hourly concentration analysis was applied. This information is then used to best fit the modelling with HYSPLIT and run simulations at the specific hours that present the maximum probability of the eventual episode under investigation.

The following figure shows the variation of the PM_{10} hourly concentrations 18^{th,} 19th, 20th , 30th and 31st of January for all the MEPA fixed stations.

Hourly measures for the 18th , 19th ,20th , 30th and 31st of January 2014.

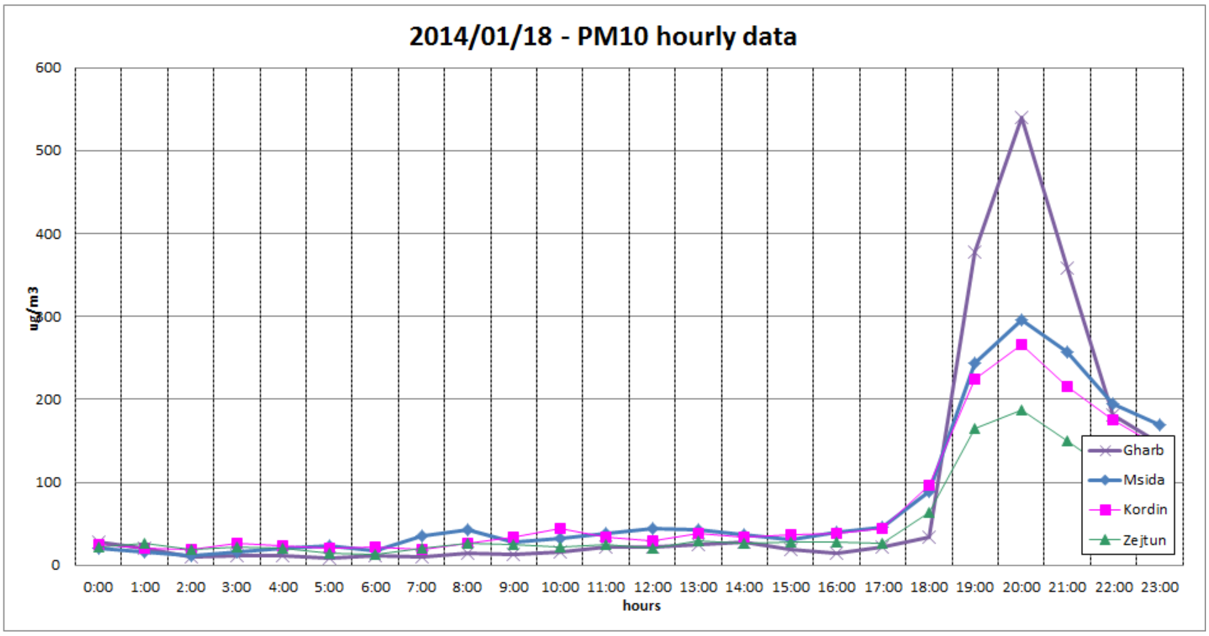


Figure 122: PM_{10} hourly data for the 18 January

From the graph above, it can be seen that the levels of PM_{10} were below the daily limit value during the entire day until 1900hrs when a sudden and strong concentration increase was recorded in all MEPA monitoring stations. According this data, the HYSPLIT model will be specified at 19.00 UTC (corresponding to 2000hrs in Malta) on the 18th Janurary, defined as the moment of maximum peak of the possible dust event.

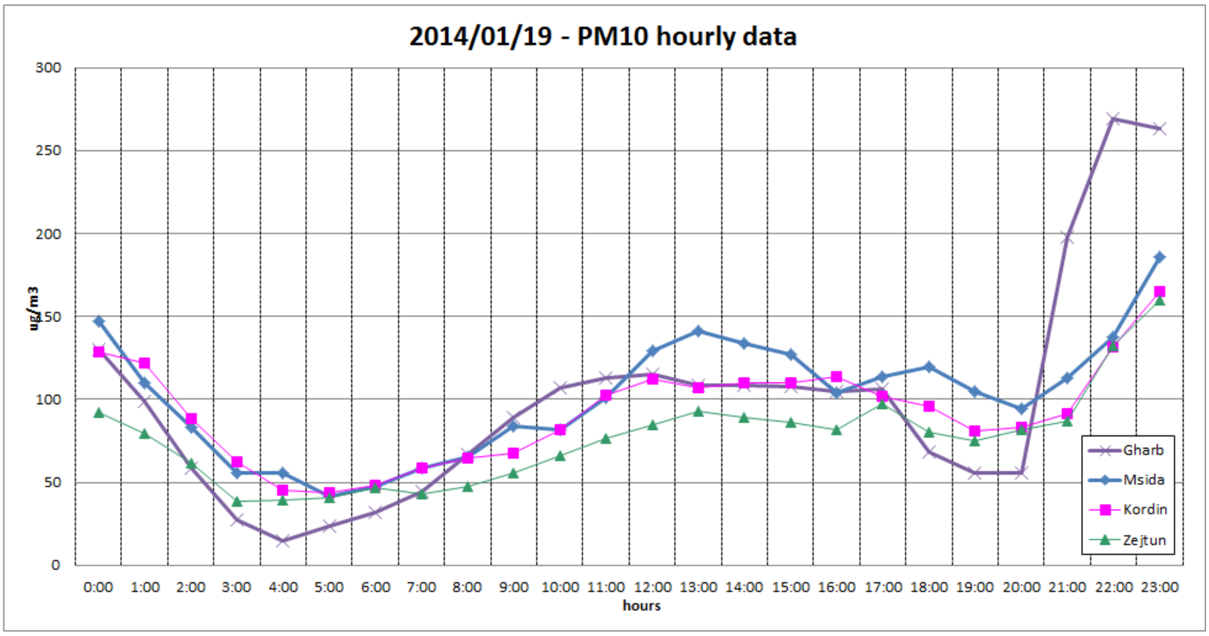


Figure 123: PM_{10} hourly data for the 19 January

During the 19th of January, the PM_{10} values were generally below the daliy limit value from 2100hrs onwards, when a strong increased occurred in all the MEPA stations. Due to the sudden increase at all the stations and the time of occurance, these values could be attributed to a Saharan event. According this data, the HYSPLIT model will be specified at 21.00 UTC (corresponding to 2200hrs in Malta) on the 18th Janurary, defined as the moment of maximum peak of the possible dust event.

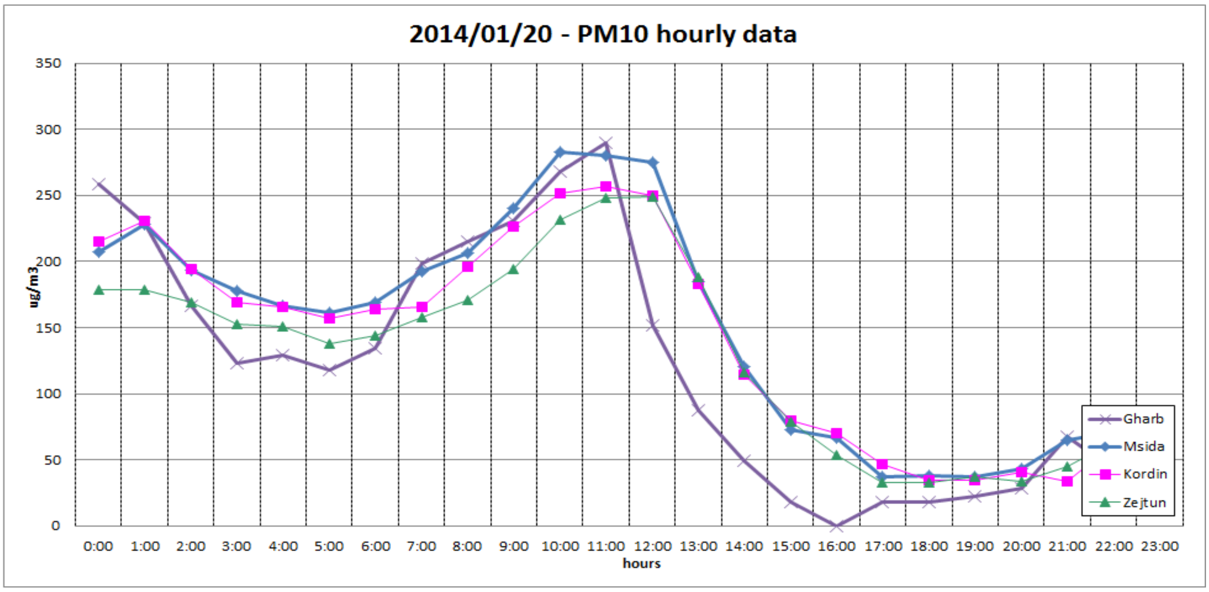


Figure 124 PM_{10} hourly data for the 20 January

During the 20th of January, a peak on the registered PM_{10} concentration occurred around 1100hrs, this event can be attributed to a dust loading episode as it is not a typical time of high density traffic on the Islands. According this data, the HYSPLIT model will be specified at 11.00 UTC (corresponding to 10 am in Malta) on the 20th Janurary, defined as the moment of maximum peak of the possible dust event.

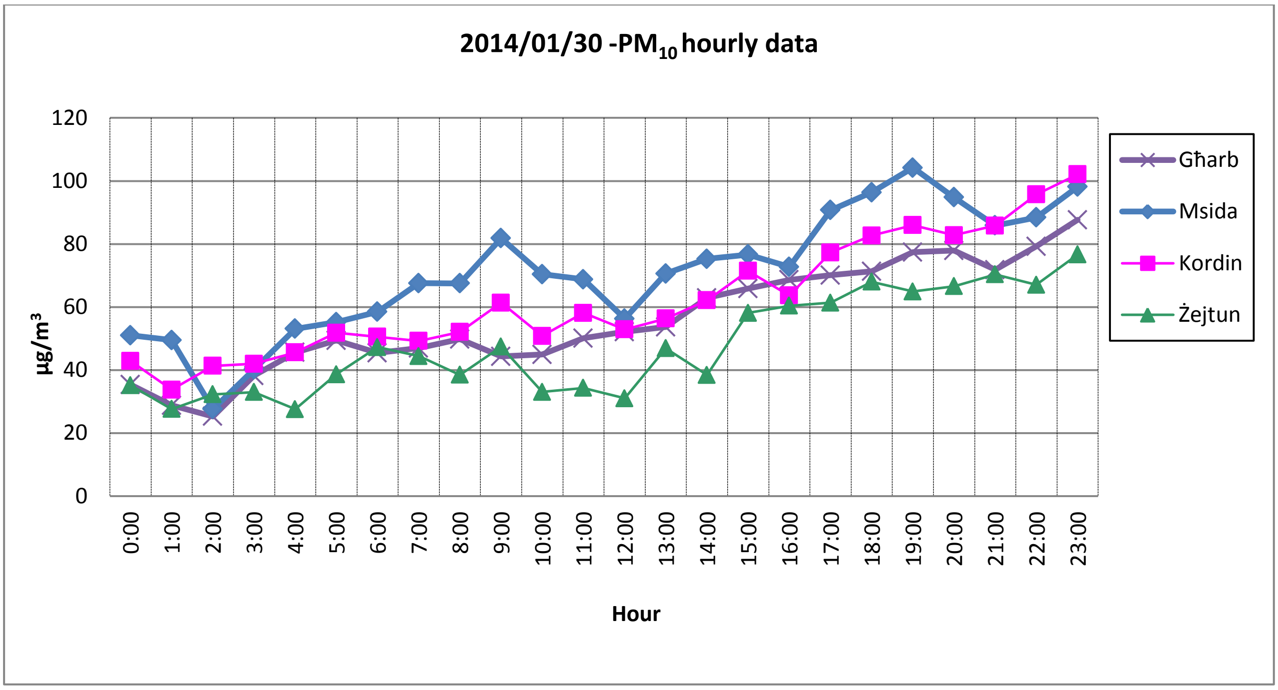


Figure 125: PM_{10} hourly data for the 30 January

From the graph above, it can be seen that at all MEPA monitoring stations, the levels of PM_{10} were gradually increasedfrom 1400hrs until the end of the day. According this data, the HYSPLIT model will be specified at 22.00 UTC (corresponding to 2300hrs in Malta), defined as the moment of maximum peak of the possible dust event.

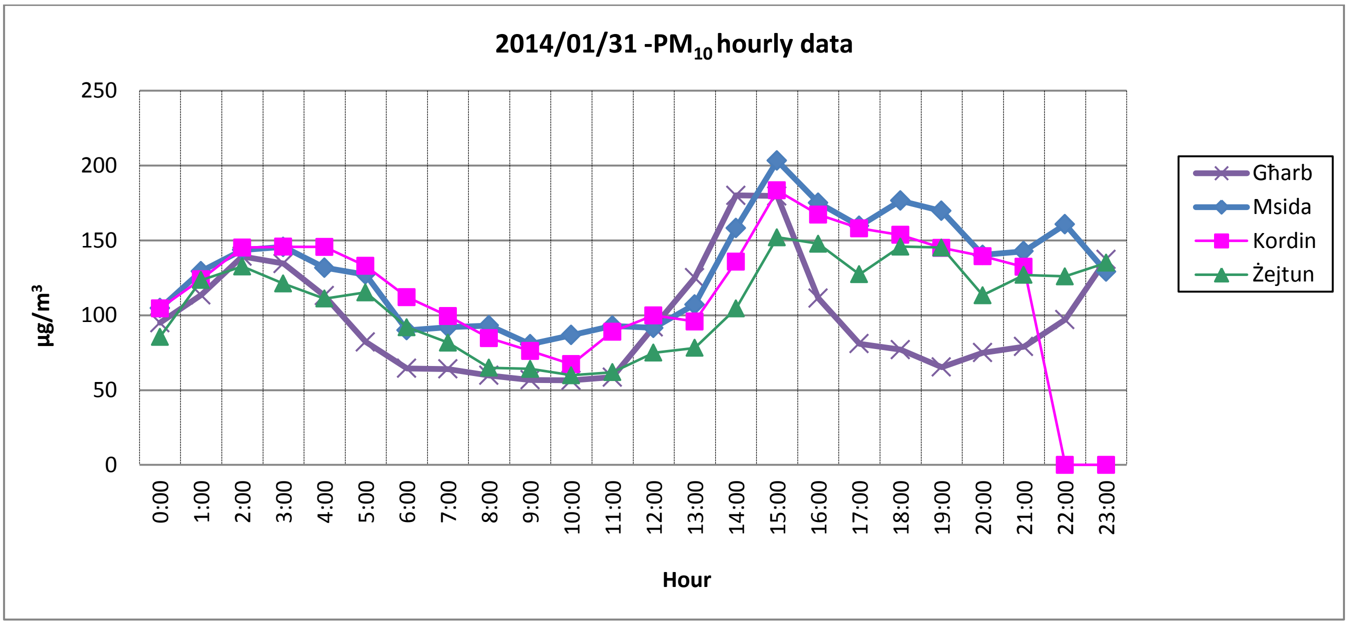


Figure 126: PM_{10} hourly data for the 31 January

On the 31st January, the PM_{10} values experienced two common peaks at all the stations, the first one around 0200hrs and the second one, the strongest, around 1500hrs. Not being periods of high traffic density, this increase in the PM_{10} concentration could be attributed to a Saharan event. According to this data, the HYSPLIT model will be specified at 14.00 UTC (corresponding to 1500hrs in Malta), defined as the moment of maximum peak of the possible dust event.

Step 2 – Satellite images

The exceedance in January has to be correlated with satellite imagery. The satellite images consulted were downloaded from the AERONET network which produces data available on the NASA website: http://rapidfire.sci.gsfc.nasa.gov/subsets/?subset=AERONET_ETNA.

The belowimages represent satellite images of 250m bands for Aqua and 250m bands for Terra.

Step 3 – Mathematical Modelling

The data available was analysed using the BSC-DREAM dust model (with concentration and deposition indicated) and HYSPLIT 4 model with a printout at heights of 100, 500 and 1500 metres above ground level, that show also mixing heights, taken over a period of 3 days prior to the day when the exceedance were recorded. BSC-DREAM dust model is helpful because it provides information not only on dust aerosols, but also because it provides the reconstruction of the wind field that is essential to better evaluate the HYSPLIT 4 model outputs. The BSC-DREAM outputs used are related to the Dust Loading (expressed in g/m^2) and to the Lowest Level Dust Concentrations (expressed in $\mu g/m^3$).

Step 4 - Satellite data

In cases where satellite images and mathematical modelling outputs were not enough to verify whether on the identified day, Saharan dust episodes really took place, satellite data from three different instruments: the MODIS sensor and AERONET data were analysed for the identified day.

- ***<u>18 January</u>***

AERONET images

The below images represent satellite images of 250m bands for Aqua and 250m bands for Terra.

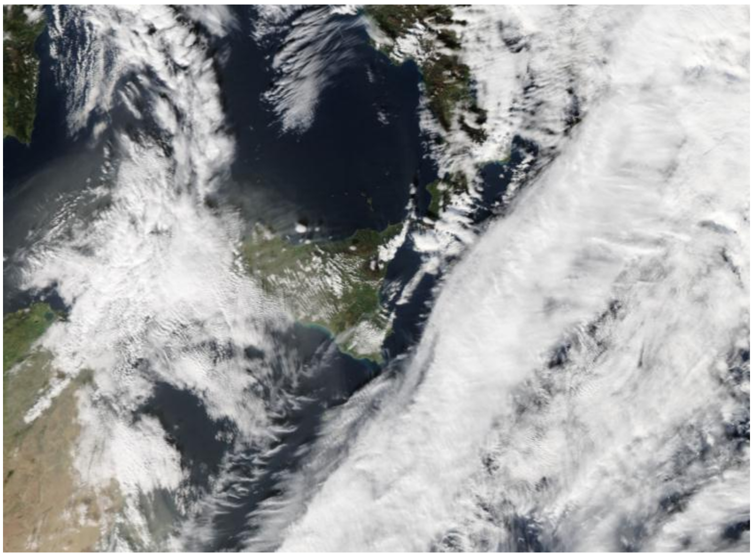


Figure 127: AERONET_ETNA 250m _AQUA

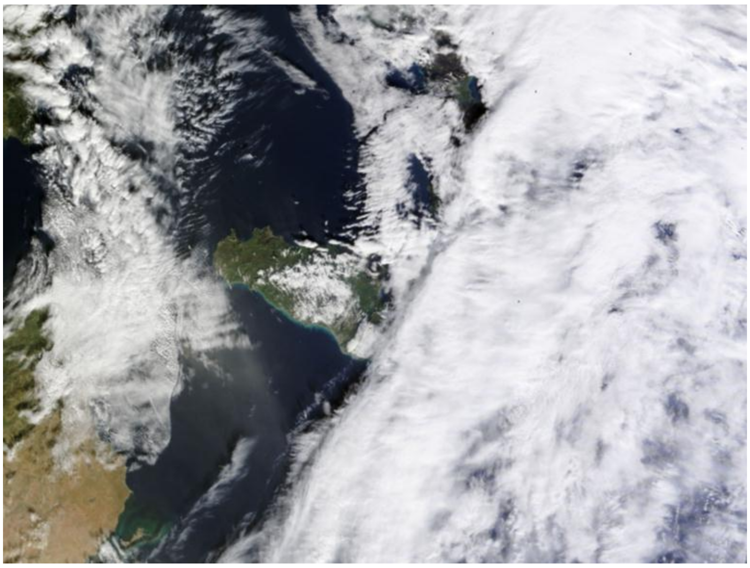


Figure 128: AERONET_ETNA 250m _TERRA

The above images show the possible presence of a dust aerosol related to the Saharan region.

BSC-DREAM dust model

The figure below represents the BSC-DREAM prediction of total dust expressed in terms of lowest model level dust concentration (in µg/m^3) and of dust load (in g/m^2). The dust load is in size classes between 0.1 and 10 µm over Europe at 12:00 UTC and 18.00 UTC, and superimposed on the same figure are the corresponding hourly forecasted wind vectors at 3000m height level.

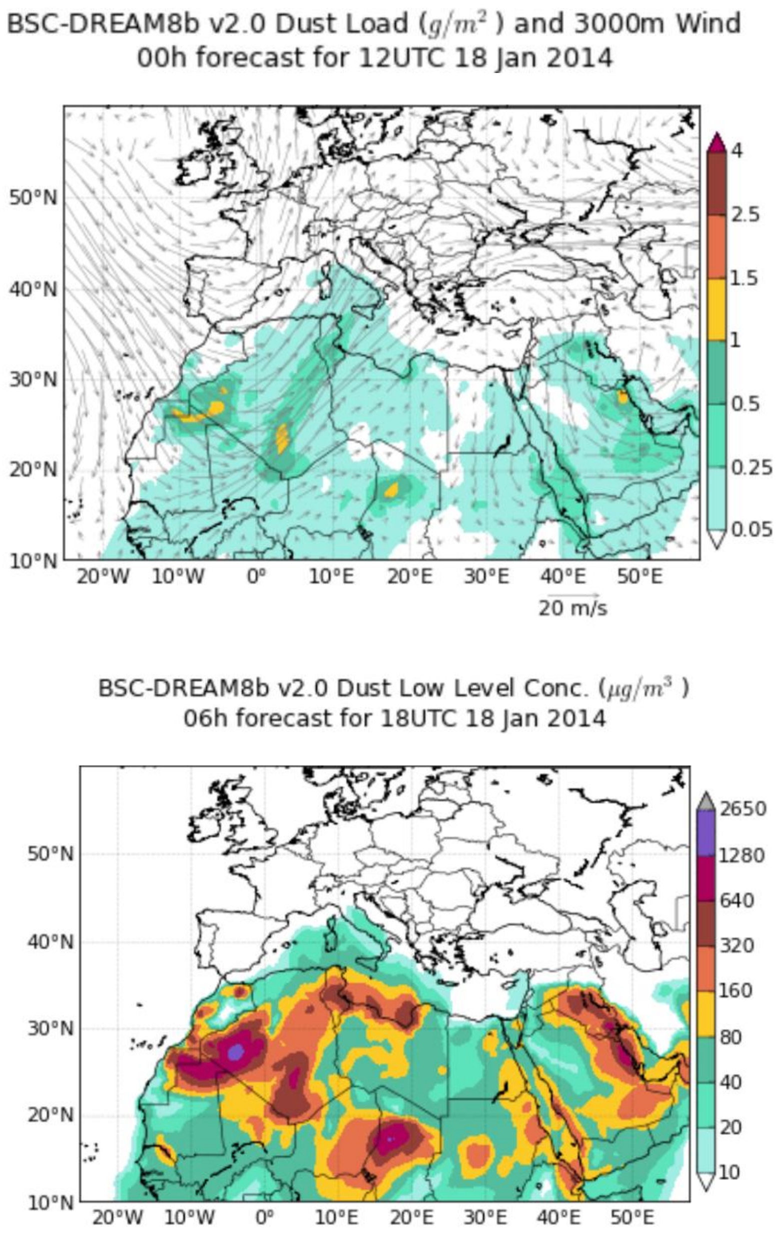


Figure 129: BSC-DREAM outputs on the 18 January

From the dust loading image it can be noted that on the 18th of January, the wind field over the Maltese islands could be mainly related to vectors from the Atlantic area. This wind field was characterized by a path crossing over Morocco, Algeria and Tunisia, Maltese islands, Southern Italy and Balkans. This wind field could have transported dust aerosol to the Italian and Central Mediterranean areas.

The dust concentration image shows a dust aerosol in chorence with the wind field and a dust loading over Algeria, Tunisia and the Southern Central Mediterranean, with a contribution towards the Maltese islands.

Therefore, the BSC-DREAM output expressed in terms of dust concentration and dust deposition are quite consistent in showing that on 18th of January, Malta was affected by a limited Saharan dust episode.

HYSPLIT model

The following figure shows the application of HYSPLIT on the Maltese islands on the 18th January. The HYSPLIT output is related to 19.00 UTC, defined as the moment of maximum peak of the possible dust event.

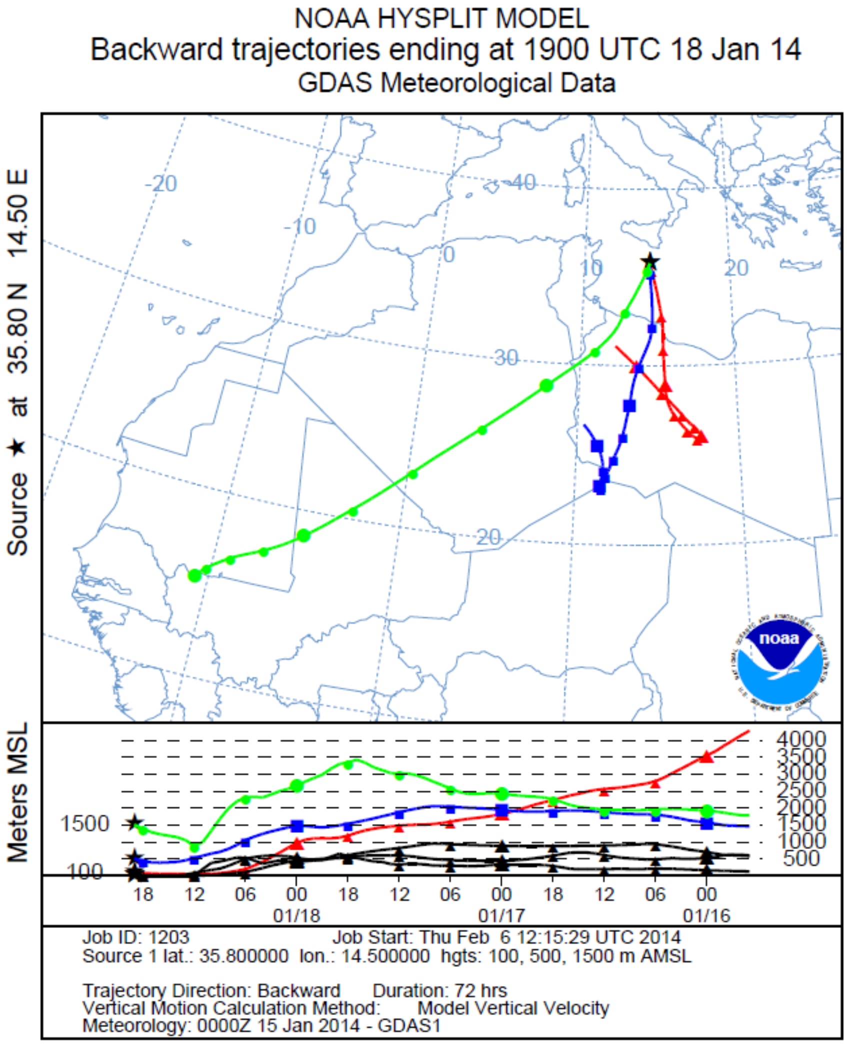


Figure 130 : HYSPLIT backward trajectory at 1500m. 500m and 100 m on the 18 January

The HYSPLIT model output related to the conditions on the 18th January shows that the backward trajectory ending over the air monitoring zone (Marsaxlokk and Birżebbuġa) at the higher level of 1500 meters above ground level, is directly from the Saharan region, perfectly according to the wind field from BSC-DREAM. Also the backward trajectories at 100 and 500 meters above ground level are related to wind vectors from Saharan region (Lybia).

So, as the direct path from Saharan zones was at the level of 1500, 500 and 100 meters the dust load over Malta was probably of high intensity.

The following figures show, for each backward trajectory, the variation of the parameters “Terrain height” and “Mixed layer depth”, along the path. This information allows some further assessment about the probable intensity of the event at the arriving-point of this trajectory:

- a reduced distance from the backward trajectory level and the terrain height is considered to be an indicator of a higher intensity event, due to a major implication of the lower level of the atmosphere;
- the presence, along the path, of many points at which the trajectory level is above the mixed layer depth is considered an indicator of a possible decrease of the intensity of the dust aerosol, even if the trajectory being always under the mixed layer depth may be affected by higher level of dust deposition along the path, with minor intensity at the ending-point of the backward trajectory;
- a mixed layer depth higher than the ending-level of each backward trajectory is an indicator of a higher level of intensity of the event;

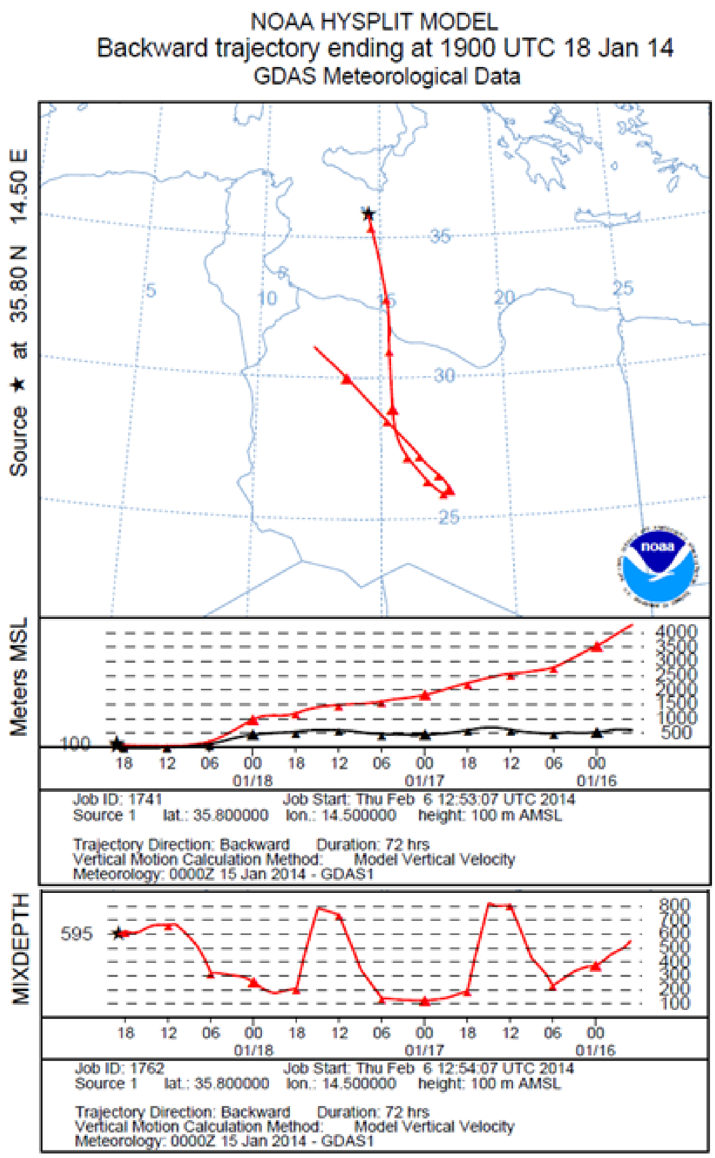


Figure 131: HYSPLIT backward trajectory at 100m on the 18 January

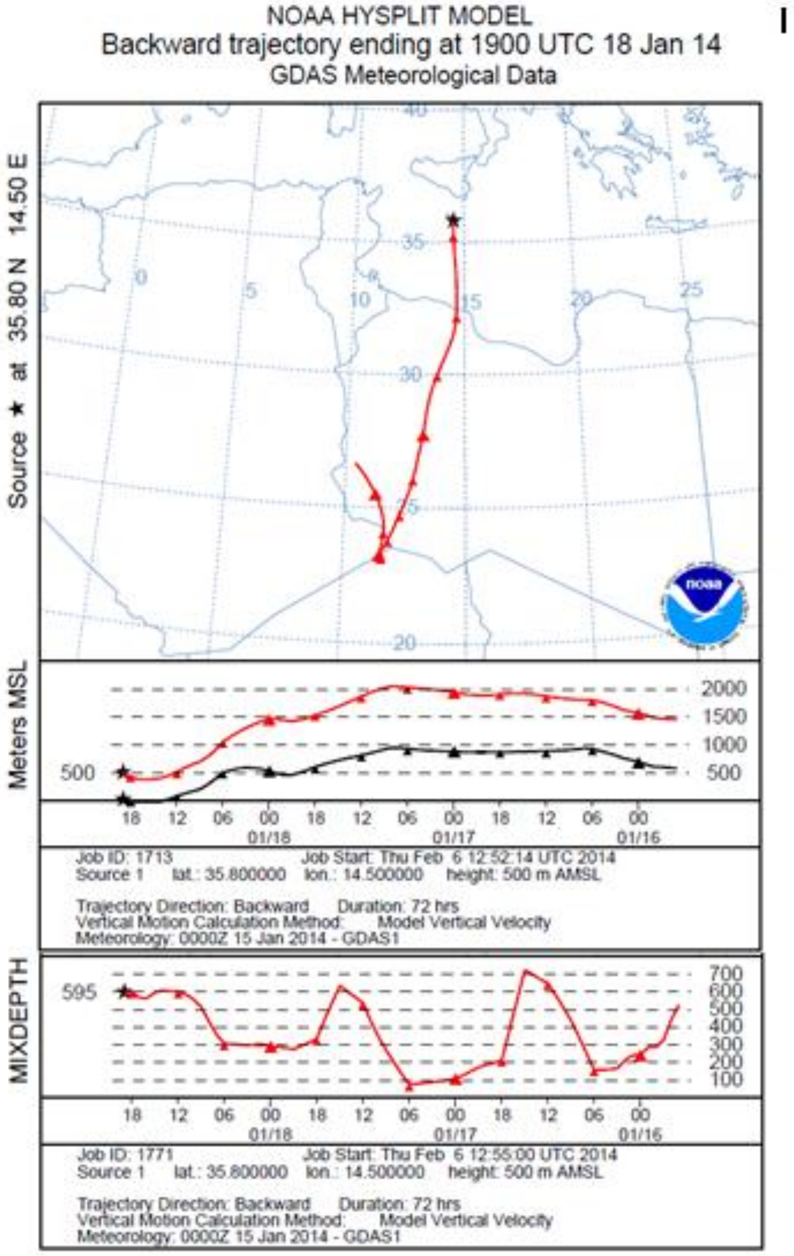


Figure 132: HYSPLIT backward trajectory at 500m on the 18 January

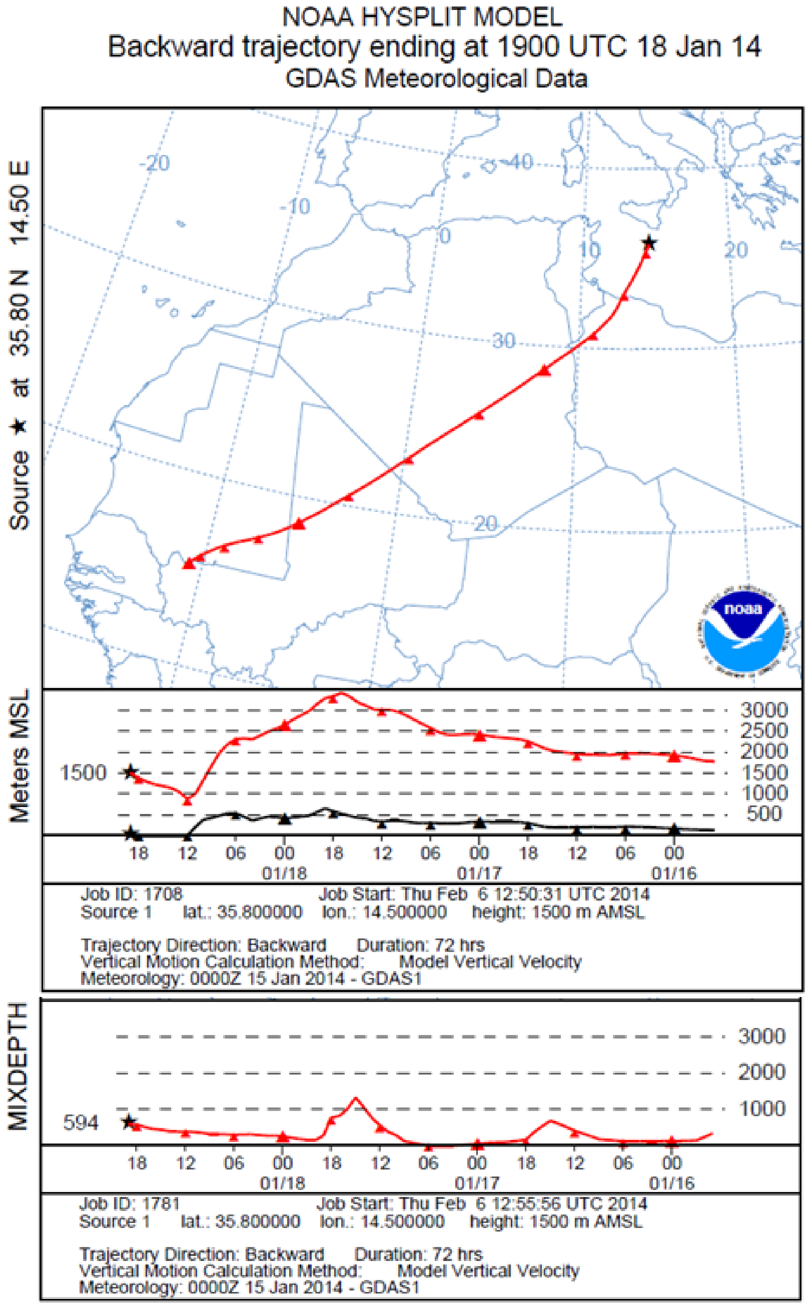
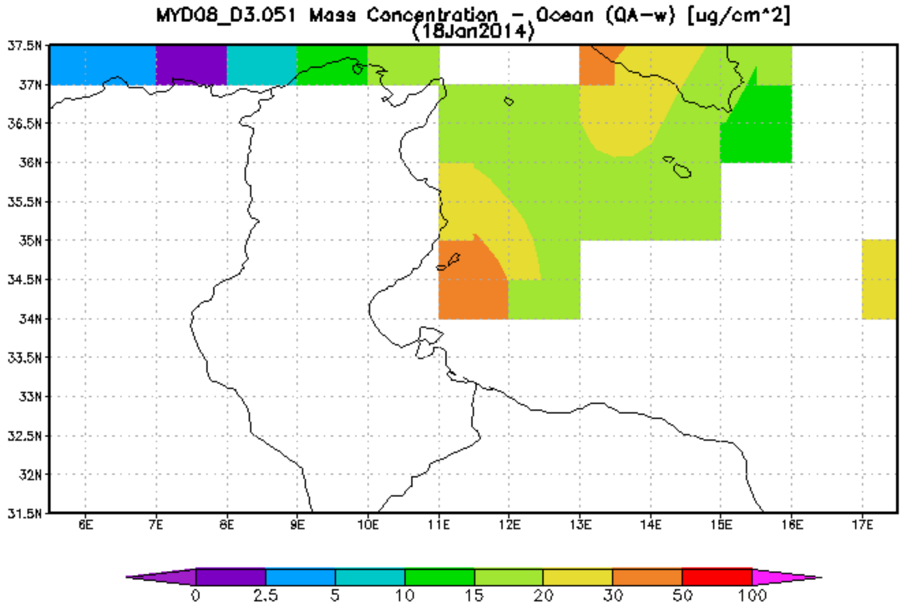


Figure 133: HYSPLIT backward trajectory at 1500m on the 18 January

The above figures show that the mixed layer depth over Malta on the 18th January was 594 metres, higher than the backward trajectory at 100 and 500 meters level ending-point, but lower than the backward trajectory at 1500 meters. That shows a possible contribution to the dust load mainly related to the 100 and 500 m backward trajectories, both from Saharan regions.

MODIS sensors

The MODIS data available shows a quite high value referred to the presence of dust aerosols over Malta on 18th January 2013. Both the Aerosol small mode and the mass concentration map show values significantly high to confirm the presence of dust aerosol.



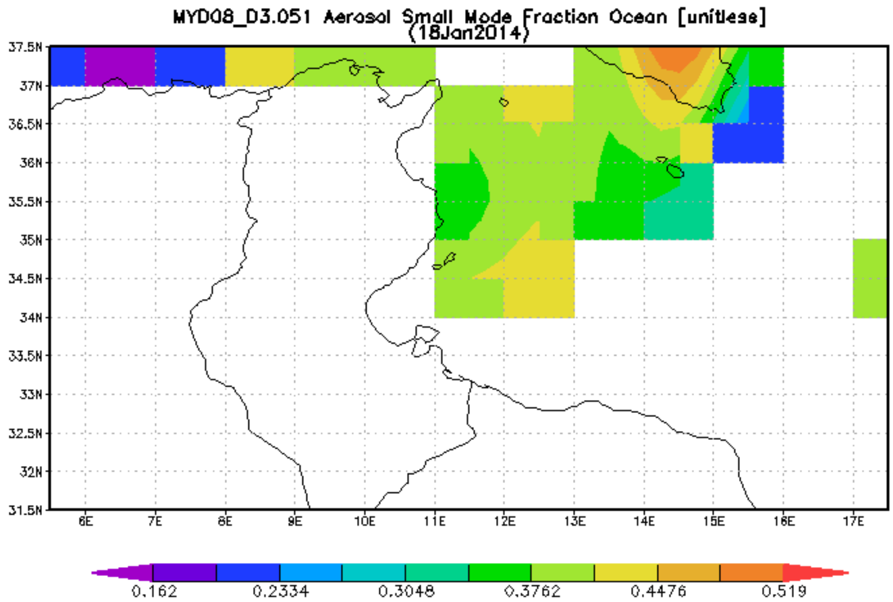


Figure 134: MODIS Terra and Aqua images on the 18 January

AERONET Data

The AERONET measurements reported in this study are related to the Lampedusa site (the site of the AERONET network closest to Malta), where the sunphotometer is located in the area of Military Base LORAM, close the west highest point of the island (150 m asl).

The available data, managed by ENEA (Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile, Italy) is plotted in the following figures:

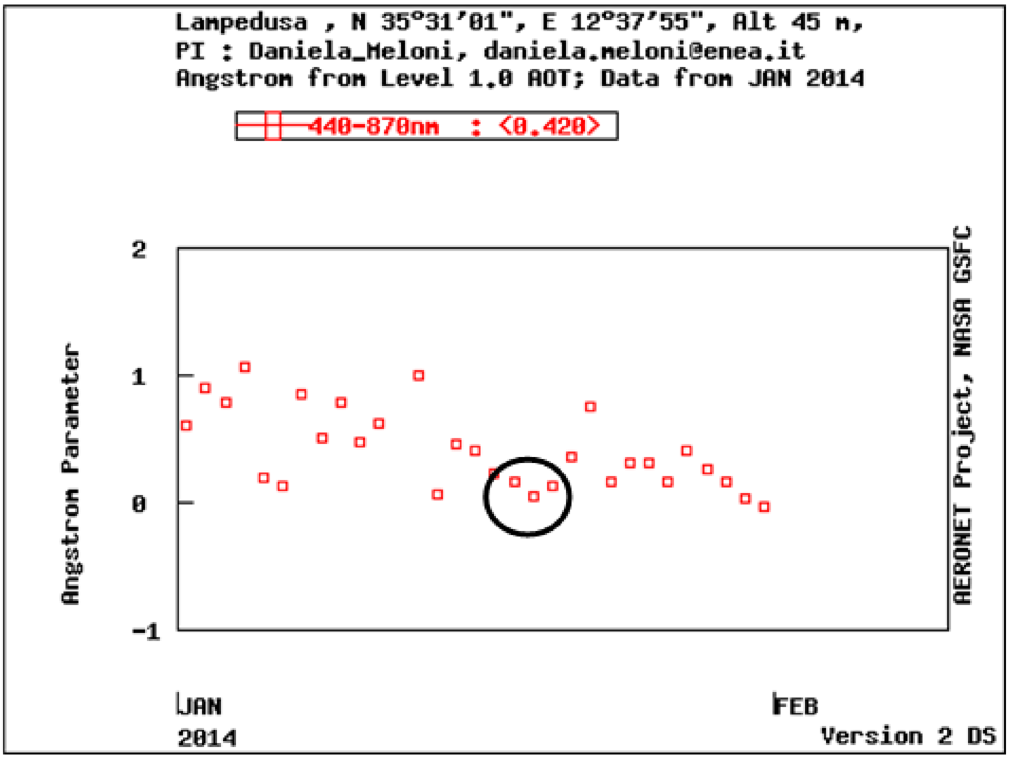


Figure 135: AERONET data from Lampedusa for January: Angstrom parameter.

The above image show the presence of a Saharan dust episode over Lampedusa on the middle of January (such episode is defined by low Angrstrom parameter values) and so the same episode must have been recorded over the Maltese Islands a few days later.

- ***<u>19 January</u>***

AERONET images

The below images represent satellite images of 250m bands for Aqua and 250m bands for Terra.

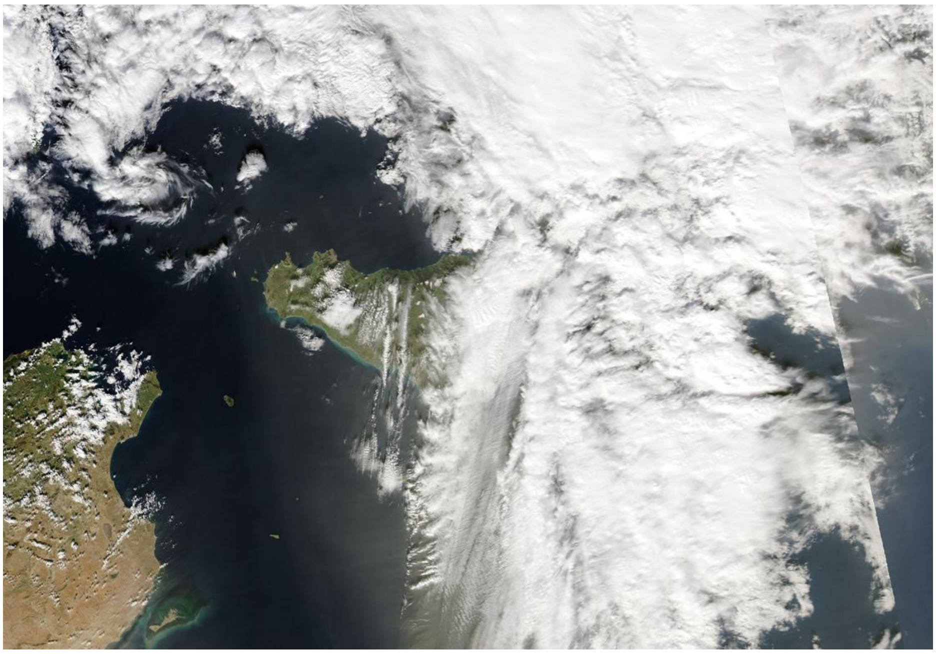


Figure 136: AERONET_ETNA 250m _AQUA

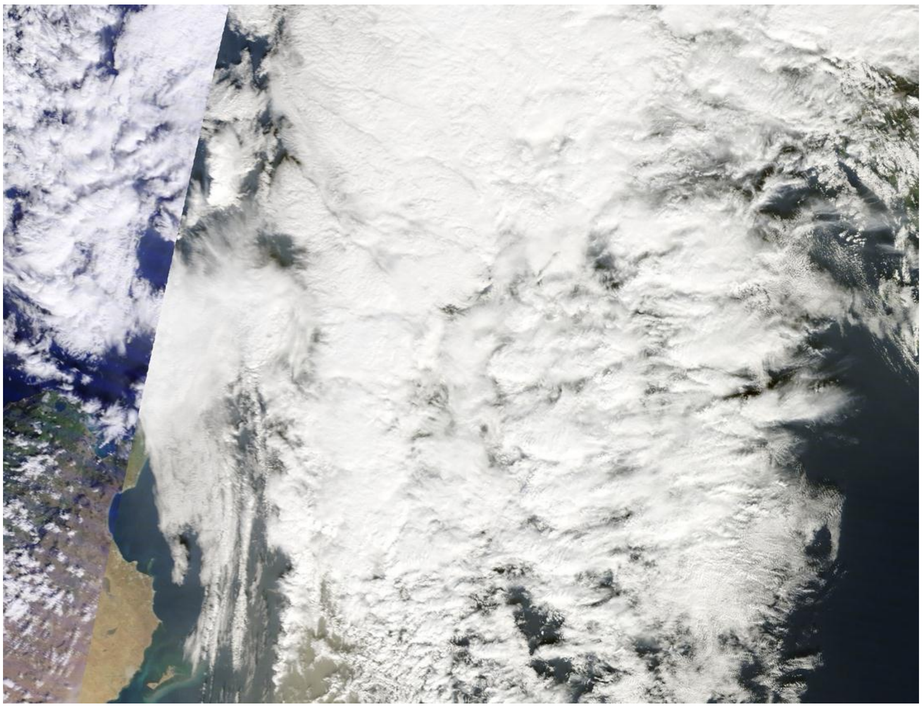
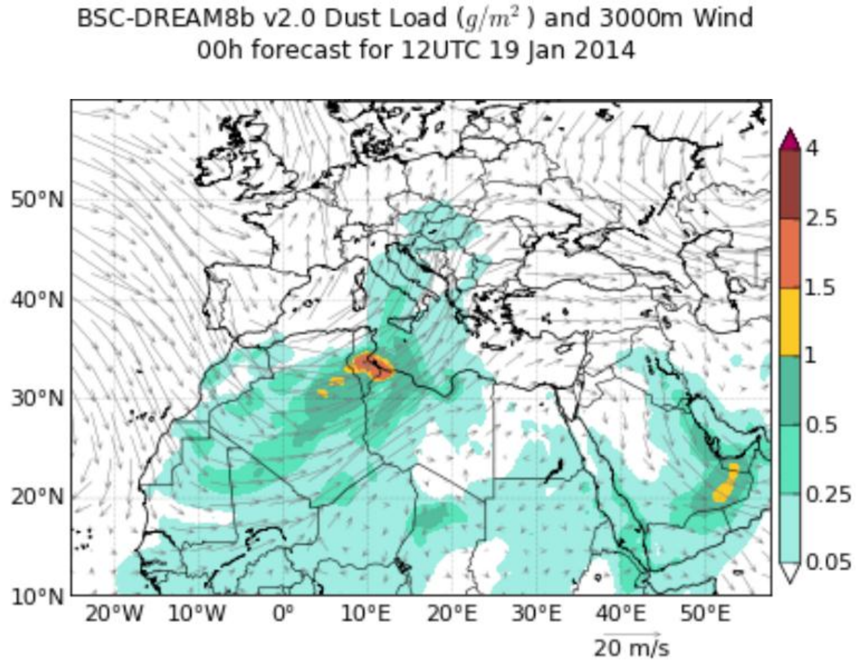


Figure 137: AERONET_ETNA 250m _TERRA

BSC-DREAM dust model

The figure below represents the BSC-DREAM prediction of total dust expressed in terms of lowest model level dust concentration (in µg/m^3) and of dust load (in g/m^2). The dust load is in size classes between 0.1 and 10 µm over Europe at 12:00 UTC and 18.00 UTC, and superimposed on the same figure are the corresponding hourly forecasted wind vectors at 3000m height level.



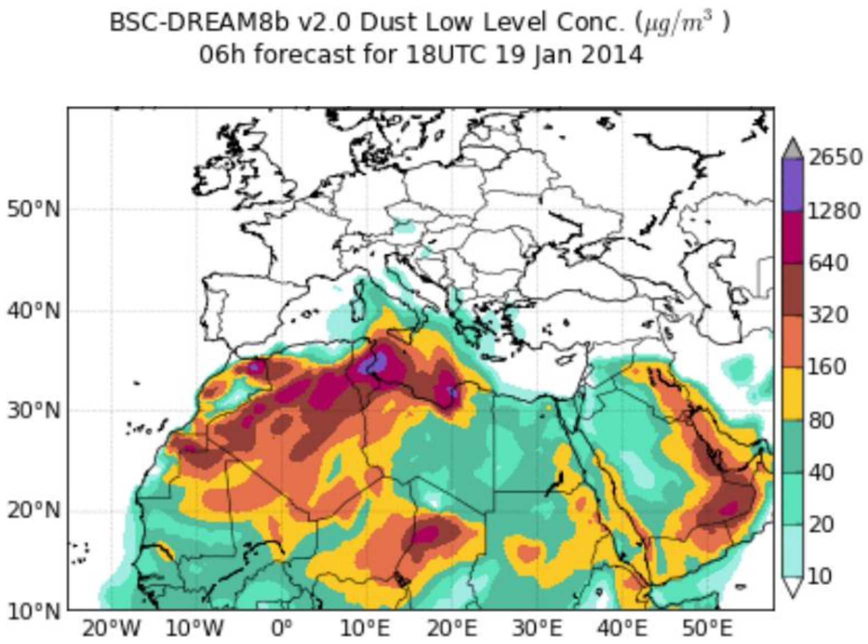


Figure 138: BSC-DREAM outputs on the 19 January

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From the dust loading image it can be noted that on the 19th of January, Malta was influenced by dust loading from Saharan region of significant intensity . The wind vectors describe a strong vortex that passes through Mauritania, Algeria and Tunisia before reaching Malta.

The dust concentration image confirms a dust loading along the path from Algeria to the Italian and Balkan regions, with a maximum located in the Tunisian coast. The concentration values indicated a significant intensity event. Therefore, the BSC-DREAM output expressed in terms of dust concentration and dust deposition are consistent in showing that on the 19th of January, Malta was affected by a Saharan dust episode.

HYSPLIT model

The following figure shows the application of HYSPLIT on the Maltese islands on the 19th of January. The HYSPLIT output is related to 21.00 UTC, defined as the moment of maximum peak of the possible dust event.

The HYSPLIT model output related to the conditions on the 19th January shows that the backward trajectories ending over the air monitoring zone (Marsaxlokk and Birżebbuġa) at the level of 100, 500 and 1500 meters above ground level are from Saharan region (Algeria and Tunisia) and follow a path directly from this area to the Maltese islands. A direct path from Saharan region can be related to a significant increase in dust concentrations.

The following figures show, for each backward trajectory, the variation of the parameters “Terrain height” and “Mixed layer depth”, along the path. This information allows some further assessment about the probable intensity of the event at the arriving-point of this trajectory:

- a reduced distance from the backward trajectory level and the terrain height is considered to be an indicator of a higher intensity event, due to a major implication of the lower level of the atmosphere;
- the presence, along the path, of many points at which the trajectory level is above the mixed layer depth is considered an indicator of a possible decrease of the intensity of the dust aerosol, even if the trajectory being always under the mixed layer depth may be affected by higher level of dust deposition along the path, with minor intensity at the ending-point of the backward trajectory;
- a mixed layer depth higher than the ending-level of each backward trajectory is an indicator of a higher level of intensity of the event;

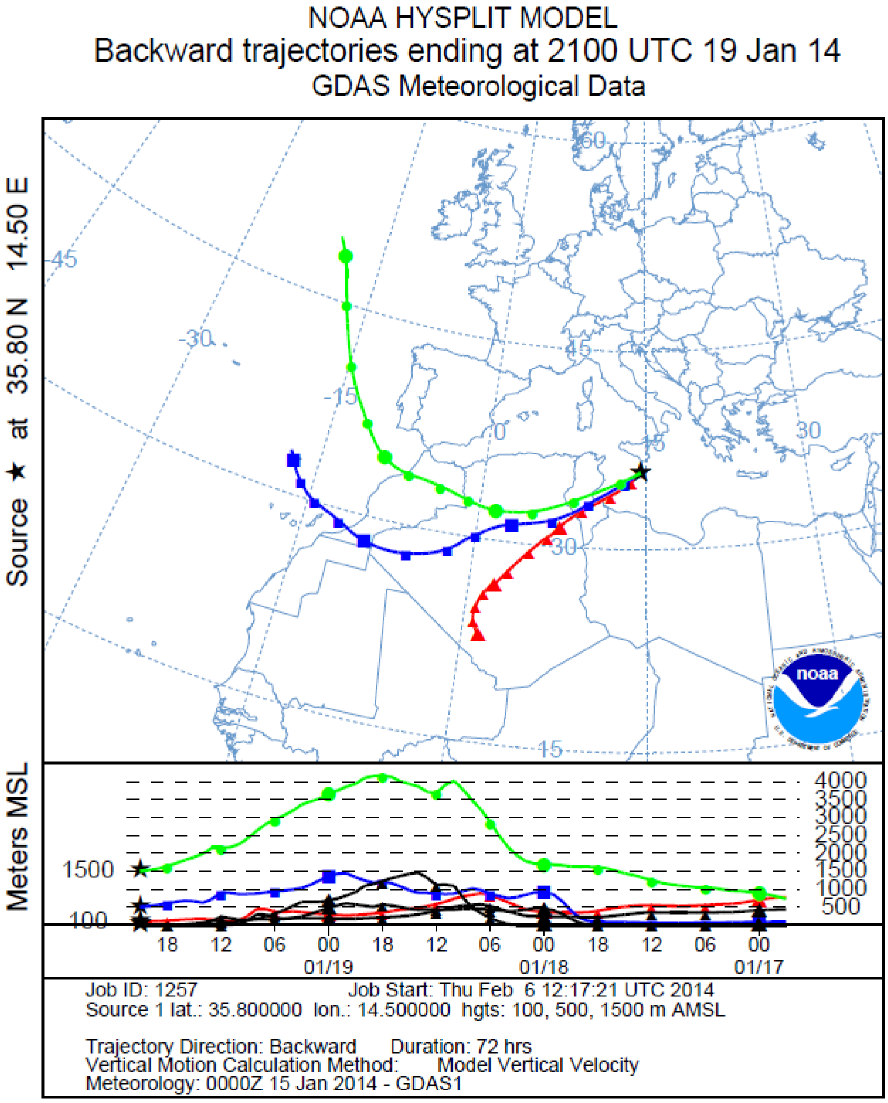


Figure 139: HYSPLIT backward trajectory at 1500m. 500m and 100 m on the 19 January

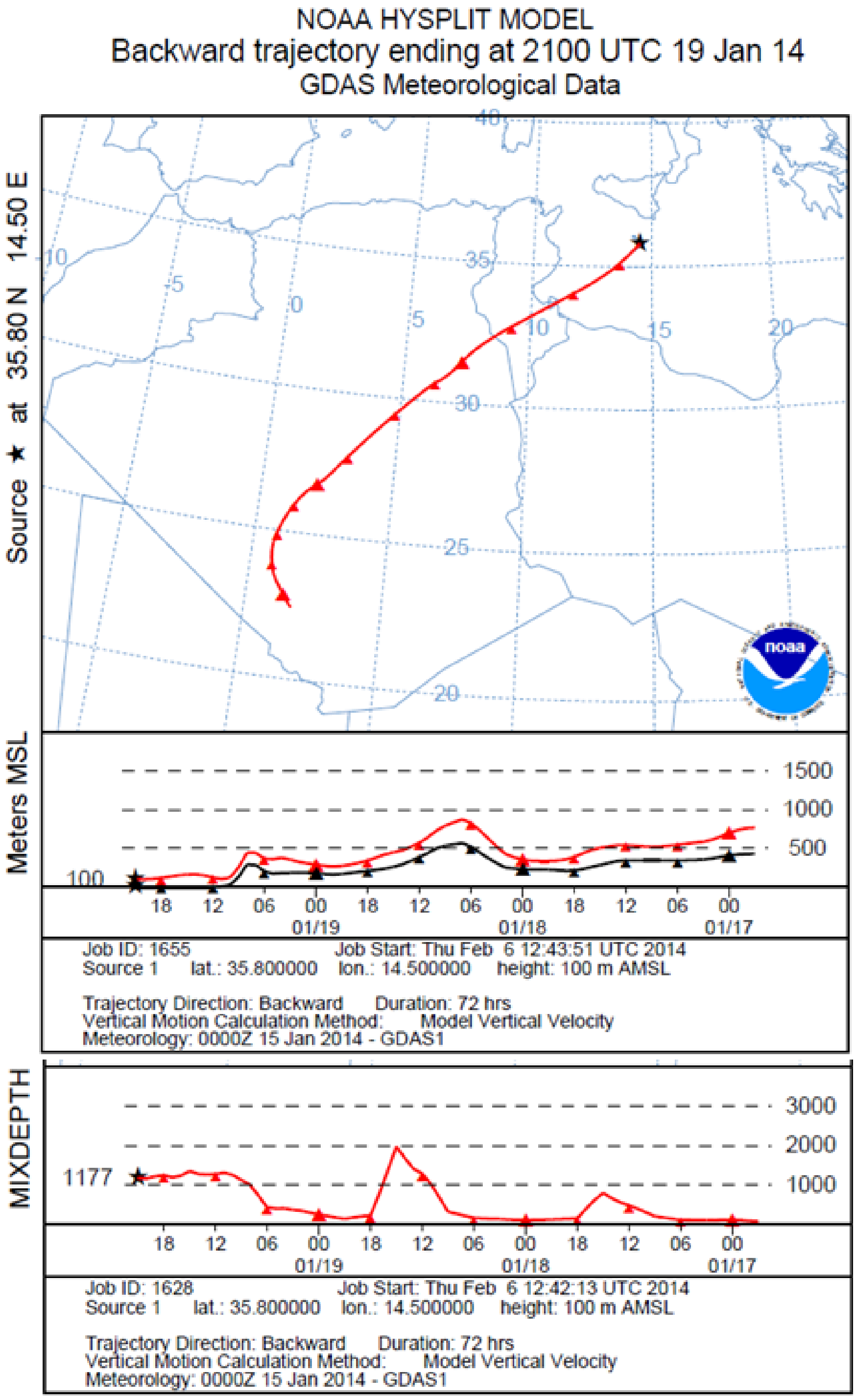


Figure 140: HYSPLIT backward trajectory at 100 m on the 19 January

The backward trajectory at 100 meters above ground level is from Saharan region and reaches Malta through a direct path over Algeria, Tunisia and the Mediterranean. The mixdepth quote over Malta was 1177 meters, higher than the arriving quote of this backward trajectory.

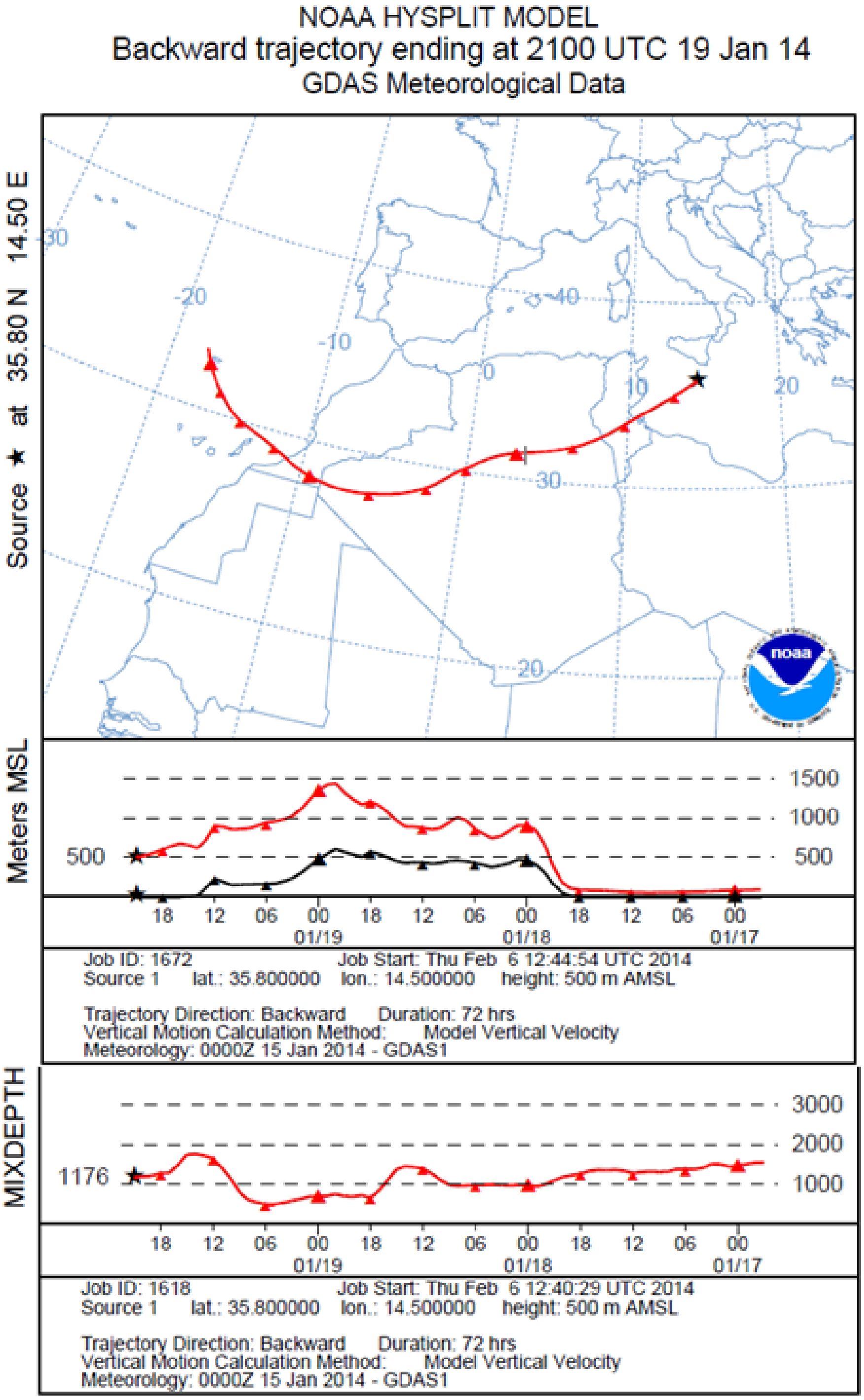


Figure 141: HYSPLIT backward trajectory at 500 m on the 19 January

The backward trajectory related to 500 meters level was directly from Saharan region, according to the wind field shown by BSC-DREAM. The mixdepth quote over Malta was higher than the arriving quote of this backward trajectory.

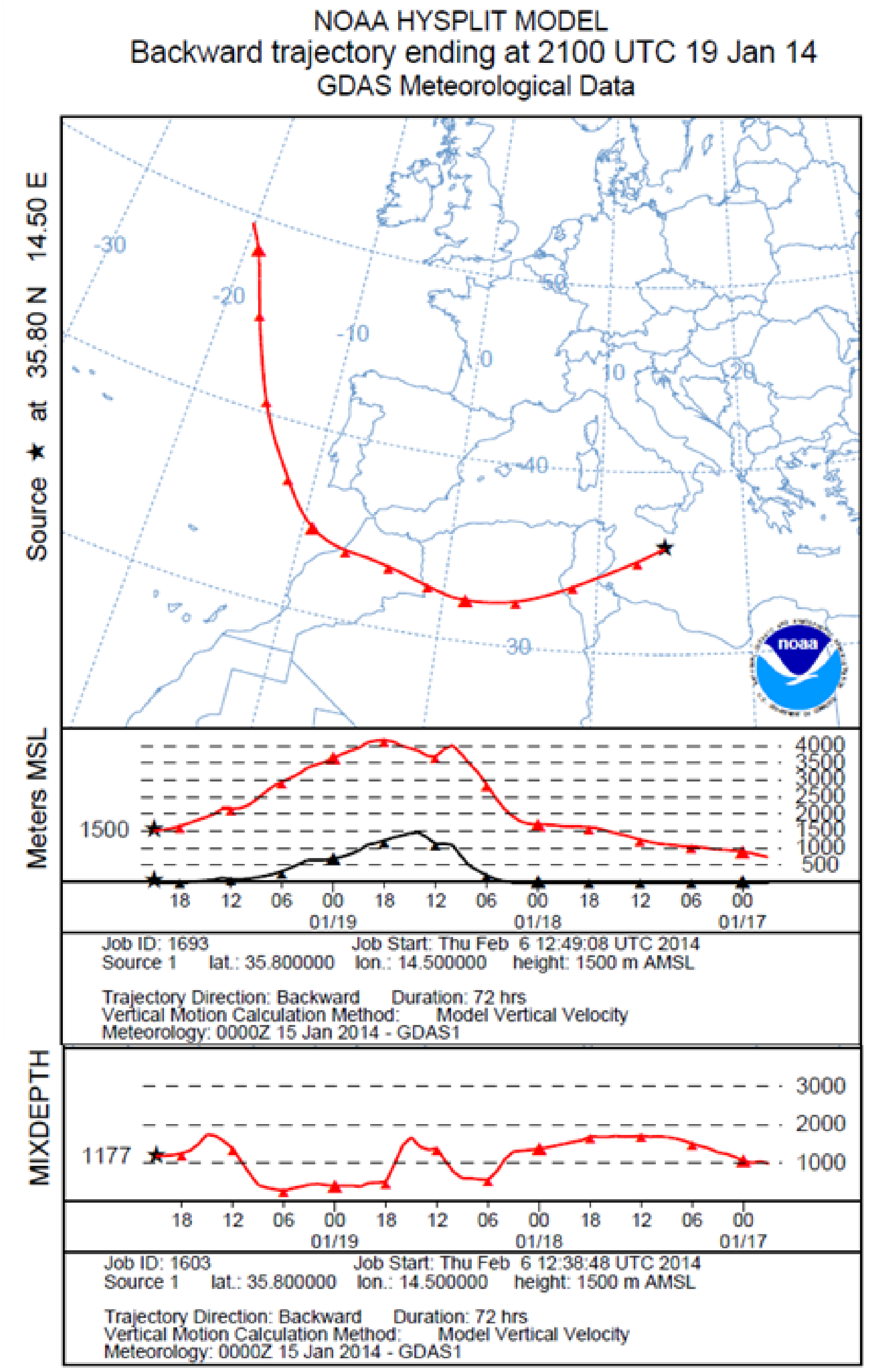
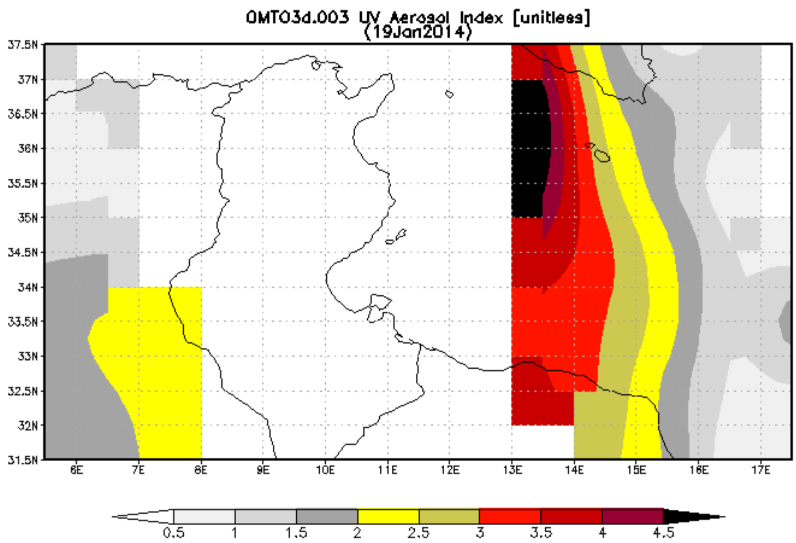


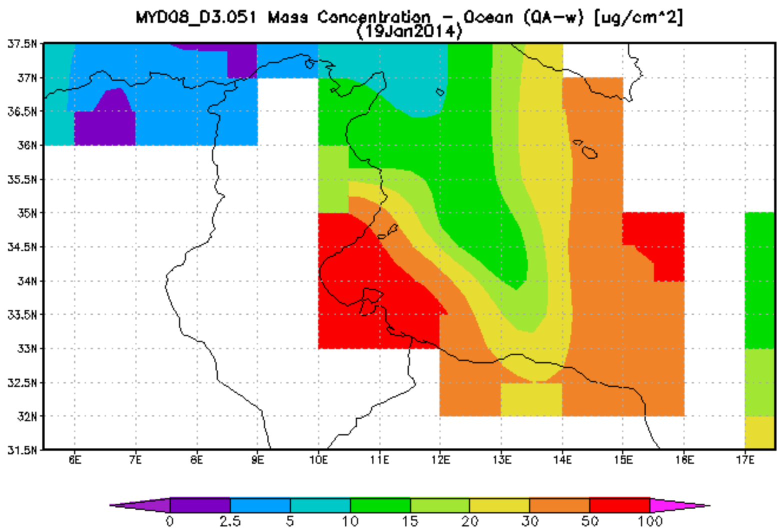
Figure 142: HYSPLIT backward trajectory at 1500 m on the 19 January

The backward trajectory at the 1500 metes level was from Saharan region (Algeria, Tunisia and Mauritania).The mixdepth quote over Malta was lower than the arriving quote of this backward trajectory.

MODIS sensors

The MODIS data available shows a quite high value referred to the presence of dust aerosols over Malta on 19th January 2013. The value for the Maltese Islands derived from the mass concentration is quite high (between 30-50 µg/cm^2) (abt. 0.15) and also the UV Aerosol Index (between 2.5 and 3.5). The Aerosol small fraction index computed fro Malta is about 0.5, in the medium interval. All of this information compiled suggests the presence of a Saharan event over the Island on the 19th of January.





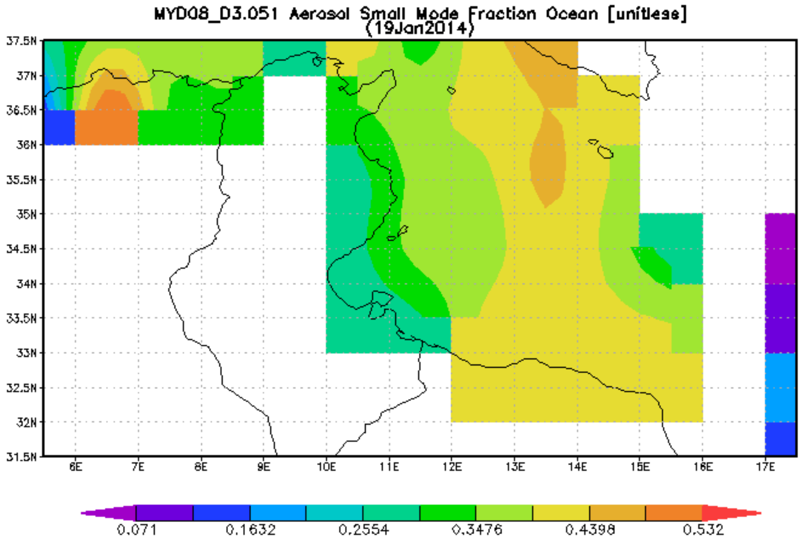


Figure 143: MODIS Terra and Aqua Level 3-Data on the 19 January

- ***20 January***

AERONET images

The below images represent satellite images of 250m bands for Aqua and 250m bands for Terra.

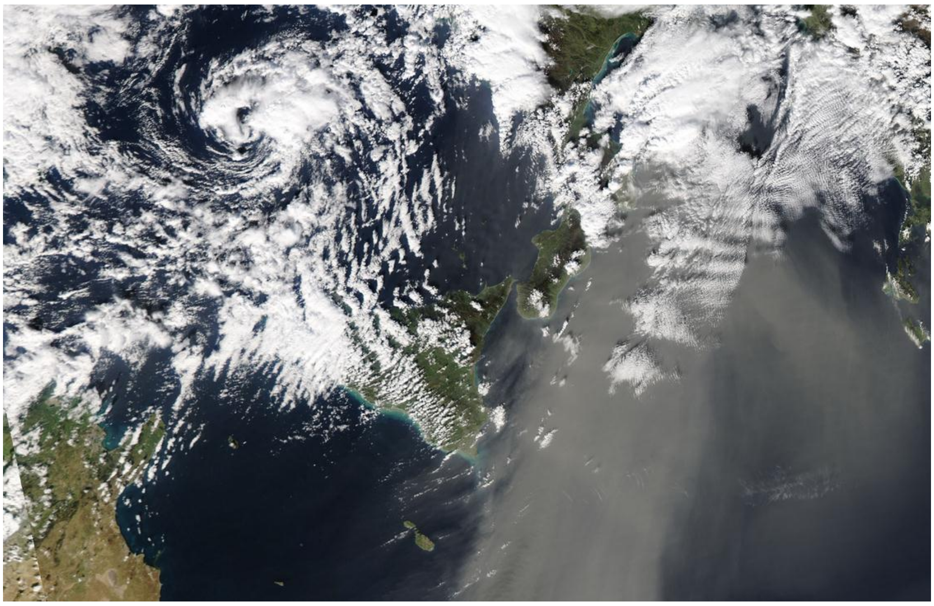


Figure 144: AERONET_ETNA 250m _AQUA

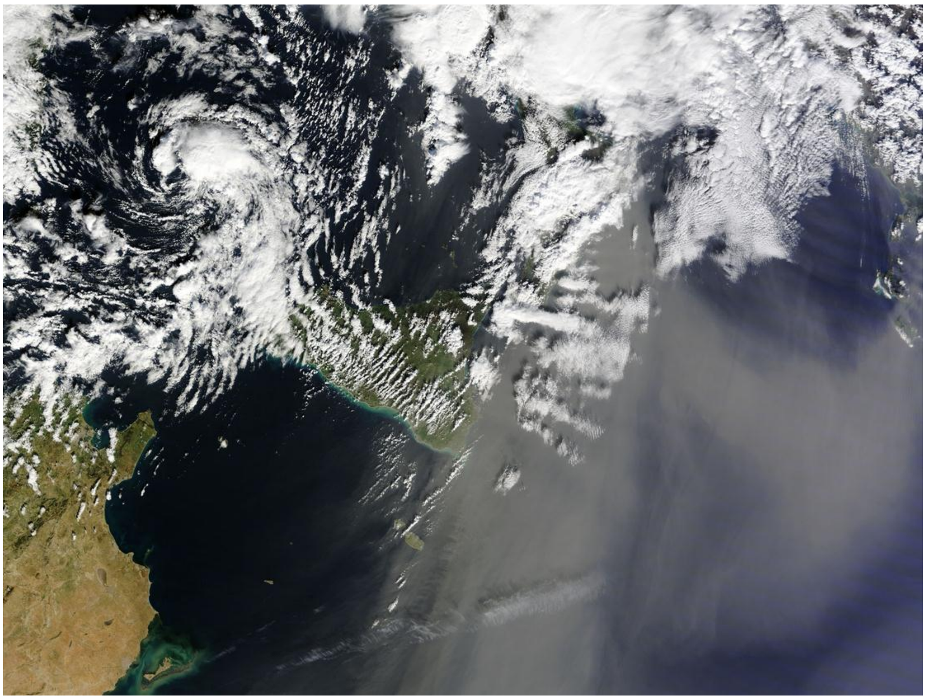


Figure 145: AERONET_ETNA 250m _TERRA

There were no satellite images available for this day.

BSC-DREAM dust model

The figure below represents the BSC-DREAM prediction of total dust expressed in terms of lowest model level dust concentration (in µg/m^3) and of dust load (in g/m^2). The dust load is in size classes between 0.1 and 10 µm over Europe at 12:00 UTC and 18.00 UTC, and superimposed on the same figure are the corresponding hourly forecasted wind vectors at 3000m height level.

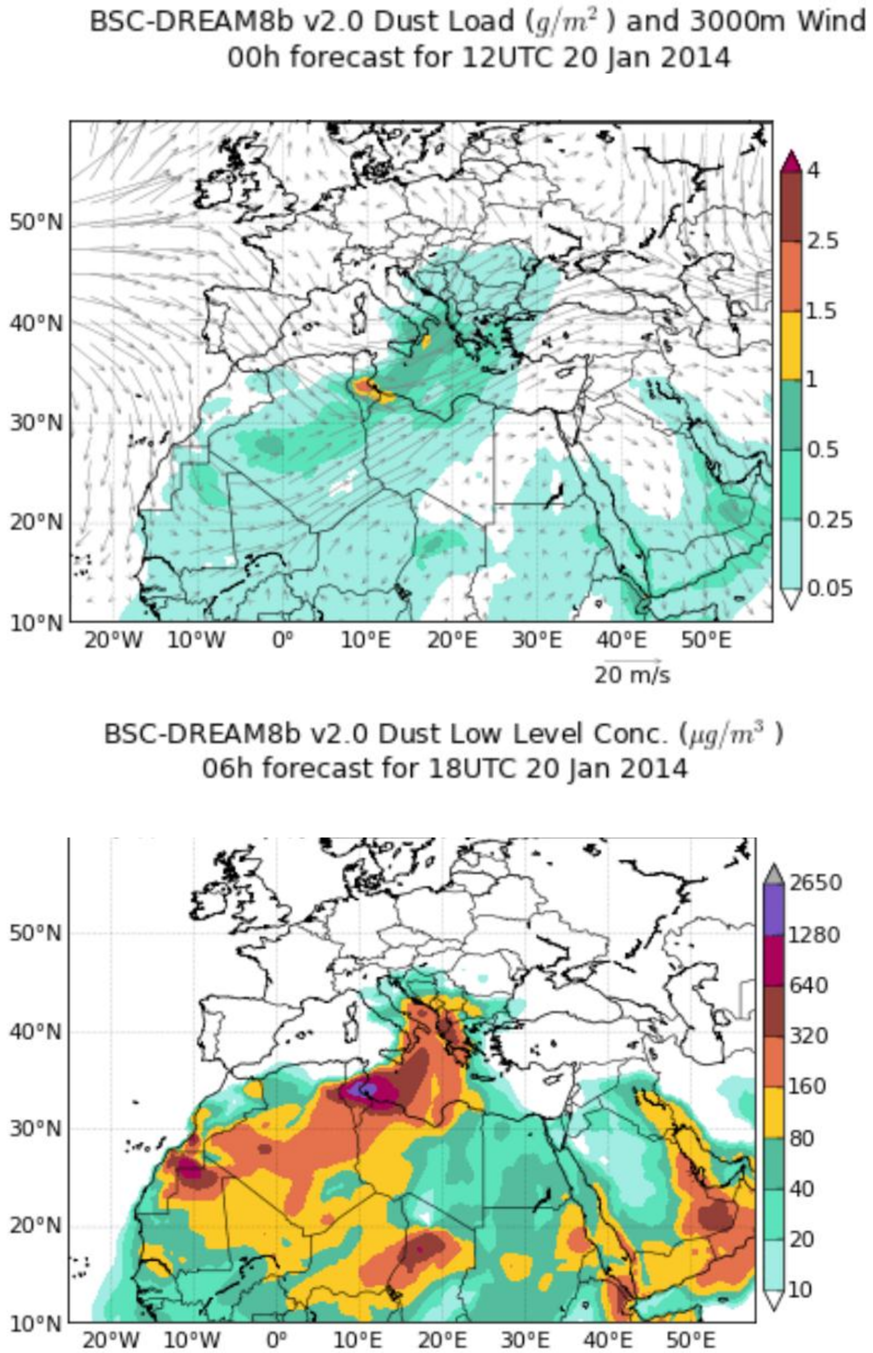


Figure 146: BSC-DREAM outputs on the 20 January 2014

From the dust loading

image it can be noted that on the 20th of January. the wind field over Malta was mainly from Algerian and Tunisian zone. In fact, the main wind vectors originated at the Atlantic, travelled towards the south and overpassed several Saharan regions while asceding toward north before reaching Malta.

The dust concentration image confirms a dust loading along the path from Mauritania to Italy and the Balkan regions, with a maximum over Tunisia and Malta. The concentration values indicated a Saharan event of significant internsity. Therefore, the BSC-DREAM output expressed in terms of dust concentration and dust deposition are consistent in showing that on the 20th January, Malta was affected by a Saharan dust episode.

HYSPLIT model

The following figure shows the application of HYSPLIT on the Maltese islands on the 20th of January. The HYSPLIT output is related to 10.00 UTC, defined as the moment of maximum peak of the possible dust event.

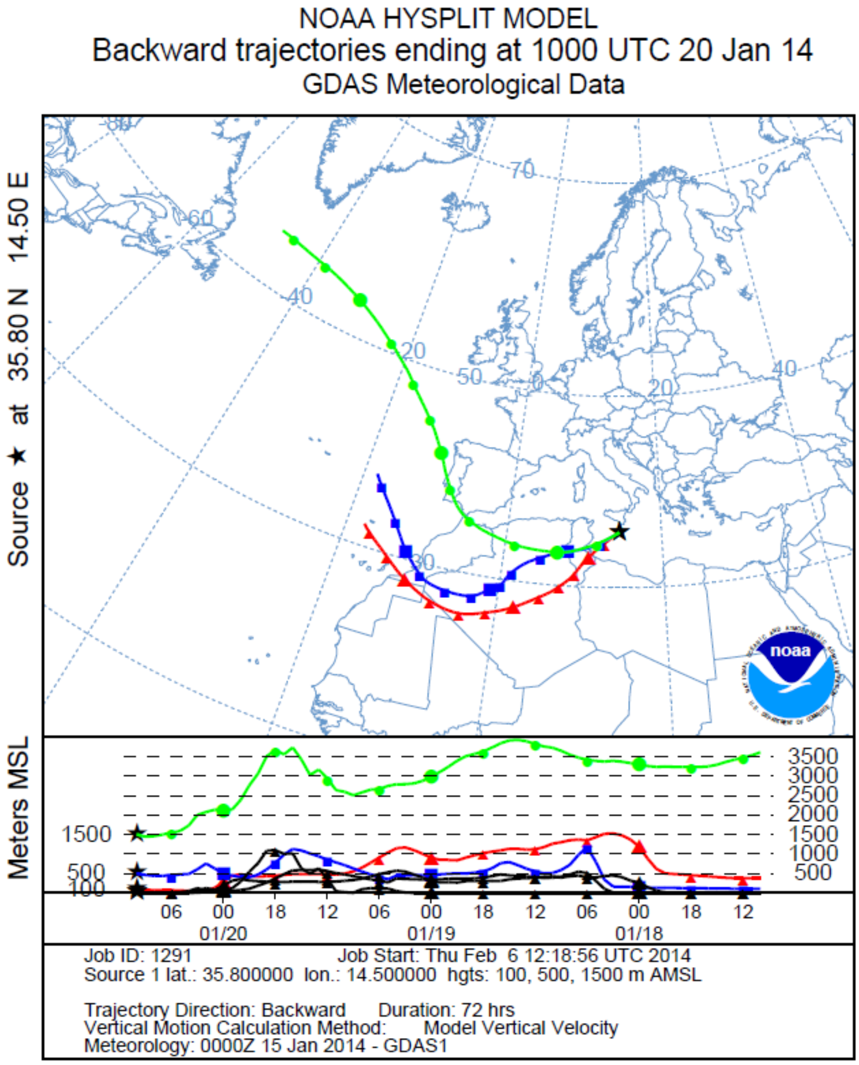


Figure 147: Backward trajectory at 1500m. 500m and 100 m on the 20 January

The HYSPLIT model output related to the conditions on the 20th January shows that the backward trajectories ending over Maltese area at the three levels of 100, 500 and 1500 meters above the ground level according to the wind field calculated by BSC-DREAM model. All the backward trajectories arriving to Malta originated at the Atlantic area and cross over Saharan regions (Moroco, Algeria and Tunisia) before reaching Malta.

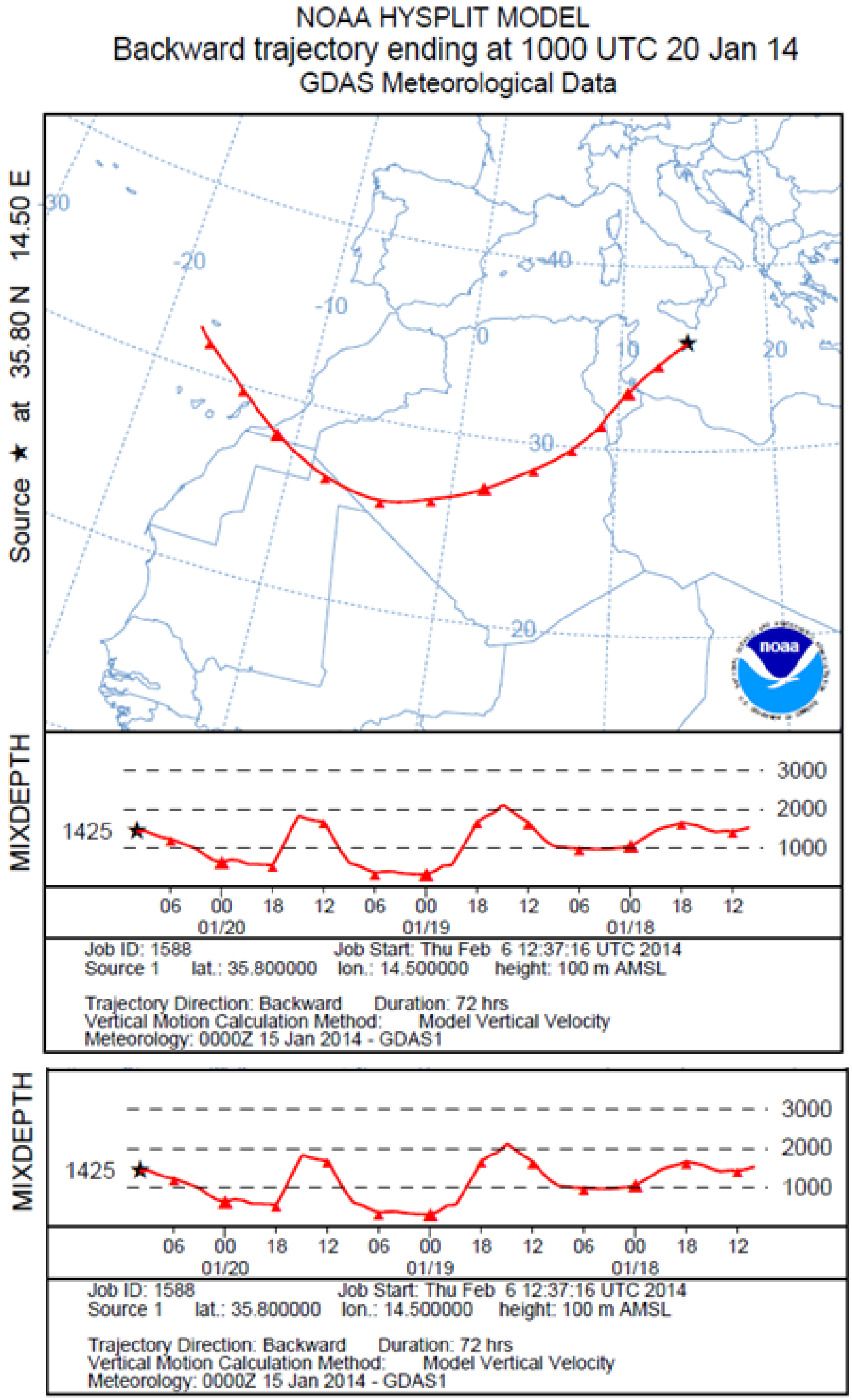


Figure 148: HYSPLIT backward trajectory at 100 m on the 20 January

The backward trajectory related to 100 meters level was from the Northern Atlantic zone, but along its path to the Maltese islands, it crossed the Saharan regions at levels quite near to the soil level. During the path toward Malta it decreased its quote. The mixdepth quote over Malta was higher than the arriving quote of this backward trajectory.

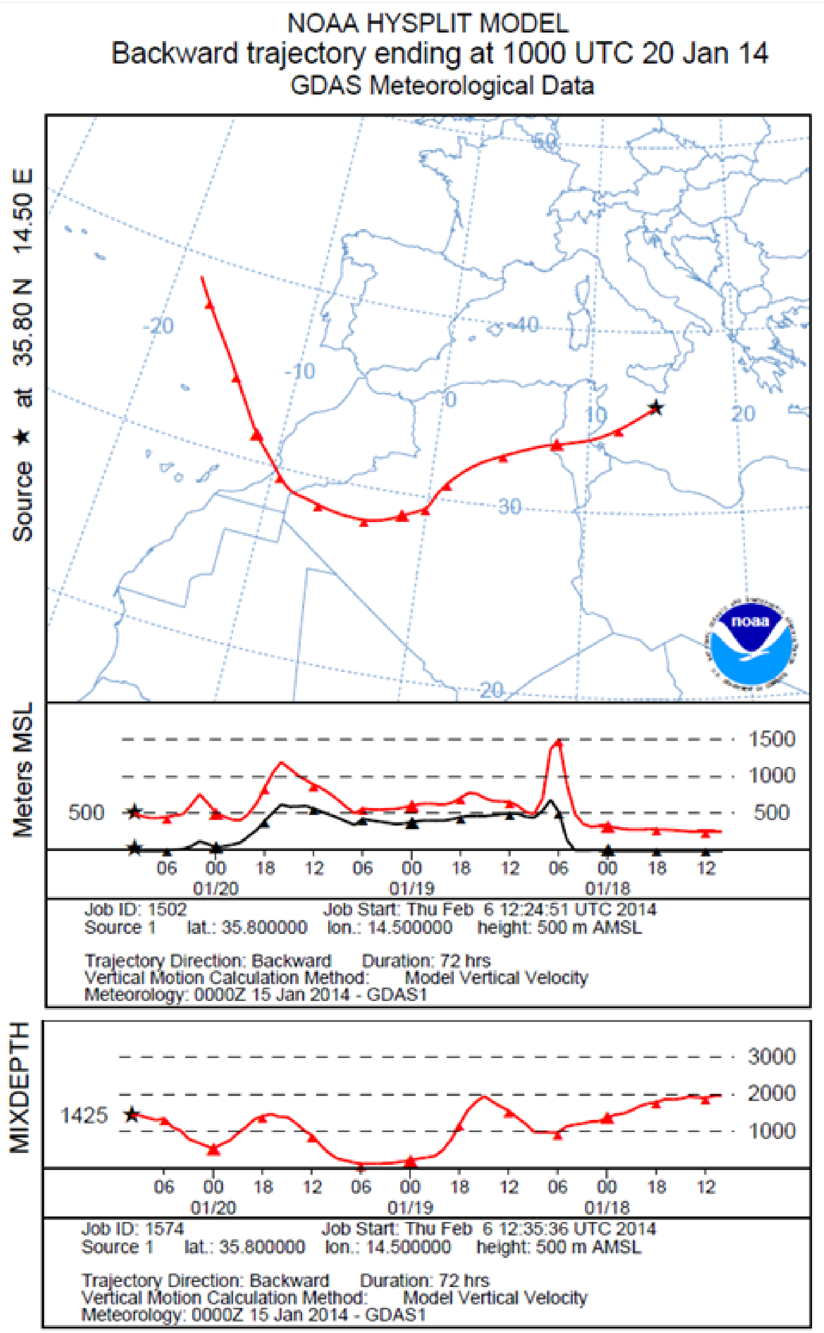


Figure 149: HYSPLIT backward trajectory at 500 m on the 20 January

The backward trajectory related to 500 meters level was from the North Atlantic and reached Malta through a path that crossed the Saharan regions (Algeria and Tunisia). During the path toward Malta it decreased its quote. The mixdepth quote over Malta was higher than the arriving quote of this backward trajectory.

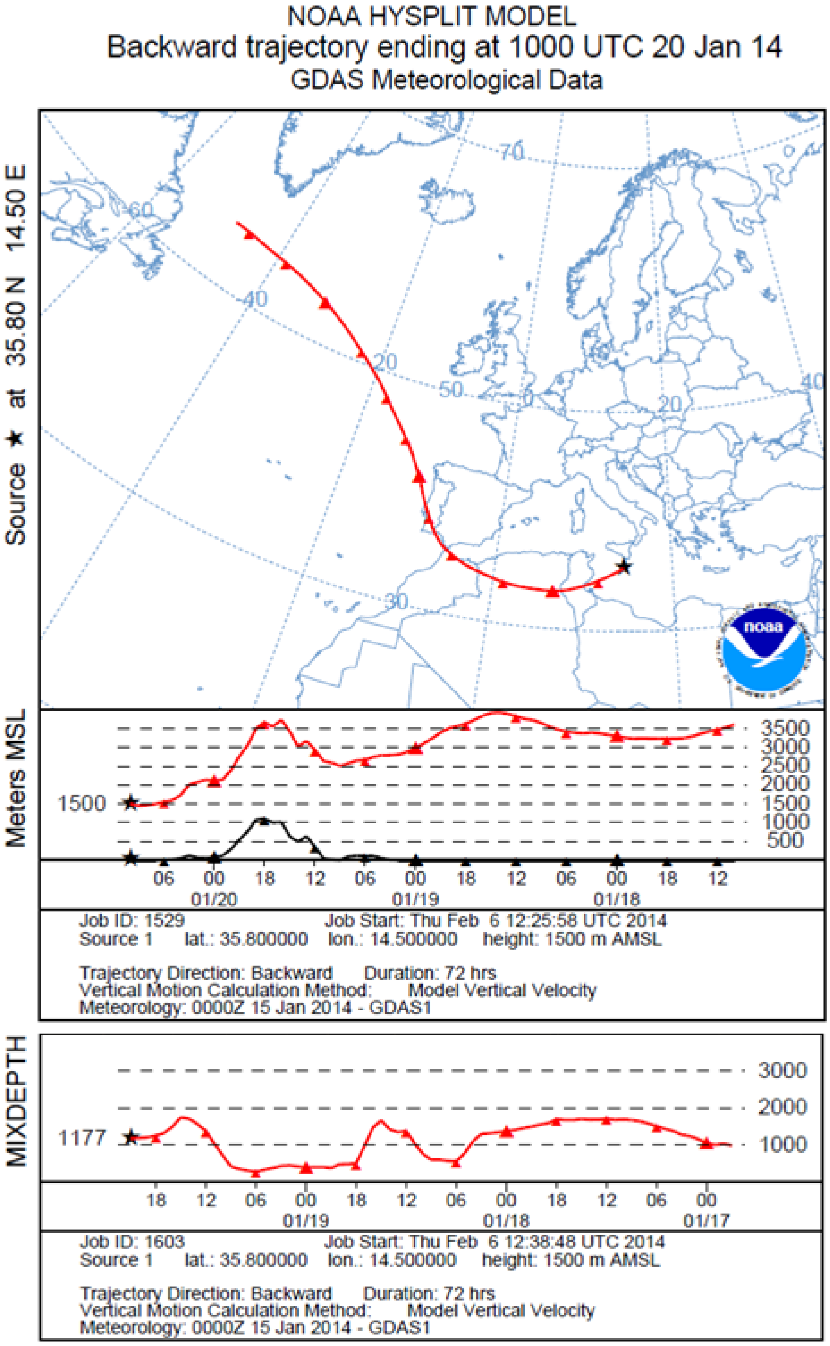
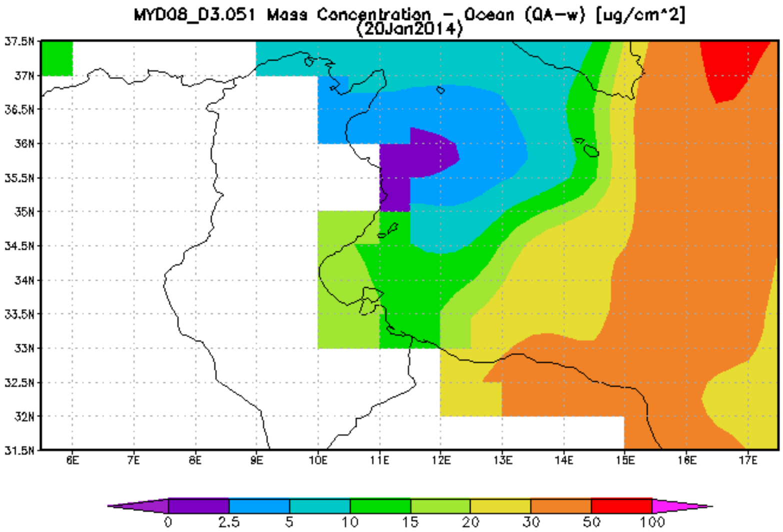


Figure 150: HYSPLIT backward trajectory at 1500 m on the 20 January

The backward trajectory related to 1500 meters level was from North Atlantic zone and reached Malta through a path that crossed the Saharan regions (Moroco, Algeria and Tunisia). During the last hour of its path before reaching Malta it decreased its quote. The mixdepth quote over Malta was lower than the arriving quote of this backward trajectory.

MODIS sensors

The MODIS data available shows a quite highvalue referred to the presence of dust aerosols over Malta on the 20th of January 2013. Both the Aerosol optical depth and the mass concentration map show values significantly high which confirm the presence of dust aerosol. The zone near south Tunisia and Libya is the area with the highest results,referring to Malta, the results assume values in the average range.



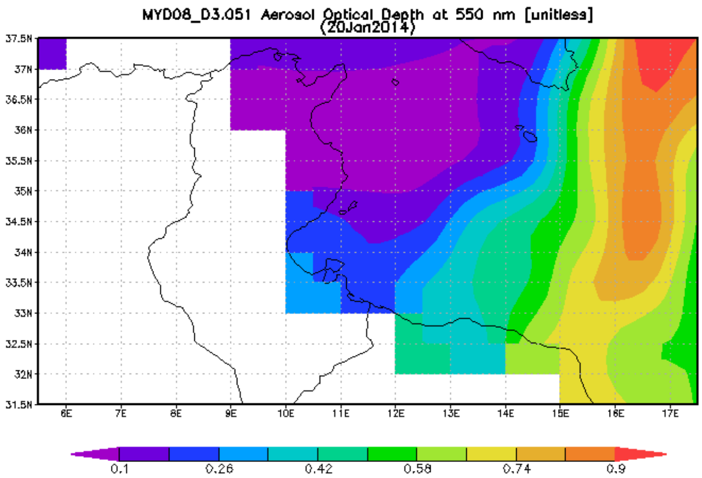


Figure 151: MODIS Terra and Aqua Level 3-Data on the 20 January

- ***30 January***

AERONET images

The below images represent satellite images of 250m bands for Aqua and 250m bands for Terra.

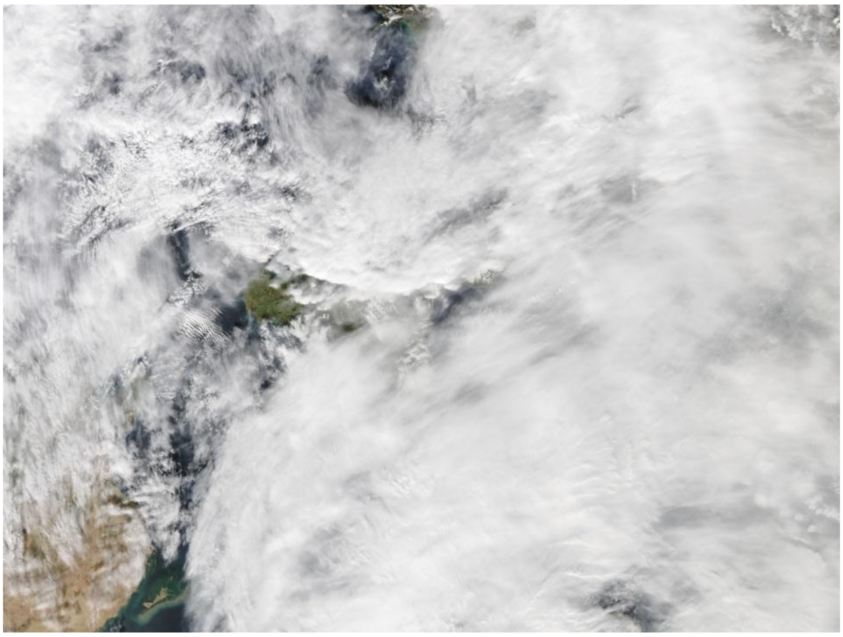


Figure 152: AERONET_ETNA 250m _AQUA

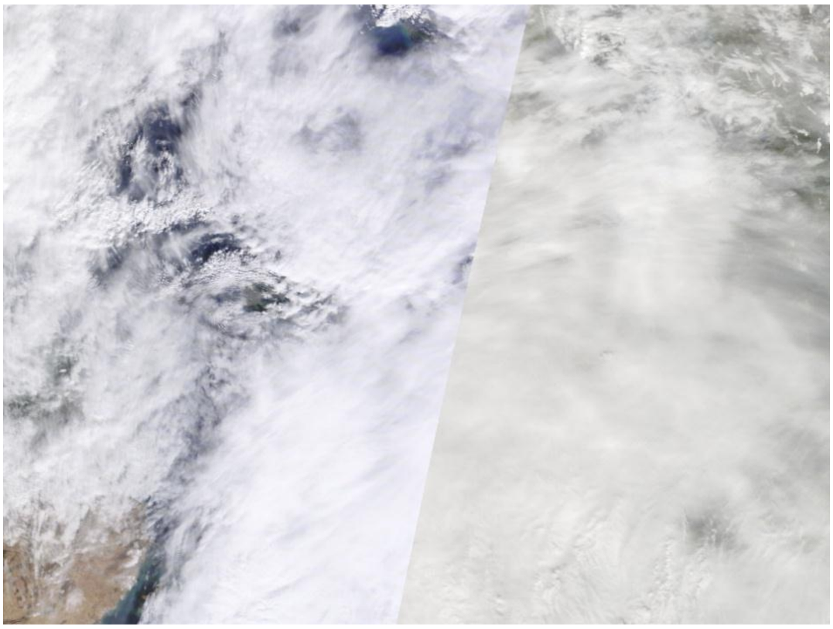


Figure 153: AERONET_ETNA 250m _TERRA

The above images do not provide clear information about the possible occurrence of a Saharan event due to the high clouds around the Maltese Islands.

BSC-DREAM dust model

The figure below represents the BSC-DREAM prediction of total dust expressed in terms of lowest model level dust concentration (in µg/m^3) and of dust load (in g/m^2). The dust load is in size classes between 0.1 and 10 µm over Europe at 12:00 UTC and 18.00 UTC, and superimposed on the same figure are the corresponding hourly forecasted wind vectors at 3000m height level.

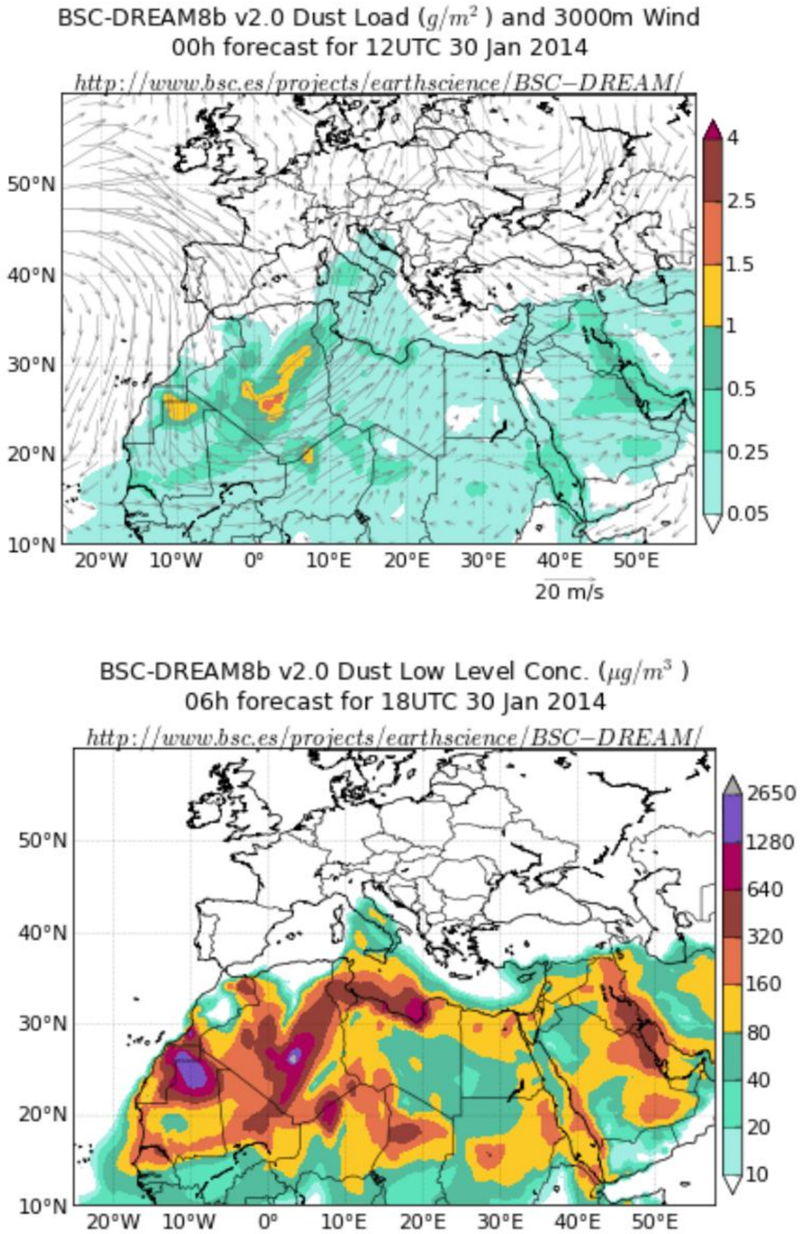


Figure 154: BSC-DREAM outputs on the 30 January

From the dust loading image above, it can be noted that on the 30th January a wind field coming from the North-Altantic sea area, descended towards the South and passed through Morocco, Algeria and Tunisia before reaching the Maltese islands.

The dust low level concentration image indicates high values all over the Saharan regions where the wind field passed through before reaching Malta.

Therefore, the BSC-DREAM output expressed in terms of dust concentration and dust deposition are quite consistent in showing that on 30th January, Malta was affected by a limited Saharan dust episode.

HYSPLIT model

The following figure shows the application of HYSPLIT on the Maltese islands on the 30th January. The HYSPLIT output is related to 22.00 UTC, defined as the moment of maximum peak of the possible dust event.

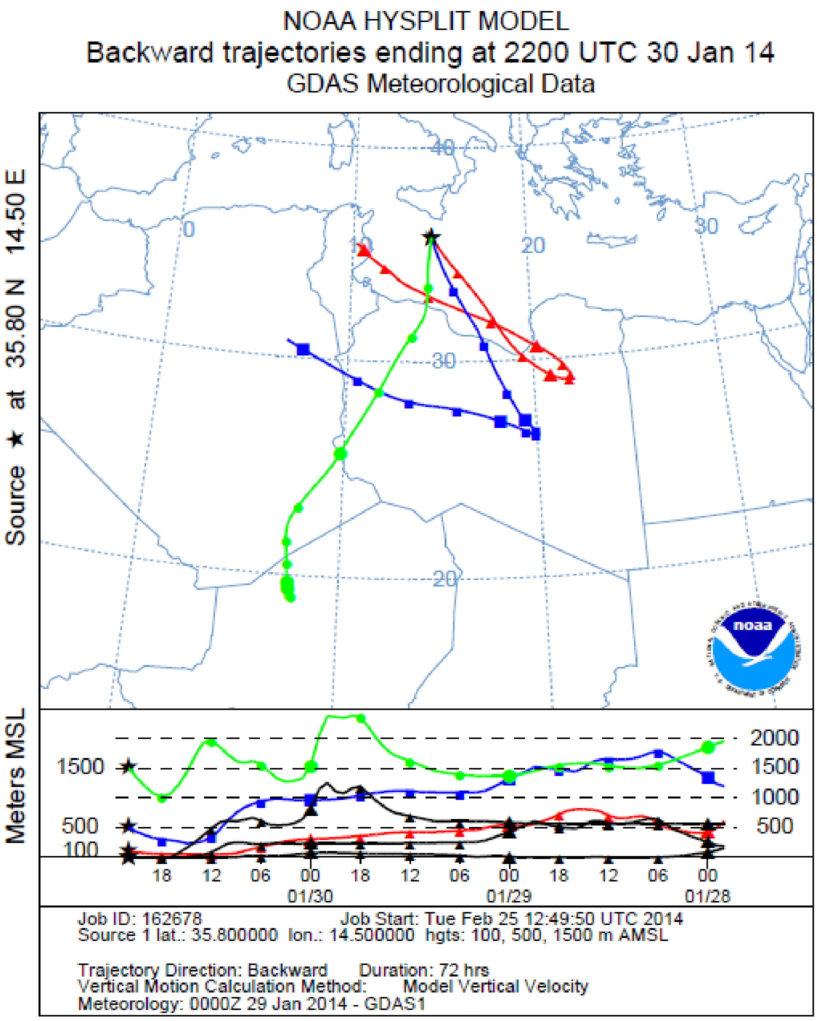


Figure 155 : HYSPLIT backward trajectory at 1500m. 500m and 100 m on the 30 January

The HYSPLIT model output, related to the conditions on the 30th January, shows that the backward trajectories ending over the air monitoring stations at the level of 100, 500 and 1500 meters above ground level are coming directly from Saharan regions.

The following figures show, for each backward trajectory, the variation of the parameters "Terrain height" and "Mixed layer depth", along the path. This information allows some further assessment about the probable intensity of the event at the arriving-point of this trajectory:

- a reduced distance from the backward trajectory level and the terrain height is considered to be an indicator of a higher intensity event, due to a major implication of the lower level of the atmosphere;
- the presence, along the path, of many points at which the trajectory level is above the mixed layer depth is considered an indicator of a possible decrease of the intensity of the dust aerosol, even if the trajectory being always under the mixed layer depth may be affected by higher level of dust deposition along the path, with minor intensity at the ending-point of the backward trajectory;
- a mixed layer depth higher than the ending-level of each backward trajectory is an indicator of a higher level of intensity of the event;

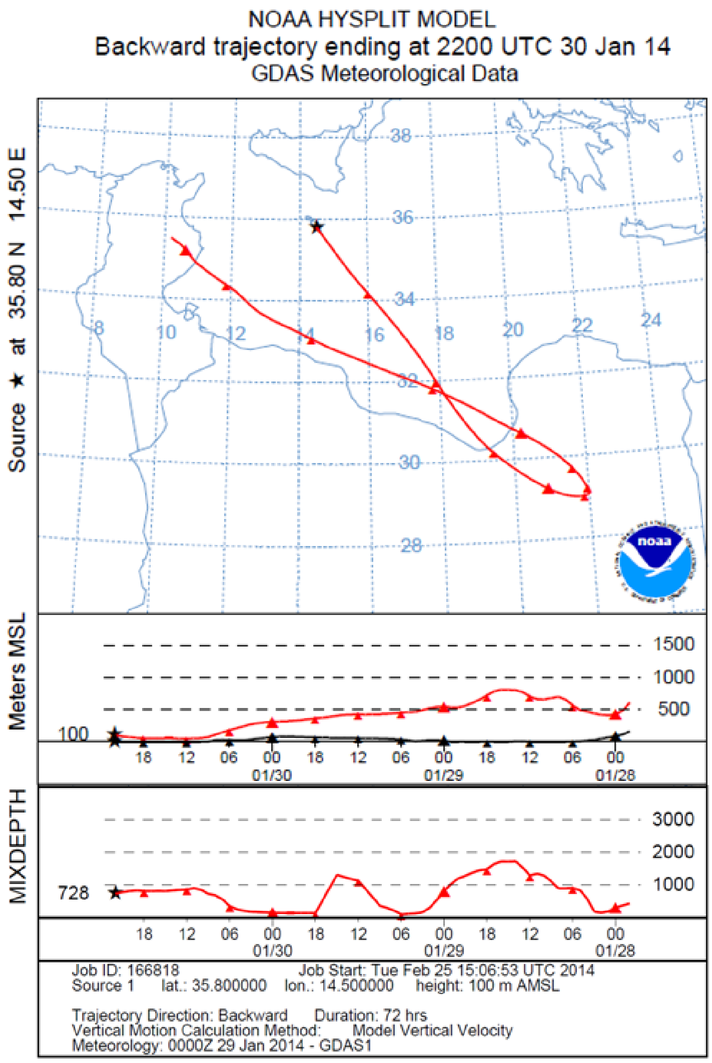


Figure 156: HYSPLIT backward trajectory at 100m on the 30 January

The backward trajectory at 100 meters above ground level, starts from Tunisia and then passes over the Libyan zone and turns back to Malta. The path of this trajectory passes in an area potentially affected by uplift of Saharan dust. The mixdepth quote over Malta was 728 meters, higher than the arriving quote of this backward trajectory.

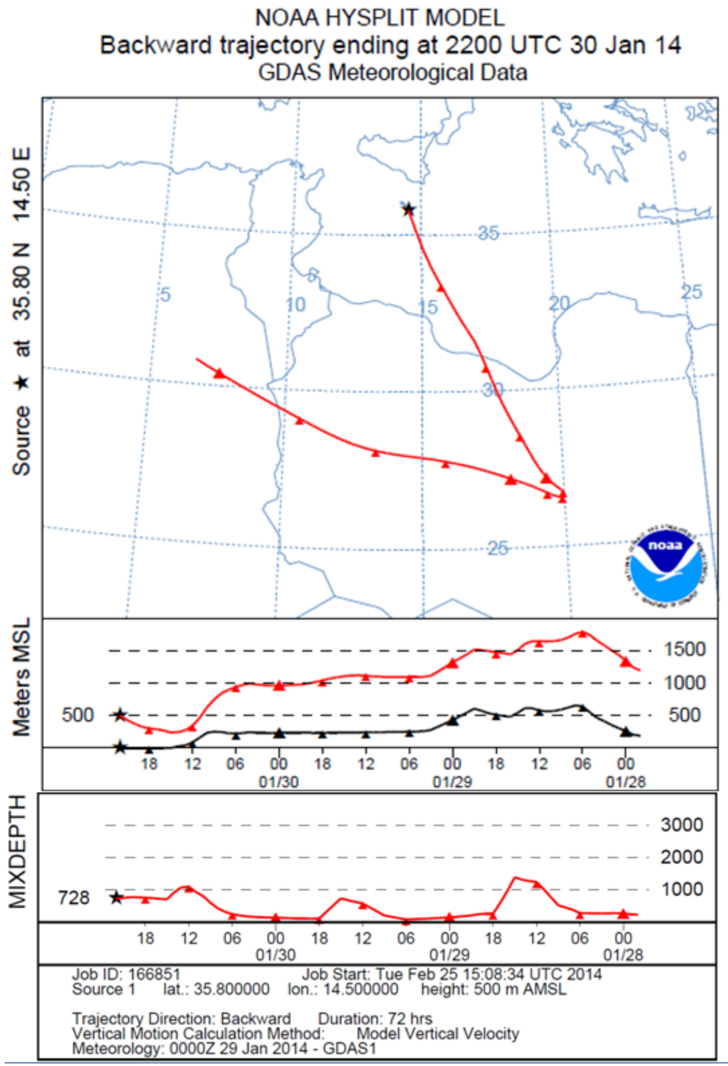


Figure 157: HYSPLIT backward trajectory at 500m on the 30 January

The backward trajectory at 500 meters above ground level came from Algeria and then crossed Libya before arriving to Malta. The mixdepth altitude over Malta was higher than the arriving quote of this backward trajectory.

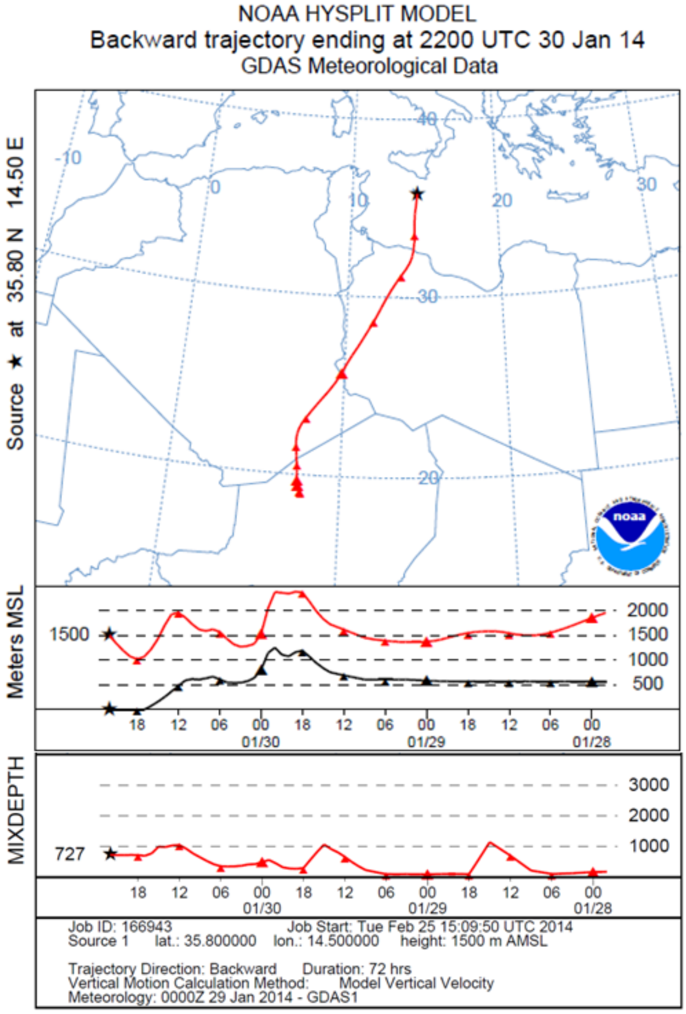
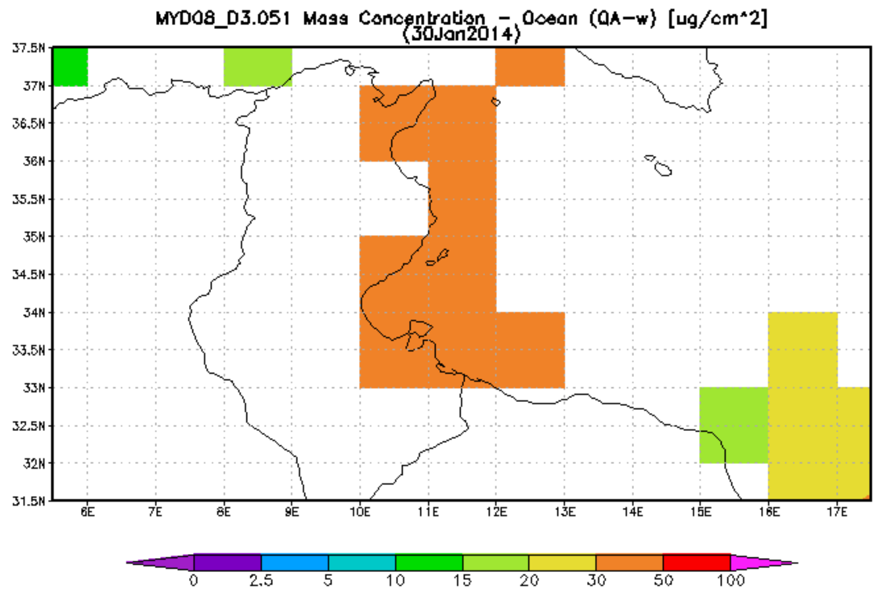


Figure 158: HYSPLIT backward trajectory at 1500m on the 30 January

The backward trajectory at 1500 meters above ground level came from Saharan regions and reached directly the Maltese islands. This trajectory is compliant with the wind field calculated by BSC-DREAM model. The mixdepth quote over Malta was lower than the arriving quote of this backward trajectory.

MODIS sensors

The MODIS data available showed a quite high value referred to the presence of dust aerosols over Malta on 30th of January 2013. Both the Aerosol small mode and the mass concentration map show values significantly high that confirm the presence of dust aerosol.



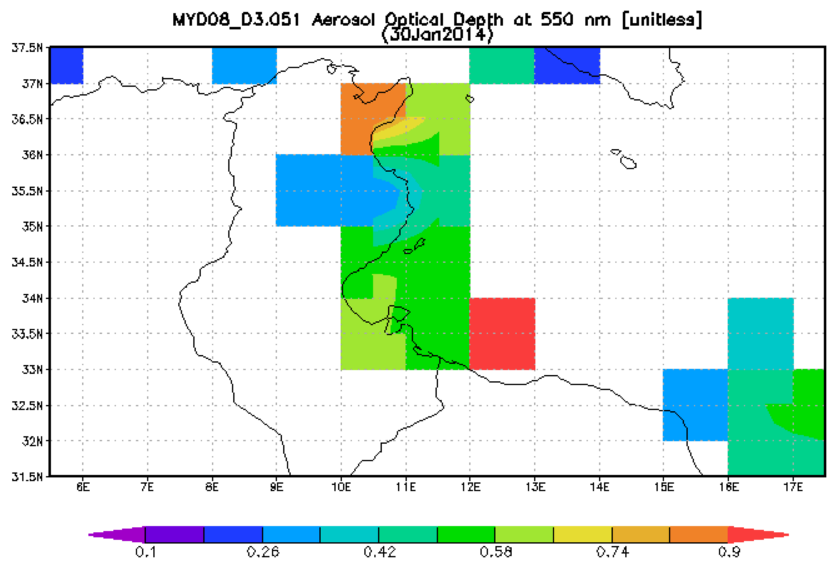


Figure 159: MODIS Terra and Aqua images on the 30 January

- ***31 January***

AERONET images

The below images represent satellite images of 250m bands for Aqua and 250m bands for Terra.

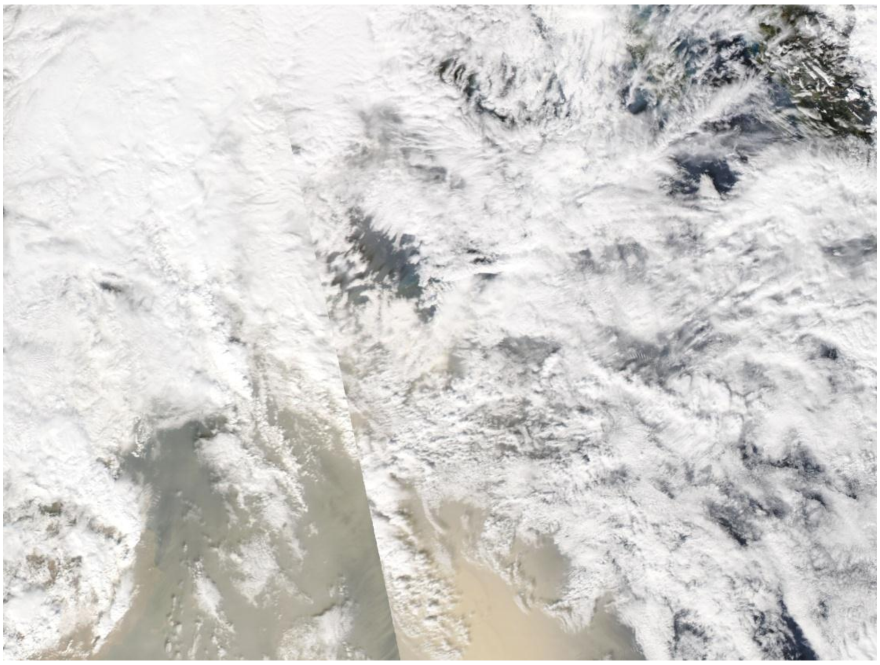


Figure 160: AERONET_ETNA 250m _AQUA

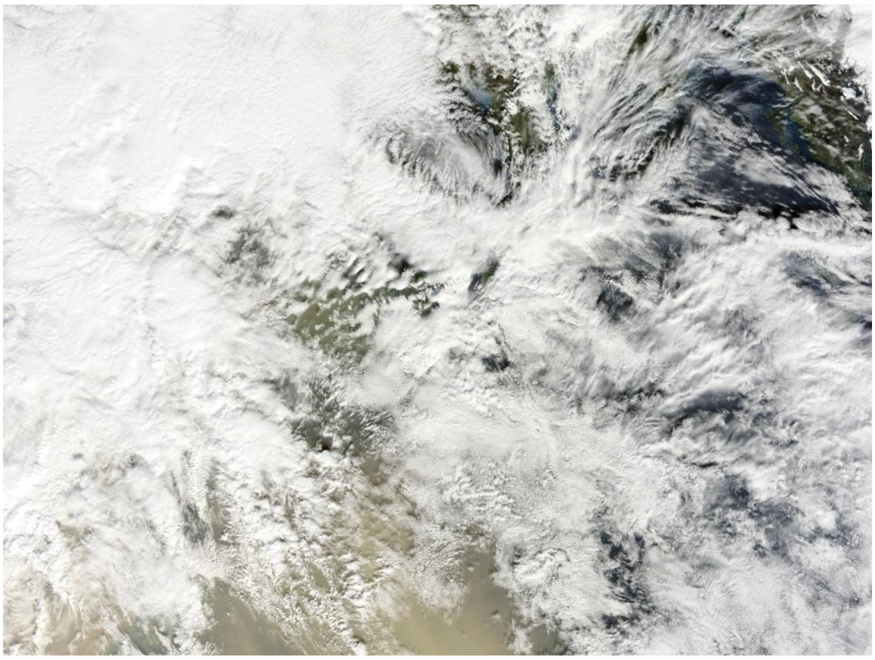


Figure 161: AERONET_ETNA 250m _TERRA

The above images do not provide clear information about the possible occurrence of a Saharan event due to the high clouds around the Maltese Islands

BSC-DREAM dust model

The figure below represents the BSC-DREAM prediction of total dust expressed in terms of lowest model level dust concentration (in µg/m^3) and of dust load (in g/m^2). The dust load is in size classes between 0.1 and 10 µm over Europe at 12:00 UTC and 18.00 UTC, and superimposed on the same figure are the corresponding hourly forecasted wind vectors at 3000m height level.

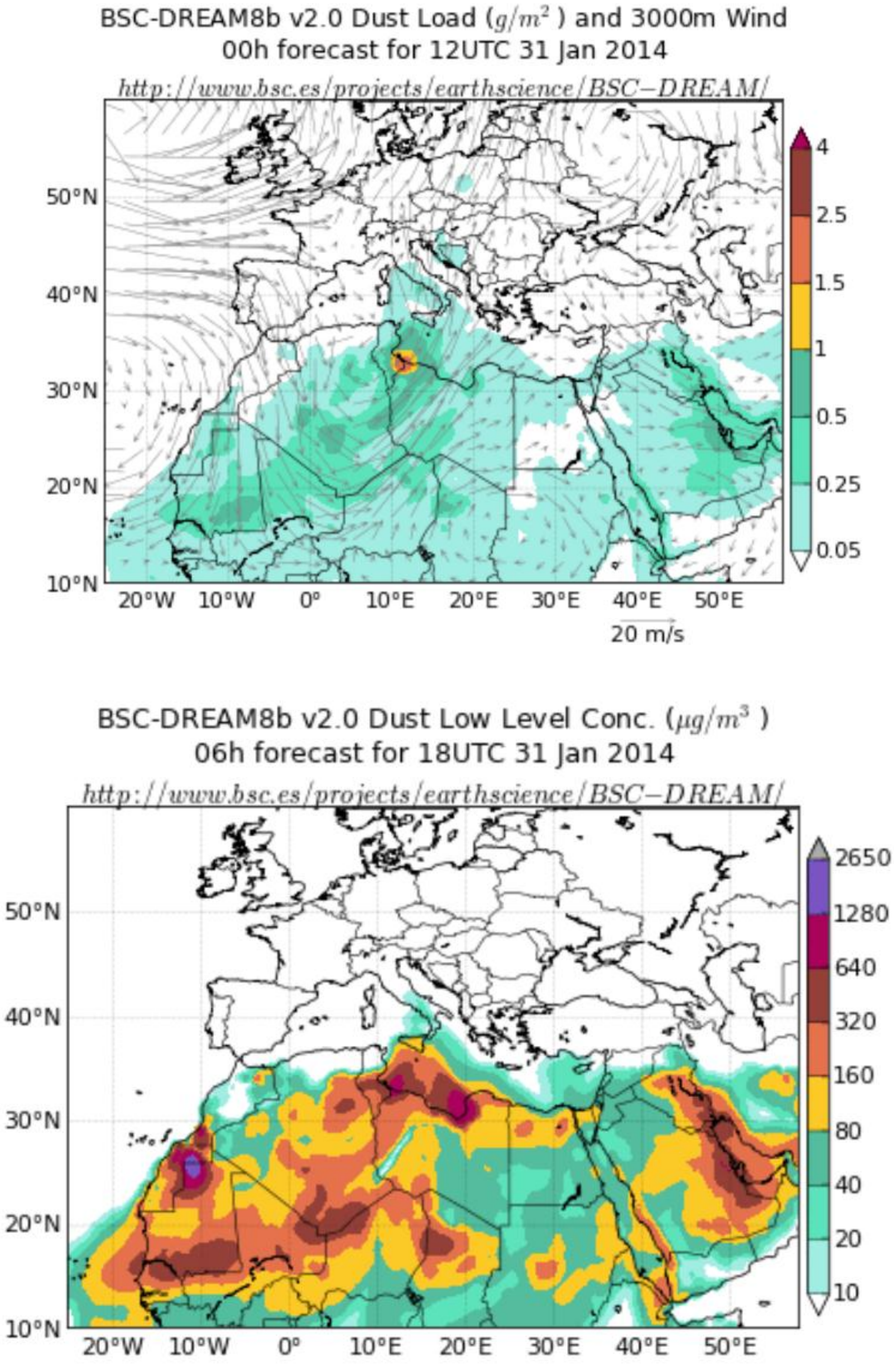


Figure 162: BSC-DREAM outputs on the 31 January

From the dust loading image above, it can be noted that on the 31st January, the wind field over Malta came from the Atlantic area before turning towards South and overpassing Algeria, Tunisia and Libya.

The dust concentration image confirms a dust loading along the path from Mauritania and Moroco to Italy, with a high peak over Central Tunisia and the coast of Libya. The concentration values indicates the strong intensity of a Saharan event, therefore, the BSC-DREAM output expressed in terms of dust concentration and dust deposition are consistent in showing that on the 31st January, Malta was affected by a Saharan dust episode.

HYSPLIT model

The following figure shows the application of HYSPLIT on the Maltese islands on the 31st of January. The HYSPLIT output is related to 14.00 UTC, defined as the moment of maximum peak of the possible dust event.

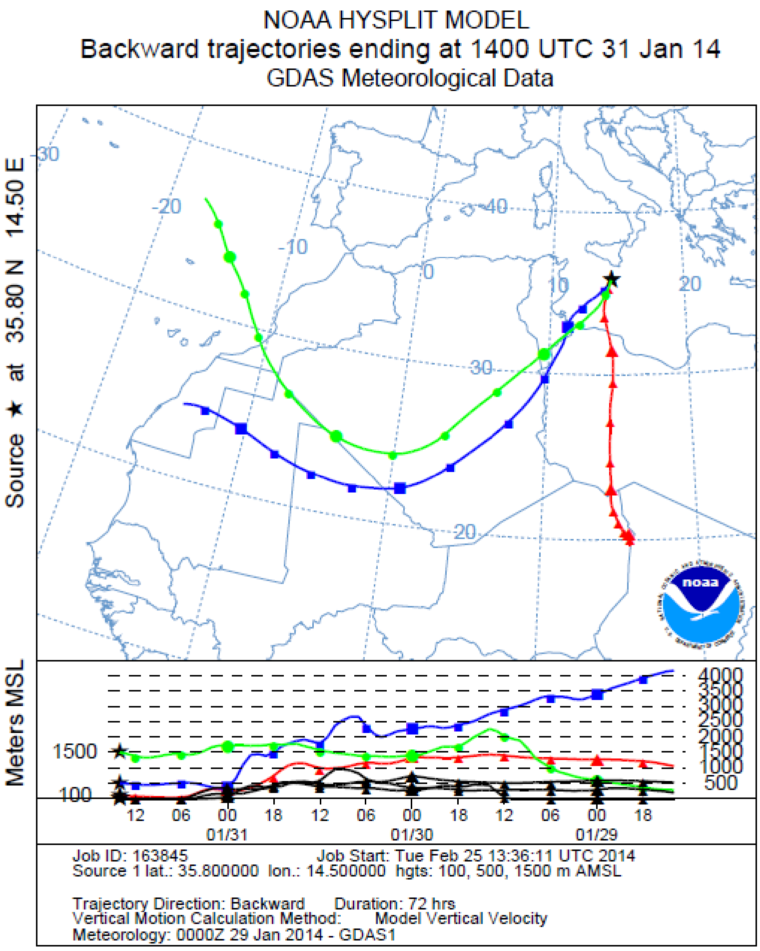


Figure 163 : HYSPLIT backward trajectory at 1500m. 500m and 100 m on the 31 January

The HYSPLIT model output related to the conditions on the 31st January shows that the backward trajectories ending over the air monitoring zone (Marsaxlokk and Birżebbuġa) at the higher level of

1500, 500 and 100 meters above ground level, are directly from the Saharan region which indicates a possible dust load episode of high intensity over Malta.

The following figures show, for each backward trajectory, the variation of the parameters “Terrain height” and “Mixed layer depth”, along the path. This information allows some further assessment about the probable intensity of the event at the arriving-point of this trajectory:

- a reduced distance from the backward trajectory level and the terrain height is considered to be an indicator of a higher intensity event, due to a major implication of the lower level of the atmosphere;
- the presence, along the path, of many points at which the trajectory level is above the mixed layer depth is considered an indicator of a possible decrease of the intensity of the dust aerosol, even if the trajectory being always under the mixed layer depth may be affected by higher level of dust deposition along the path, with minor intensity at the ending-point of the backward trajectory;
- a mixed layer depth higher than the ending-level of each backward trajectory is an indicator of a higher level of intensity of the event;

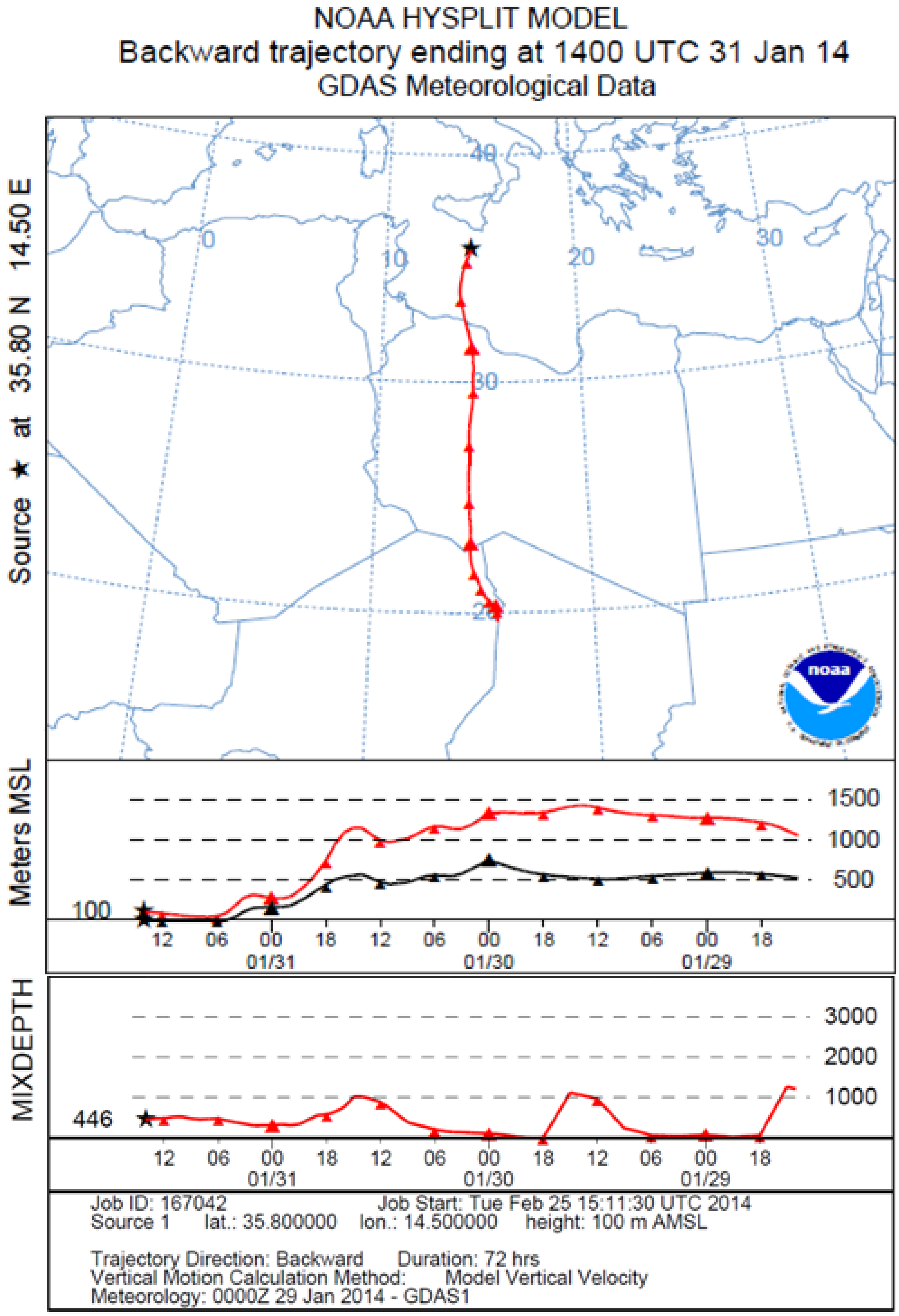


Figure 164: HYSPLIT backward trajectory at 100m on the 31 January

The backward trajectory at 100 meters above ground level came from Saharan region and reached Malta through a direct path over Libya. The mixdepth quote over Malta was, higher than the arriving quote of this backward trajectory.

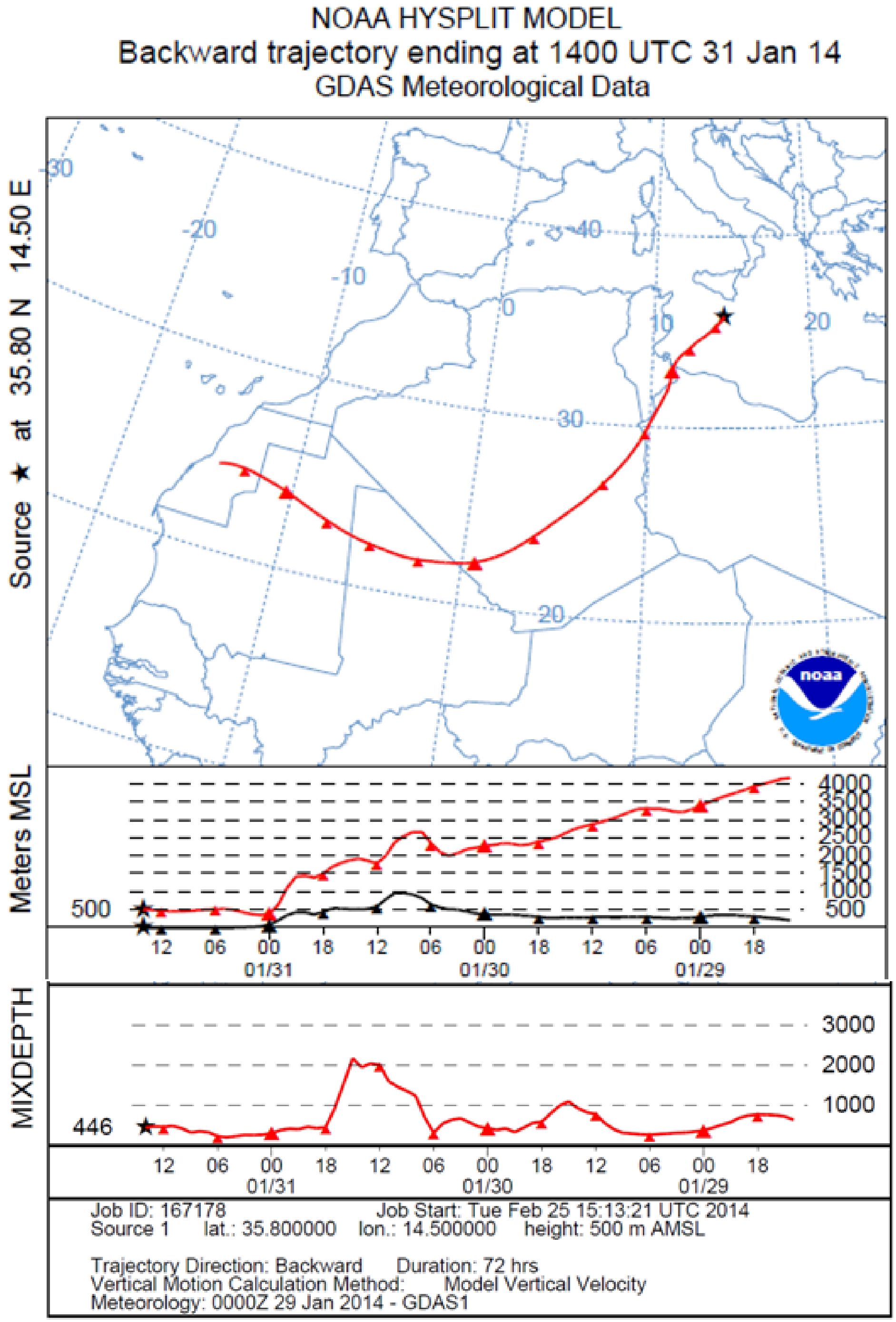


Figure 165: HYSPLIT backward trajectory at 500m on the 31 January

The backward trajectory at 500 m was coming from Saharan regions and the mixed layer depth over Malta on 31st January was 446 m, lower than this backward trajectory ending-point.

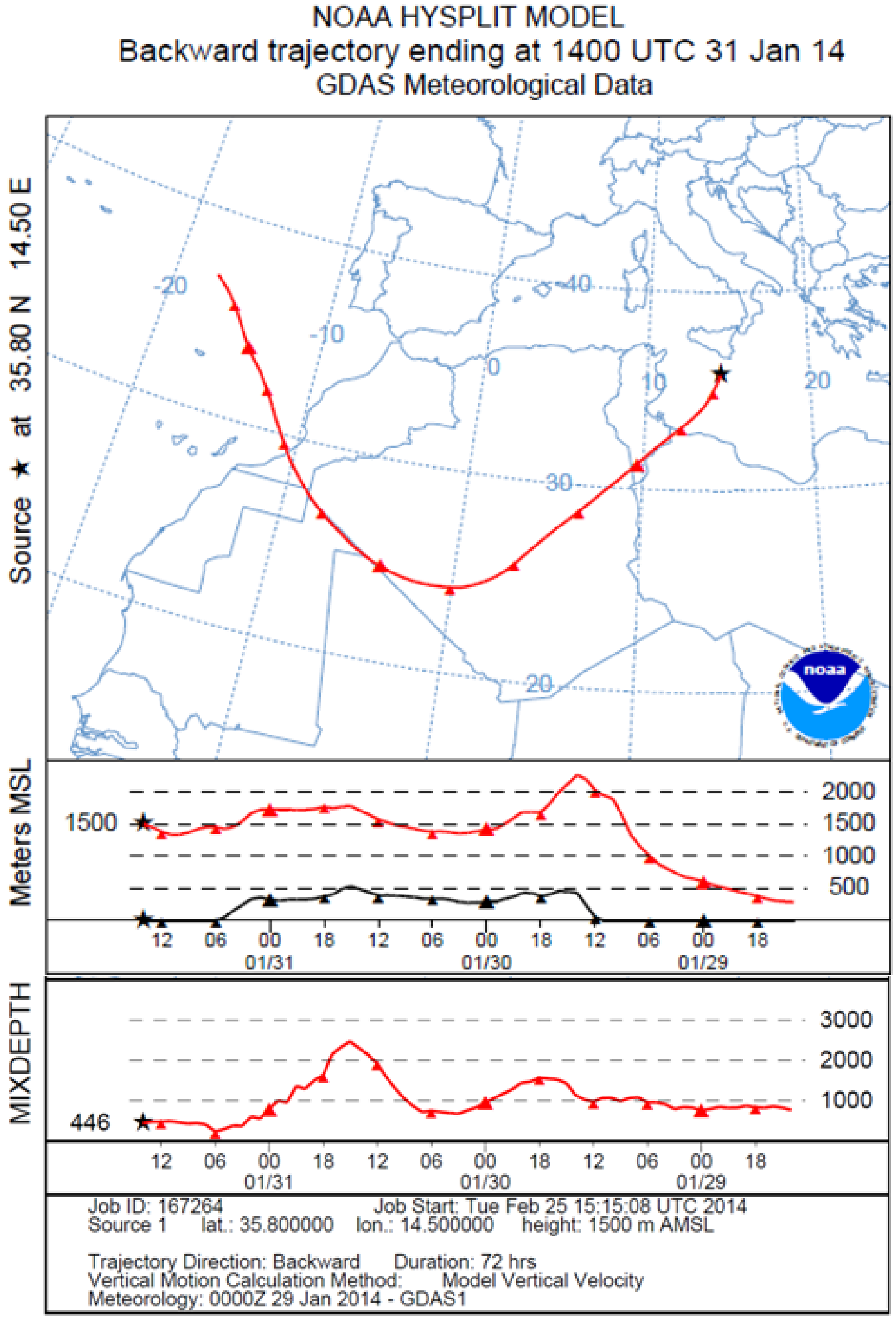
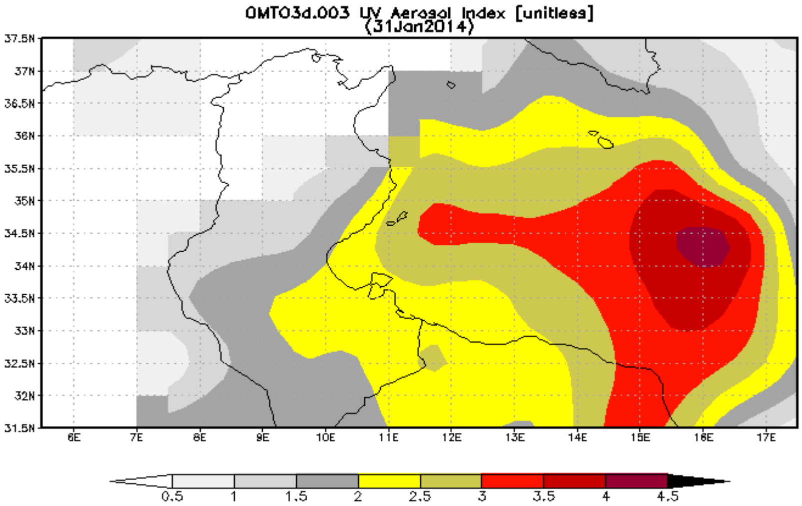


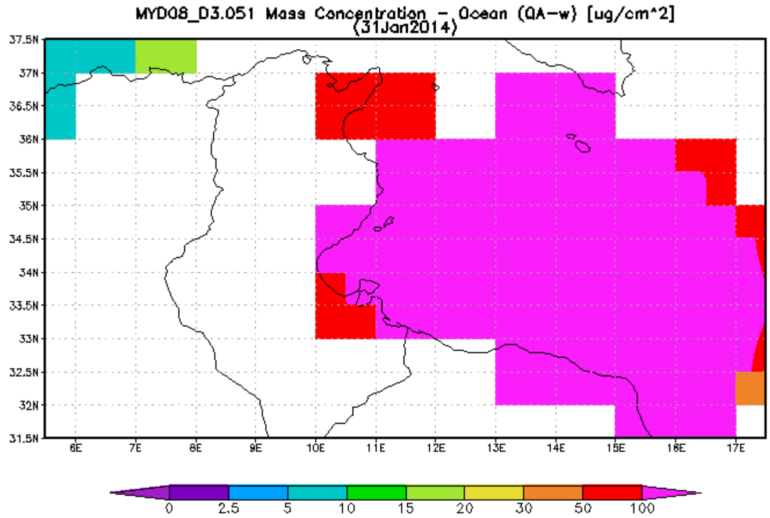
Figure 166: HYSPLIT backward trajectory at 1500m on the 31 January

The mixed layer depth was lower than the backward trajectory at 1500 meters. That shows a possible contribution to the dust load mainly related to the 100 and 500 m backward trajectories.

MODIS sensors

The MODIS data available shows that the UV Aerosol Index, Aerosol optical depth and the mass concentration map had values significantly high that confirm the presence of dust aerosol.





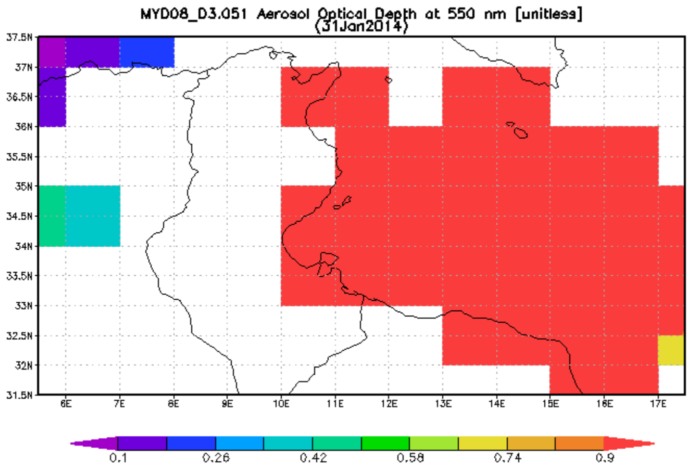


Figure 167: MODIS Terra and Aqua images on the 31 January

Conclusions

On the 18th , 19th and 20th, 30th and 31st of January the air monitoring ongoing at Birżebbuġa and Marsaxlokk stations recorded exceedances of the daily limit value of PM_{10}.

The comparison with the other MEPA air monitoring data shows consistent exceedances of the daily limit value of PM10 in the other stations on all those days (the 4 MEPA station recorded excedeences on each day).

The satellite images over Malta indicated the presence of a distributed dust aerosol over and near Maltese islands on those days.

The mathematical model applications show that on the 18th ,19th ,20th of January the Saharan dust intrusions affected Malta.

The BSC-DREAM and HYSPLIT model outputs are very coherent and the wind-field calculated by BSC-DREAM model helped to better understand the backward trajectories outputs by indicating the origin of the Saharan episodes through the HYSPLIT model.

The satellite data analysis usingthe MODIS AOD550, SMF, Reff, Mass concentration and Angrstrom exponent values have confirmed the evaluations described above related to the presence of Saharan dust episodes.

The AERONET data retrived from the Lampedusa site showed that the three Saharan dust episode that affected Malta, passed over Lampedusa one day before being recorded in Malta.

In conclusion, the PM_{10}-exceedance at Birżebbuġa and Marsaxlokk during the 18th , 19th and 20th, 30th and 31st of January are attributed to a Saharan dust episode.

2.23. FEBRUARY

2.23.1. Analysis for the Identification of Saharan Dust

Step 1: MEPA data analysis

The analysis of the air monitoring data during the period between the 1st and the 17th February 2014 determined the following exceedances:

- at Marsaxlokk site, exceedance of daily limit value of PM_{10}, occurred on
    - February 1 - daily concentration of 101.99 µg/m^3 against daily limit value of 50.0 µg/m^3
    - February 10 - daily concentration of 66.12 µg/m^3 against daily limit value of 50.0 µg/m^3
    - February 20 - daily concentration of 53.29 µg/m^3 against daily limit value of 50.0 µg/m^3
- at Birżebbuġa site, exceedance of daily limit value of PM_{10}, occurred on
    - February 1 - daily concentration of 140.58 µg/m^3 against daily limit value of 50.0 µg/m^3
    - February 10 - daily concentration of 61.67 µg/m^3 against daily limit value of 50.0 µg/m^3
    - February 20 - daily concentration of 58.38 µg/m^3 against daily limit value of 50.0 µg/m^3
    - February 21 - daily concentration of 53.44 µg/m^3 against daily limit value of 50.0 µg/m^3
    -

For the above days, the available information from MEPA air monitoring network was related to:

- Għarb station
- Msida station
- Żejtun station
- Kordin station

•

The PM_{10} daily mean values were:

- Għarb station:
  - February 1 - daily concentration of 106.38 µg/m^3 against daily limit value of 50.0 µg/m^3
  - February 10 - daily concentration of 22.72 µg/m^3 against daily limit value of 50.0 µg/m^3
  - February 21 - daily concentration of 14.75 µg/m^3 against daily limit value of 50.0 µg/m^3

- Msida station:
  - February 1 - daily concentration of 132.03 µg/m^3 against daily limit value of 50.0 µg/m^3
  - February 10 - daily concentration of 36.79 µg/m^3 against daily limit value of 50.0 µg/m^3
  - February 20 - daily concentration of 43.52 µg/m3 against daily limit value of 50.0 µg/m^3
  - February 21 - daily concentration of 30.24 µg/m3 against daily limit value of 50.0 µg/m^3
- Żejtun station:
  - February 1 - daily concentration of 107.07µg/m^3 against daily limit value of 50.0 µg/m^3
  - February 10 - daily concentration of 30.34 µg/m^3 against daily limit value of 50.0 µg/m^3
  - February 20 - daily concentration of 39.25 µg/m3 against daily limit value of 50.0 µg/m3
  - February 21 - daily concentration of 25.08 µg/m3 against daily limit value of 50.0 µg/m^3
- Kordin station:
  - February 10 - daily concentration of 27.06 µg/m^3 against daily limit value of 50.0 µg/m^3

- February 20 - daily concentration of 34.43 µg/m3 against daily limit value of 50.0 µg/m^3
- February 21 - daily concentration of 27.27 µg/m3 against daily limit value of 50.0 µg/m^3

The following table summarizes the above information:

Date	Enemalta air monitoring stations		MEPA air monitoring network stations			
	Marsaxlokk	Birżebbuġa	Għarb	Msida	Kordin	Żejtun
February 1	102.00	140.58	106.38	132.03	No Data	107.07
February 10	66.12	61.67	22.72	36.79	30.34	27.06
February 20	53.29	58.38	No Data	43.52	34.43	39.25
February 21	46.71	53.44	14.75	30.24	27.27	25.08

Table 60: PM_{10} measurements on 1 and 10 February 2014

The following figure shows the above information:

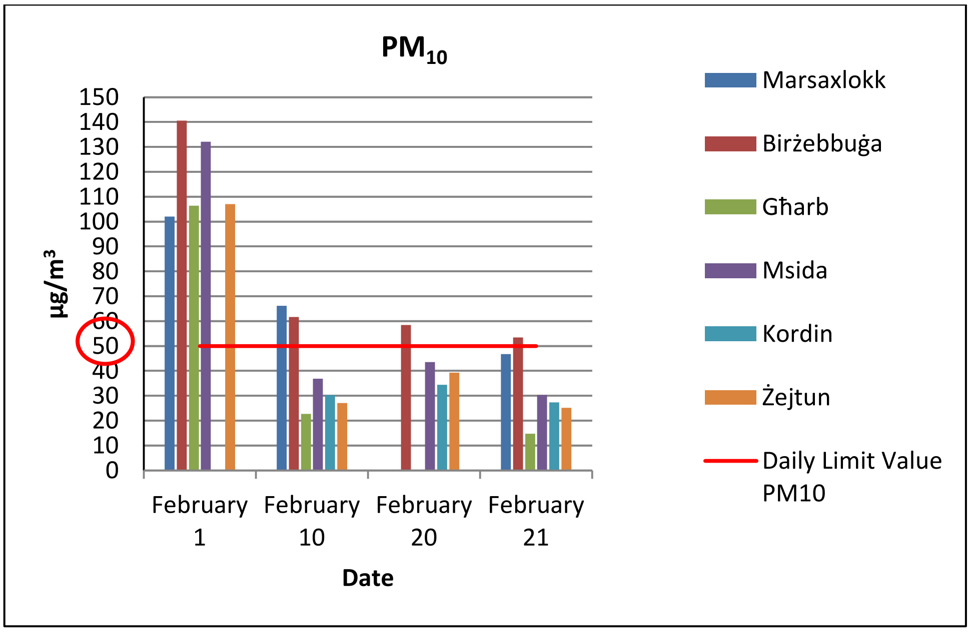


Figure 168: Air monitoring data plot on the days of exceedance

During the 1st of February, the four stations experienced an exeedance of the Daily Limit value, which could indicate the possibility of a Saharan event.

During the 10th of February, none of the four MEPA monitoring stations experienced an exeedance of the Daily Limit value.

In order to assess whether or not a Saharan event took place, a detailed analysis was carried out based on the EU guidelines in Steps 2 and 3 below. Satellite images were evaluated and the mathematical model tools applied in order to reach a conclusion.

For setting up the model variables in Step 3, a PM_{10} hourly concentration analysis was applied. This information is then used to best fit the modelling with HYSPLIT and run simulations at the specific hours that present the maximum probability of the eventual episode under investigation.

The following figure shows the variation of the PM_{10} hourly concentrations for the 1st ,10th, 20th and 21st of February 2014 at all the MEPA fixed stations.

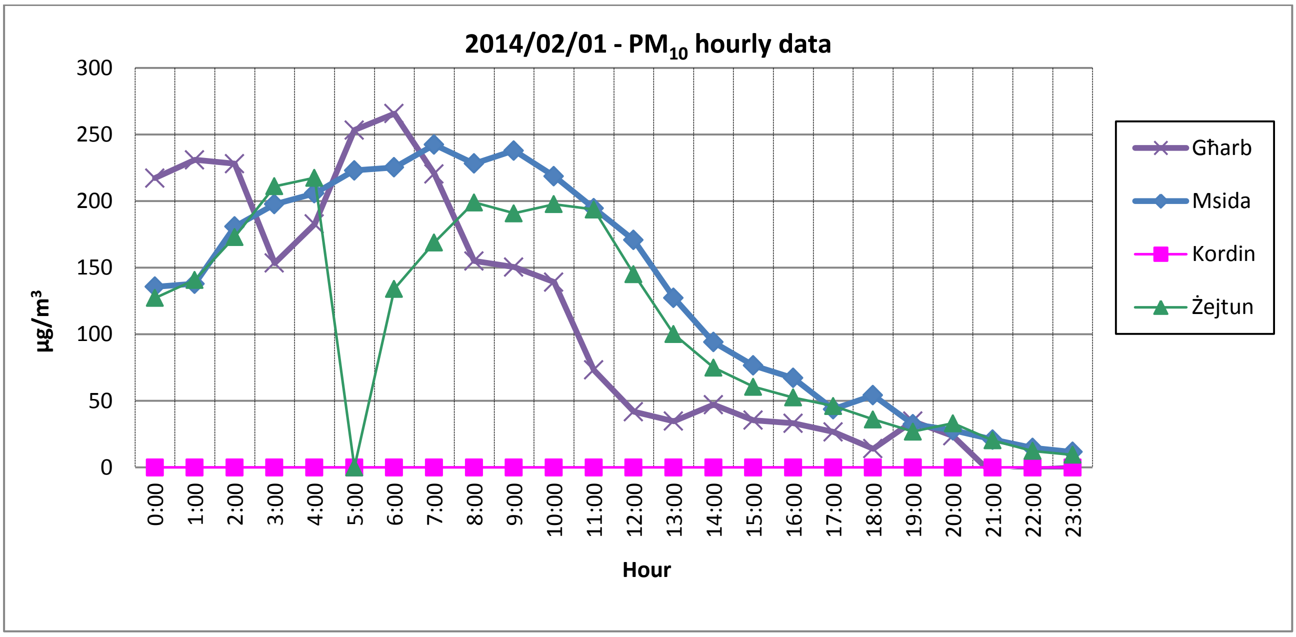


Figure 169: PM_{10} hourly data for the 1 February

On the 1st of February the highest PM_{10} concentrations were reached during the first hours of the day, between 0:00hrs and 0900hrs, decreasing gradually until 2300hrs. According to this data, the HYSPLIT model will be specified at 06.00 UTC (corresponding to 0700hrs in Malta), defined as the moment of maximum peak of the possible dust event.

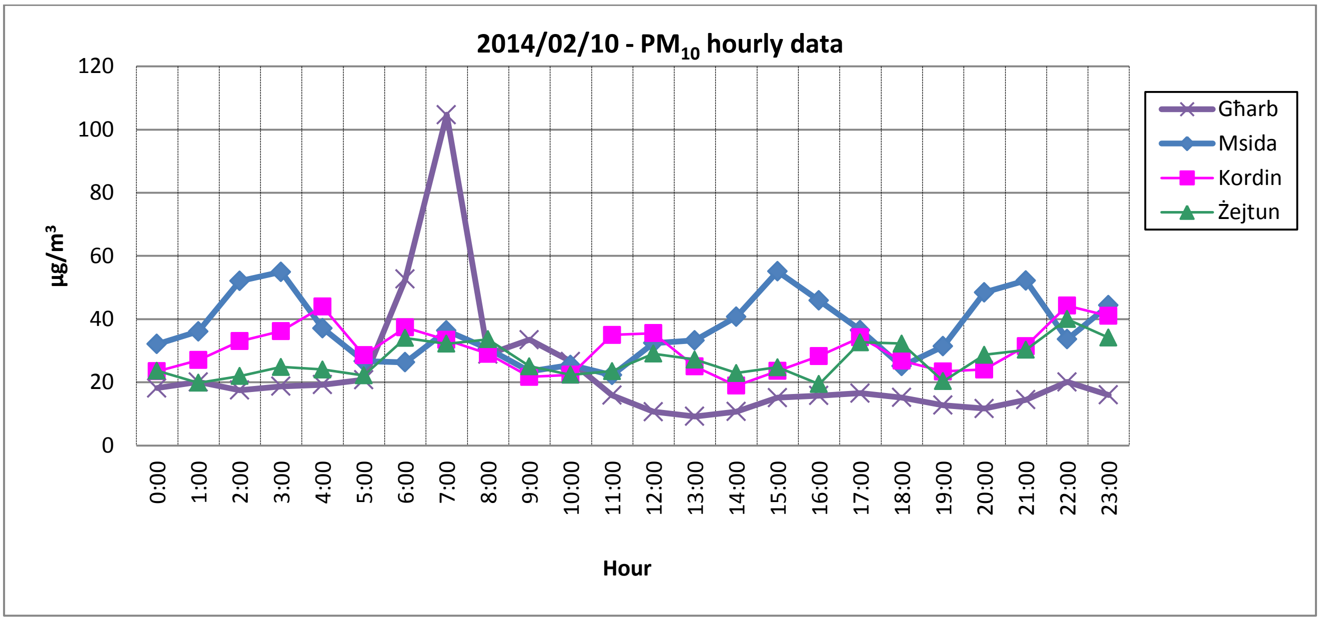


Figure 170: PM$_{10}$ hourly data for the 10 February

From the graph above, it can be seen that at all MEPA monitoring stations, the levels of PM$_{10}$ were quite unfirm during the dat, except for Ghrab, which experience a striong PM$_{10}$ concentration increase around 0700hrs. According this data, the HYSPLIT model will be specified at 6:00 UTC (corresponding to 0700hrs in Malta), defined as the moment of maximum peak of the possible dust event.

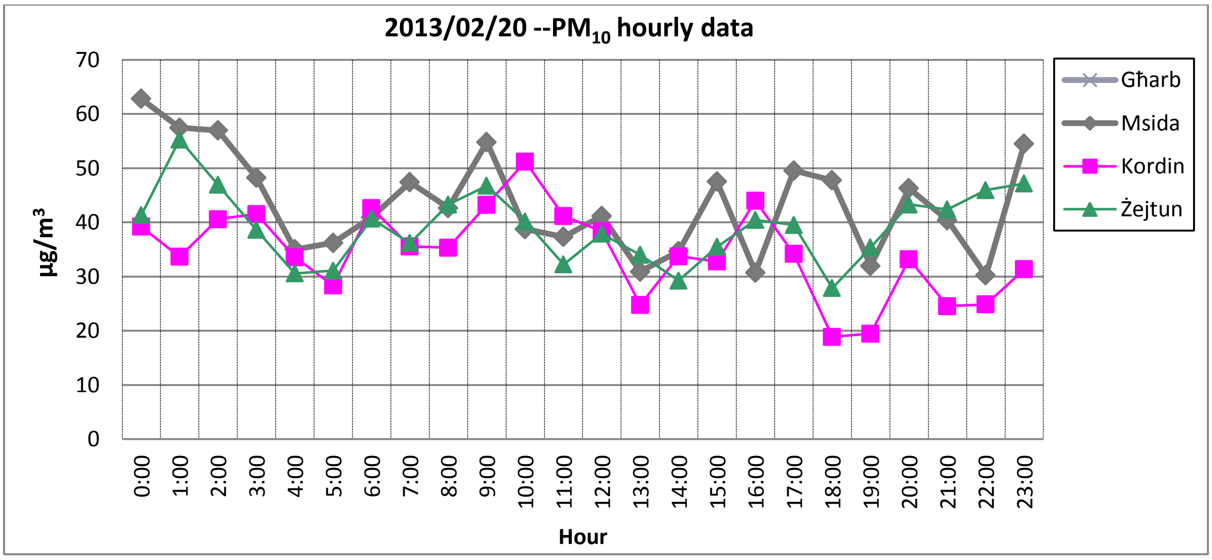


Figure 171: - PM$_{10}$ hourly data for the 20 February 2014

From the figure above, it can be concluded that on the 20th February there were not strong peaks for the PM$_{10}$ concentrations values during the day, the highest one occurred around 0100hrs. According to this data, the HYSPLIT model will be specified at 00.00 UTC (corresponding to 0100hrs in Malta), defined as the moment of maximum peak of the possible dust event.

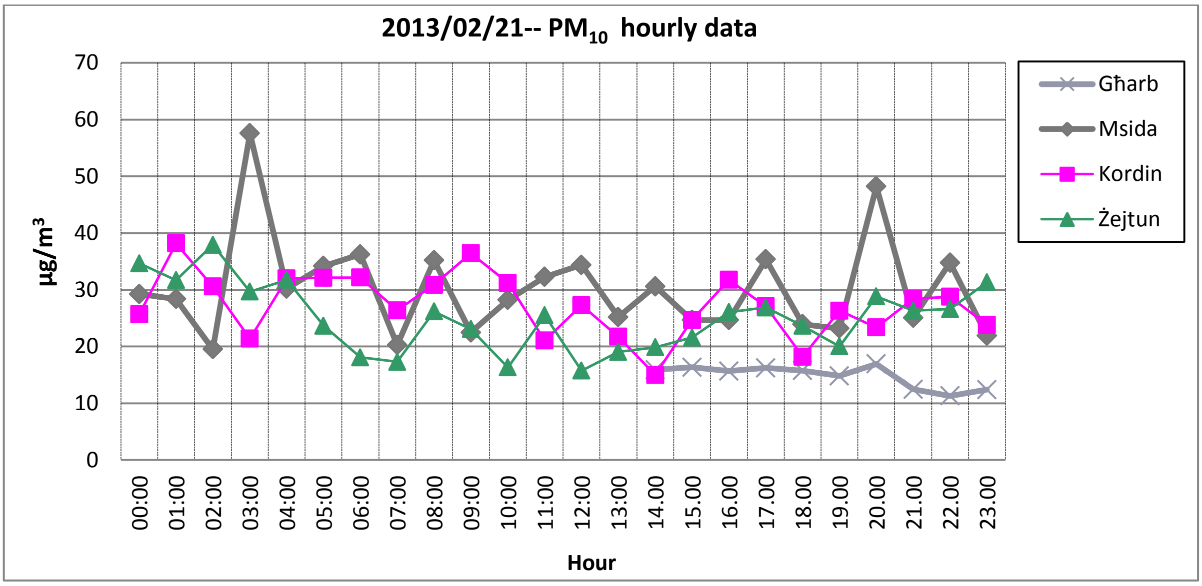


Figure 172: - PM_{10} hourly data for the 21 February 2014

During the 21st of February there were two strong concentration peaks of PM_{10} at Msida station. One around 0300hrs, and the second one at 2000hrs. According to this data, the HYSPLIT model will be specified at 00.00 UTC (corresponding to 0100hrs in Malta), defined as the moment of maximum peak of the possible dust event as the second concentration peak could be more easiy attributed to an episode of high traffic density.

Step 2 – Satellite images

The exceedance in January has to be correlated with satellite imagery. The satellite images consulted were downloaded from the AERONET network which produces data available on the NASA website: http://rapidfire.sci.gsfc.nasa.gov/subsets/?subset=AERONET_ETNA.

The below images represent satellite images of 250m bands for Aqua and 250m bands for Terra.

Step 3 – Mathematical Modelling

The data available was analysed using the BSC-DREAM dust model (with concentration and deposition indicated) and HYSPLIT 4 model with a printout at heights of 100, 500 and 1500 metres above ground level, that show also mixing heights, taken over a period of 3 days prior to the day when the exceedance were recorded. BSC-DREAM dust model is helpful because it provides information not only on dust aerosols, but also because it provides the reconstruction of the wind field that is essential to better evaluate the HYSPLIT 4 model outputs. The BSC-DREAM outputs used are related to the Dust Loading (expressed in g/m^2) and to the Lowest Level Dust Concentrations (expressed in $\mu g/m^3$).

Step 4 - Satellite data

In cases where satellite images and mathematical modelling outputs were not enough to verify whether on the identified day, Saharan dust episodes really took place, satellite data from three different instruments: the MODIS sensor and AERONET data were analysed for the identified day.

- ***1 February***

AERONET images

The below images represent satellite images of 250m bands for Aqua and 250m bands for Terra.

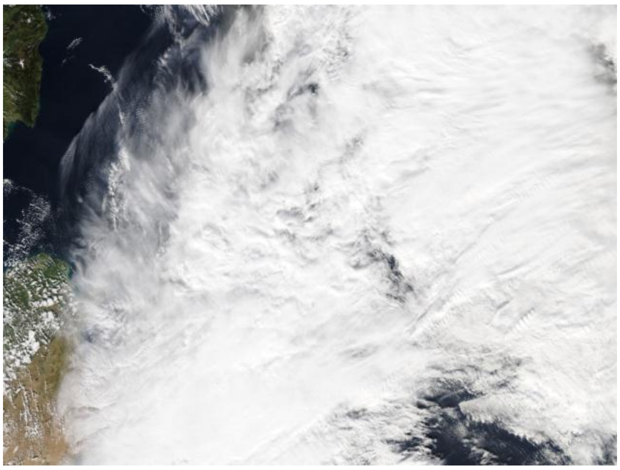


Figure 173: AERONET_ETNA 250m _AQUA

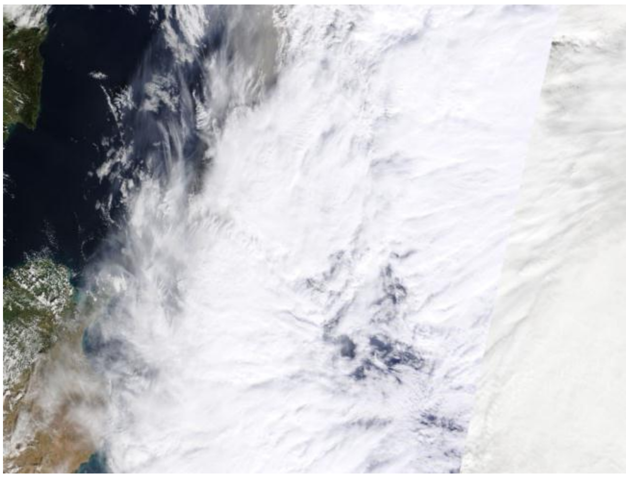
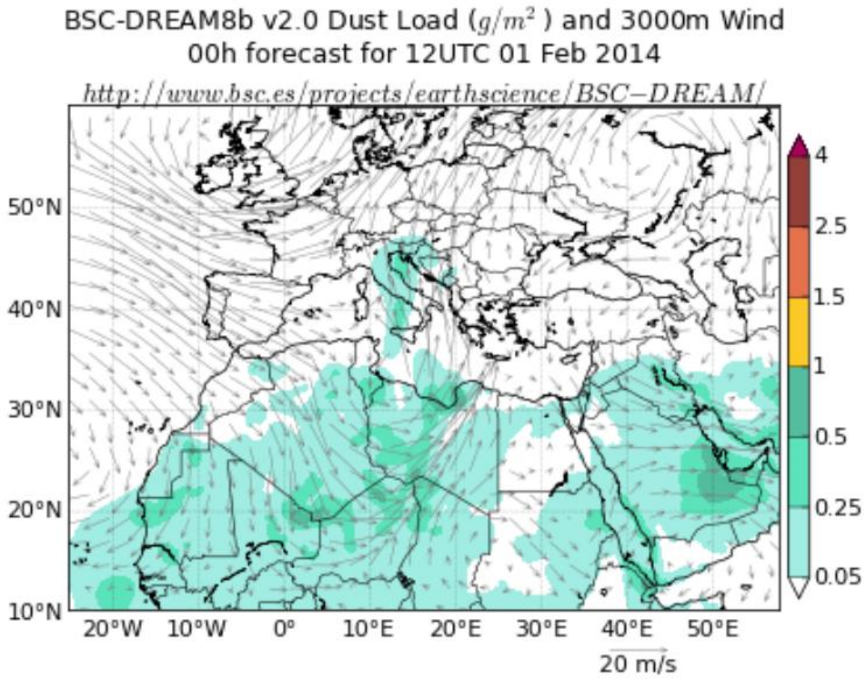


Figure 174: AERONET_ETNA 250m _TERRA

The above images do not provide clear information about the possible occurrence of a Saharan event due to the high cloudiness around the Maltese Islands.

BSC-DREAM dust model

The figure below represents the BSC-DREAM prediction of total dust expressed in terms of lowest model level dust concentration (in µg/m^3) and of dust load (in g/m^2). The dust load is in size classes between 0.1 and 10 µm over Europe at 12:00 UTC and 18.00 UTC, and superimposed on the same figure are the corresponding hourly forecasted wind vectors at 3000m height level.



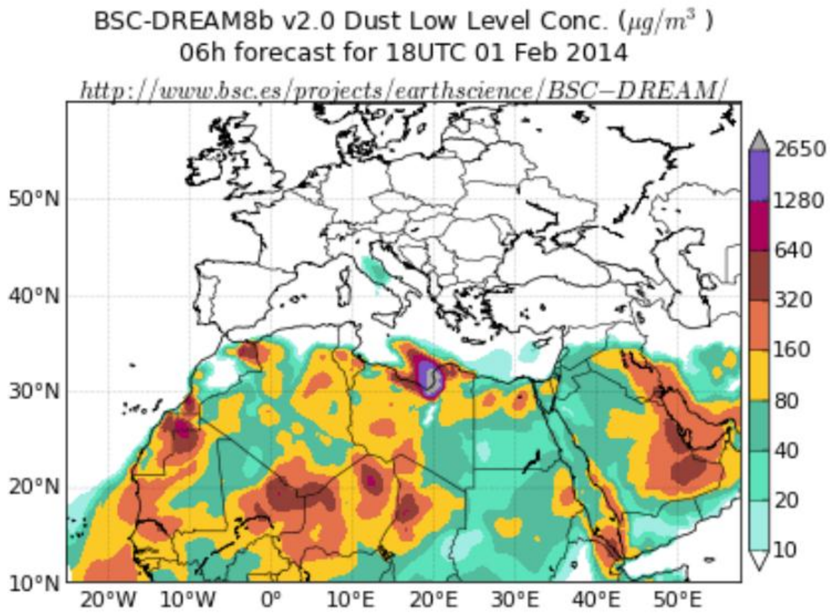


Figure 175: BSC-DREAM outputs on the 1st January.

From the dust loading image it can be noted that on the 1st February, the wind field over Northern Africa and Central-Western Mediterranean was composed by wind vectors that followed a path from Atlantic area downward to Saharan regions in Morocco, Algeria, Tunisia and Libya, and then upwards to the Central Mediterranean area (the Maltese islands, Southern Italy and Balkan area).

The dust concentration image shows many areas affected by dust aerosol, some of them located between Morocco and Algeria, and others in the Southern-Central Mediterranean area, with higher values of dust concentrations along the Libyan coasts.

Therefore, the BSC-DREAM output expressed in terms of dust concentration and dust deposition are consistent in showing that on 1st February, Malta was affected by a Saharan dust episode.

HYSPLIT model

The following figure shows the application of HYSPLIT on the Maltese islands on the 1st February. The HYSPLIT output is related to 06.00 UTC, defined as the moment of maximum peak of the possible dust event.

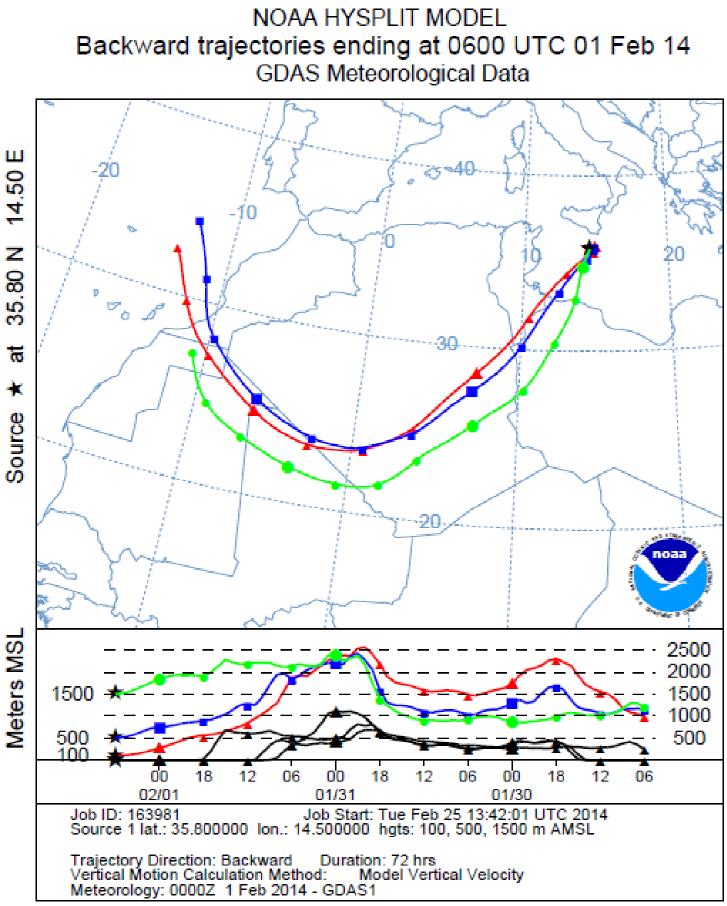


Figure 176 : HYSPLIT backward trajectory at 1500m. 500m and 100 m on the 1 February

The HYSPLIT model output related to the conditions on the 1st Febuary showed that the backward trajectory ending over the air monitoring zone (Marsaxlokk and Birżebbuġa) at 1500,500 and 100 came directly from the Saharan region and are in perfectly according to the wind field from BSC-DREAM.

The following figures show, for each backward trajectory, the variation of the parameters "Terrain height" and "Mixed layer depth", along the path. This information allows some further assessment about the probable intensity of the event at the arriving-point of this trajectory:

The mixed layer depth over Malta on the 1st February was 170m, which is higher than the ending-level of the 100m backward trajectory.

- a reduced distance from the backward trajectory level and the terrain height is considered to be an indicator of a higher intensity event, due to a major implication of the lower level of the atmosphere;
- the presence, along the path, of many points at which the trajectory level is above the mixed layer depth is considered an indicator of a possible decrease of the intensity of the dust aerosol, even if the trajectory being always under the mixed layer depth may be affected by higher level of dust deposition along the path, with minor intensity at the ending-point of the backward trajectory;
- a mixed layer depth higher than the ending-level of each backward trajectory is an indicator of a higher level of intensity of the event;

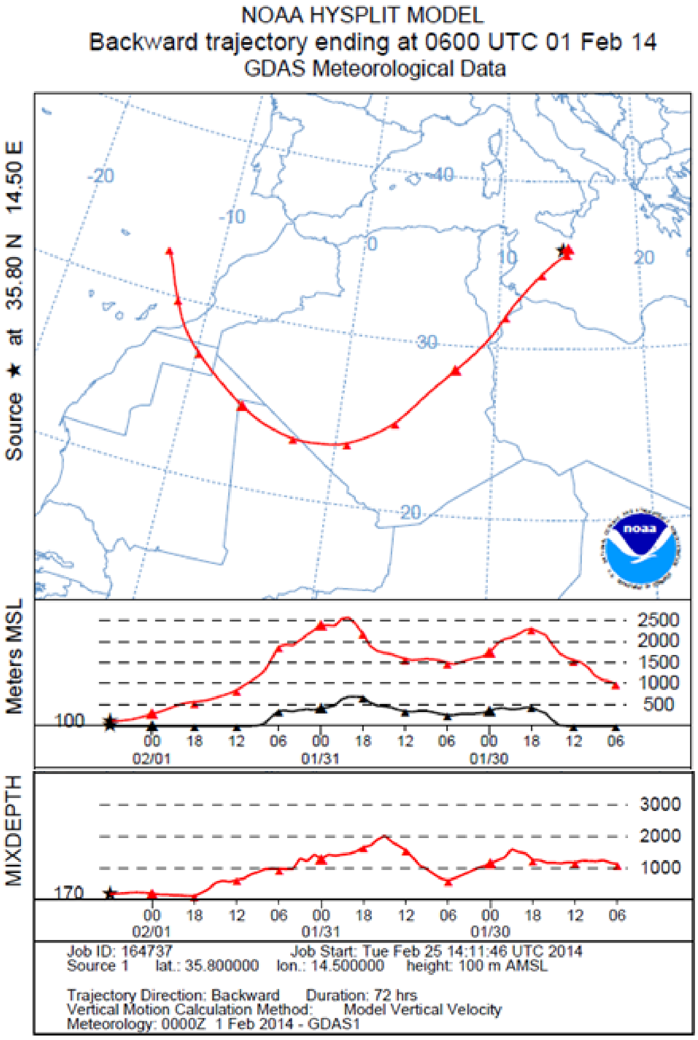


Figure 177: HYSPLIT backward trajectory at 100m on the 1 February

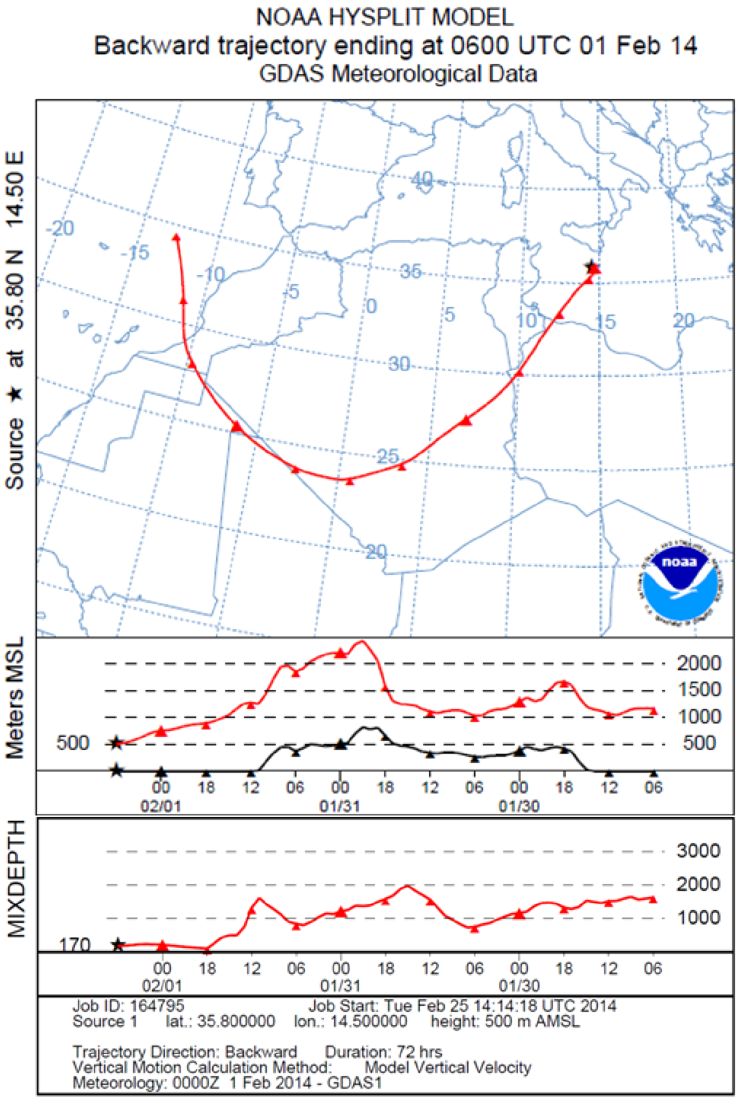


Figure 178: HYSPLIT backward trajectory at 500m on the 1 February

The mixed layer depth was lower than the ending-level of the 500 m backward trajectory.

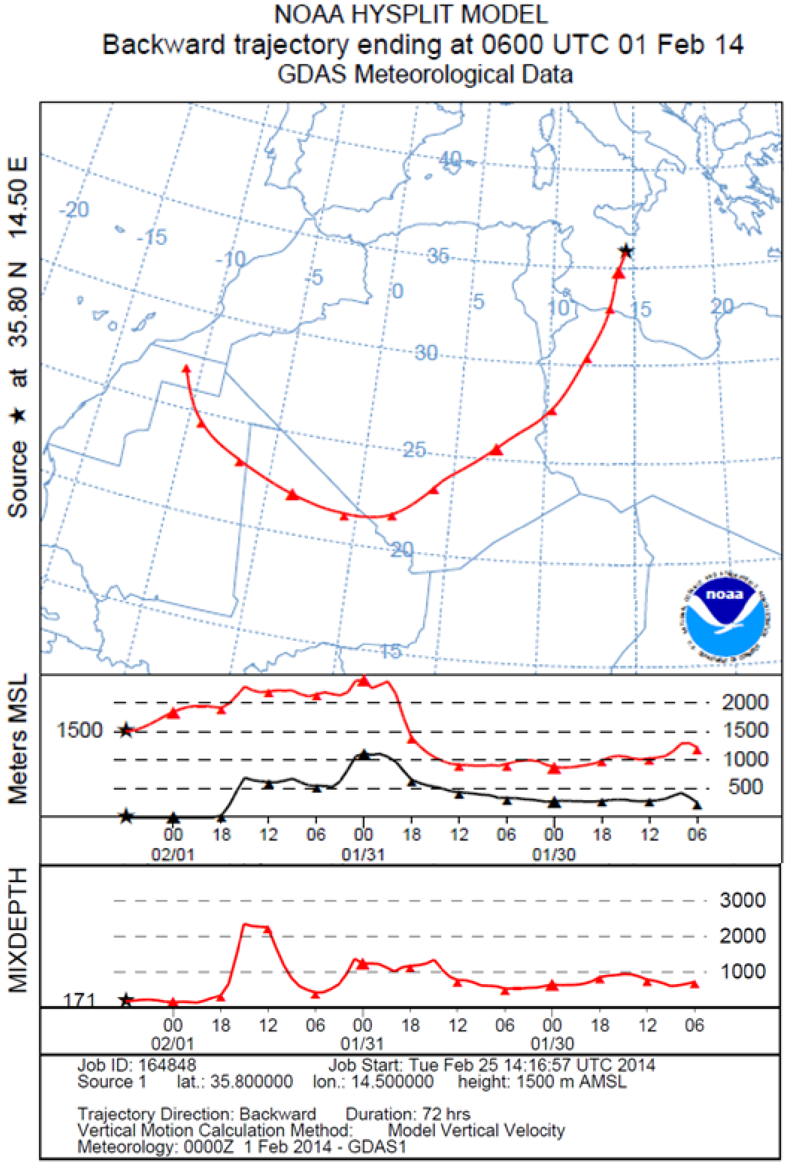


Figure 179: HYSPLIT backward trajectory at 1500m on the 1 February

The mixed layer depth was lower than the ending-level of the 1500 m backward trajectory.

MODIS sensors

The MODIS data available for the 1st of February 2014 does not show clear information about the possible presence of dust aerosol.

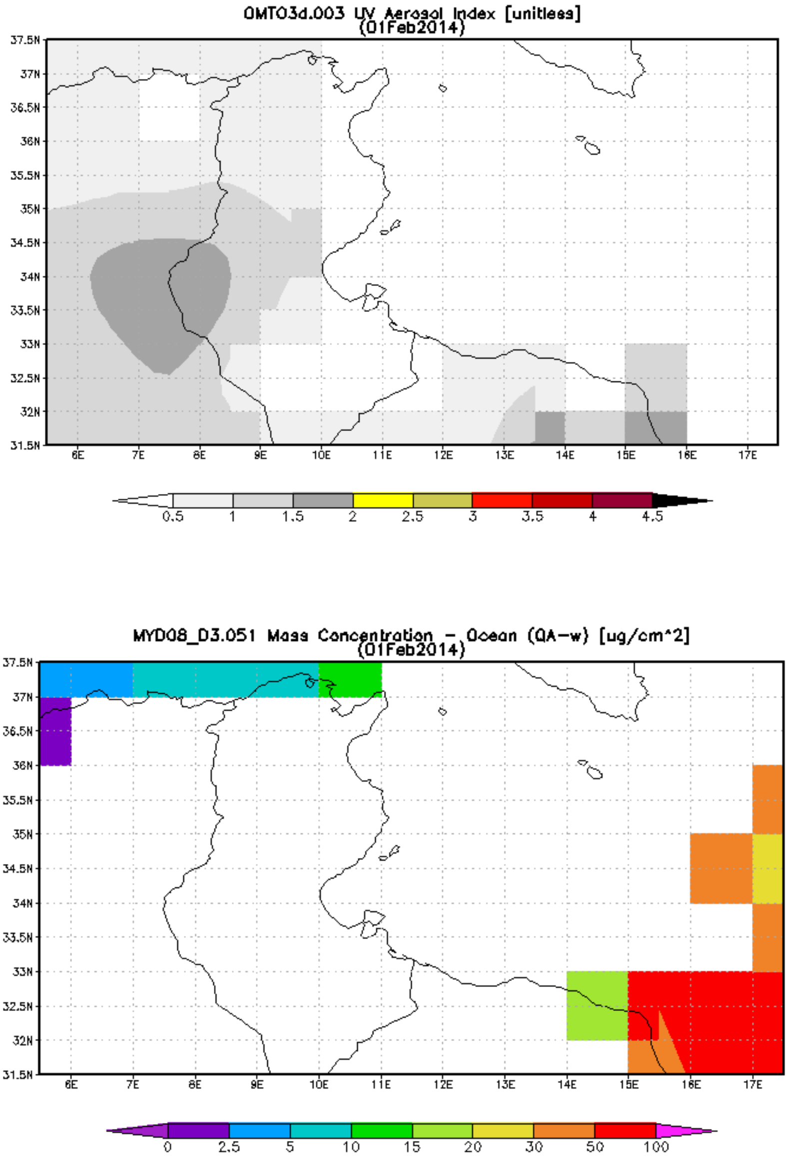


Figure 180: MODIS Terra and Aqua images on the 1 February.

- ***10 February***

AERONET images

The below images represent satellite images of 250m bands for Aqua and 250m bands for Terra.

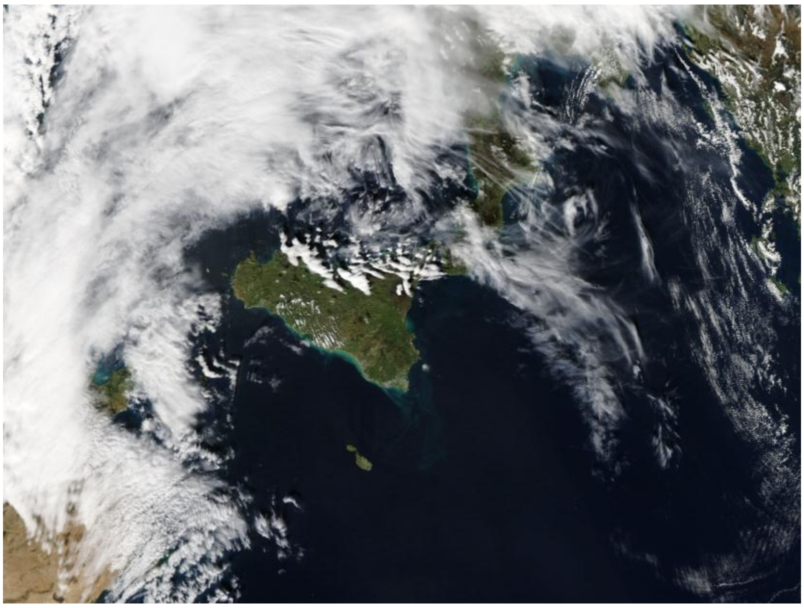


Figure 181: AERONET_ETNA 250m _AQUA

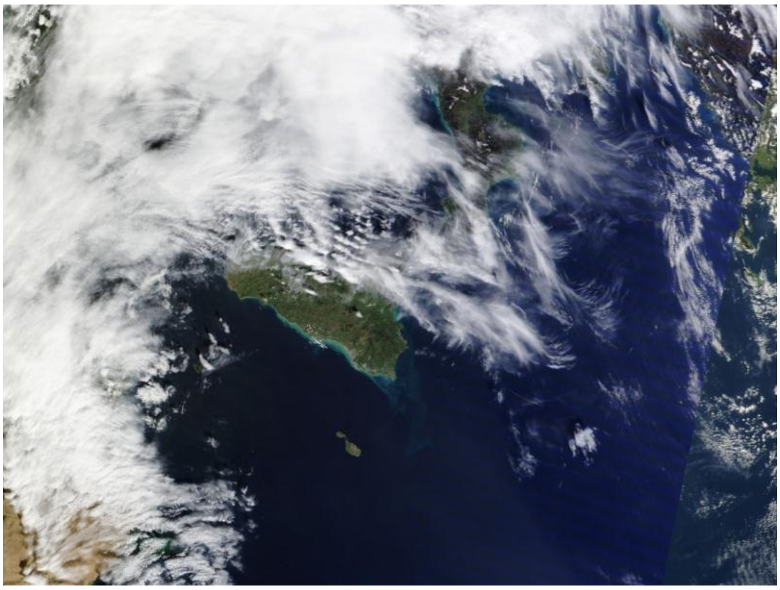


Figure 182: AERONET_ETNA 250m _TERRA

The above images do not provide clear information about the possible occurrence of a Saharan event due to the high clouds around the Maltese Islands.

BSC-DREAM dust model

The figure below represents the BSC-DREAM prediction of total dust expressed in terms of lowest model level dust concentration (in µg/m^3) and of dust load (in g/m^2). The dust load is in size classes between 0.1 and 10 µm over Europe at 12:00 UTC and 18.00 UTC, and superimposed on the same figure are the corresponding hourly forecasted wind vectors at 3000m height level.

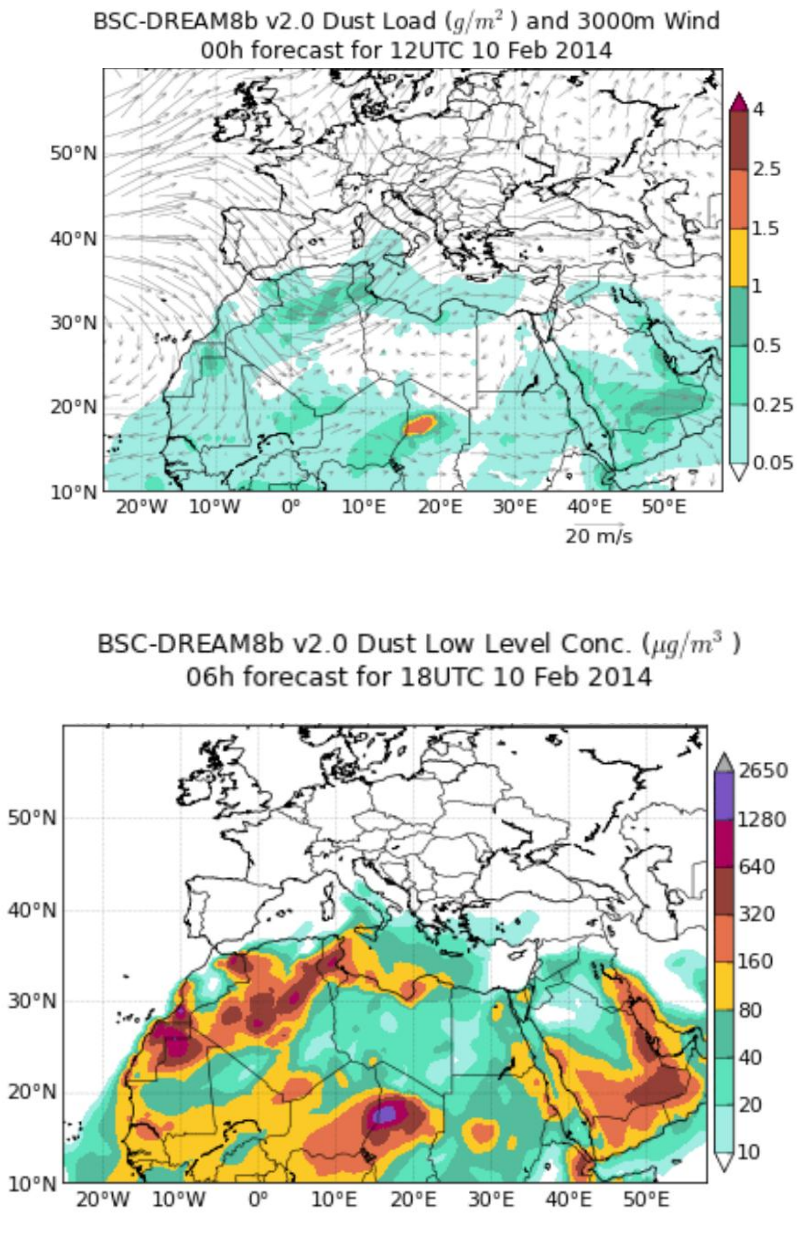


Figure 183: BSC-DREAM outputs on the 10 February

From the dust loading image it can be noted that on the 10th February, the wind field over Central Mediterranean was composed by wind vectors that followed a path from Northern Atlantic area downward to Saharan regions in Morocco, Algeria, Tunisia and Libya, and then directly upwards to Central Mediterranean area (the Maltese islands and Southern Italy).

The dust concentration image shows a dust aerosol from Moroco till the sourth of Italy related to the above wind field.

Therefore, the BSC-DREAM output expressed in terms of dust concentration and dust deposition are very consistent in showing that on 10th February, Malta was affected by a Saharan dust episode.

HYSPLIT model

The following figure shows the application of HYSPLIT on the Maltese islands on the 10th February. The HYSPLIT output is related to 06.00 UTC, defined as the moment of maximum peak of the possible dust event.

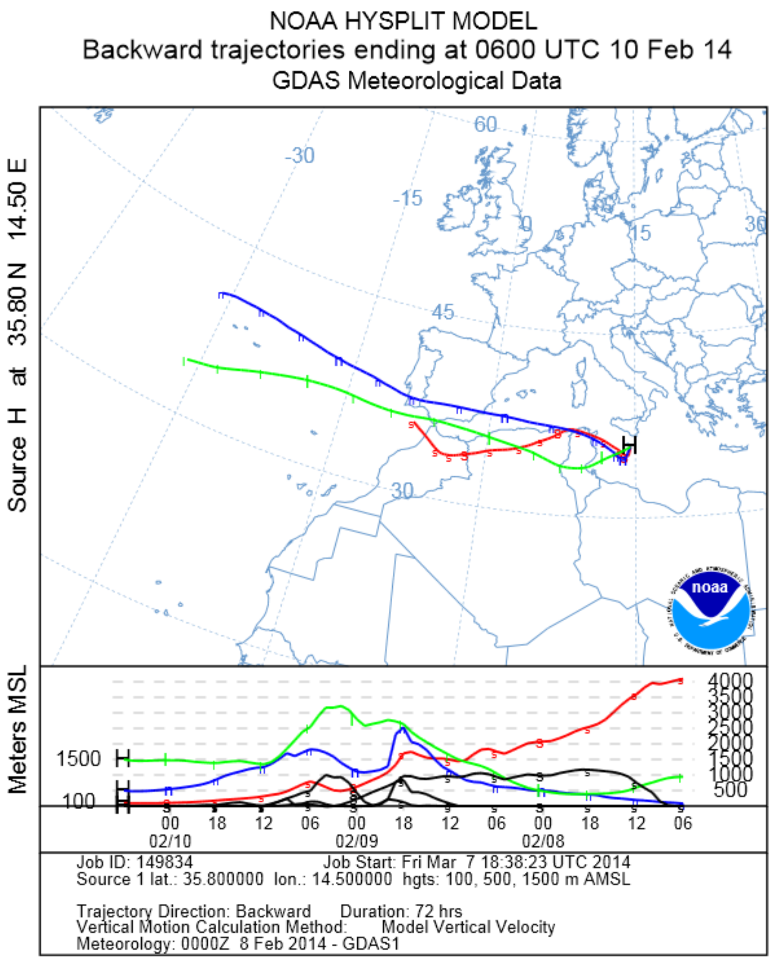


Figure 184 : HYSPLIT backward trajectory at 1500m, 500m and 100 m on the 10 February

The HYSPLIT model output related to the conditions on the 10th February shows that the backward trajectories ending over the air monitoring zone (Marsaxlokk and Birzebbuga) at the level of 100 and 1500 meters above ground level are from Saharan region (Morocco, Algeria and Tunisia) and follow a path directly from this region to the Maltese islands (without any vortex trajectory). A direct path from Saharan region can be related to a significant increase in dust concentrations. The backward trajectory at 100 m and 1500 are well according to the BSC-DREAM output.

The following figures show, for each backward trajectory, the variation of the parameters “Terrain height” along the path. This information allows some further assessment about the probable intensity of the event at the arriving-point of this trajectory:

- a reduced distance from the backward trajectory level and the terrain height is considered to be an indicator of a higher intensity event, due to a major implication of the lower level of the atmosphere;
- the presence, along the path, of many points at which the trajectory level is above the mixed layer depth is considered an indicator of a possible decrease of the intensity of the dust aerosol, even if the trajectory being always under the mixed layer depth may be affected by higher level of dust deposition along the path, with minor intensity at the ending-point of the backward trajectory;
- a mixed layer depth higher than the ending-level of each backward trajectory is an indicator of a higher level of intensity of the event;

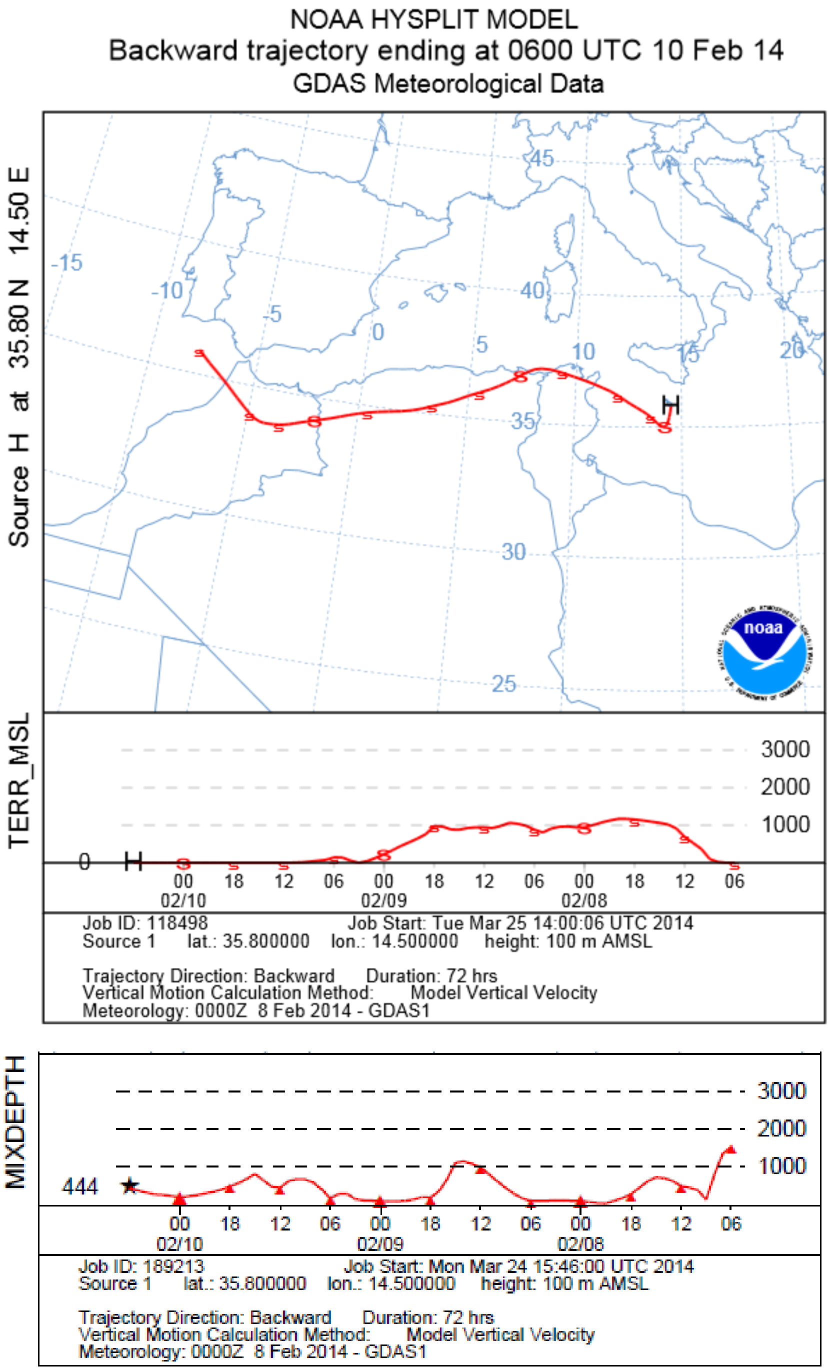


Figure 185: HYSPLIT backward trajectory at 100m on the 10 February

The backward trajectory at 100 meters above ground level is from Atlantic area and reaches Malta through a path that before arriving to Malta passed over Algeria, Tunisia and Mediterranean.

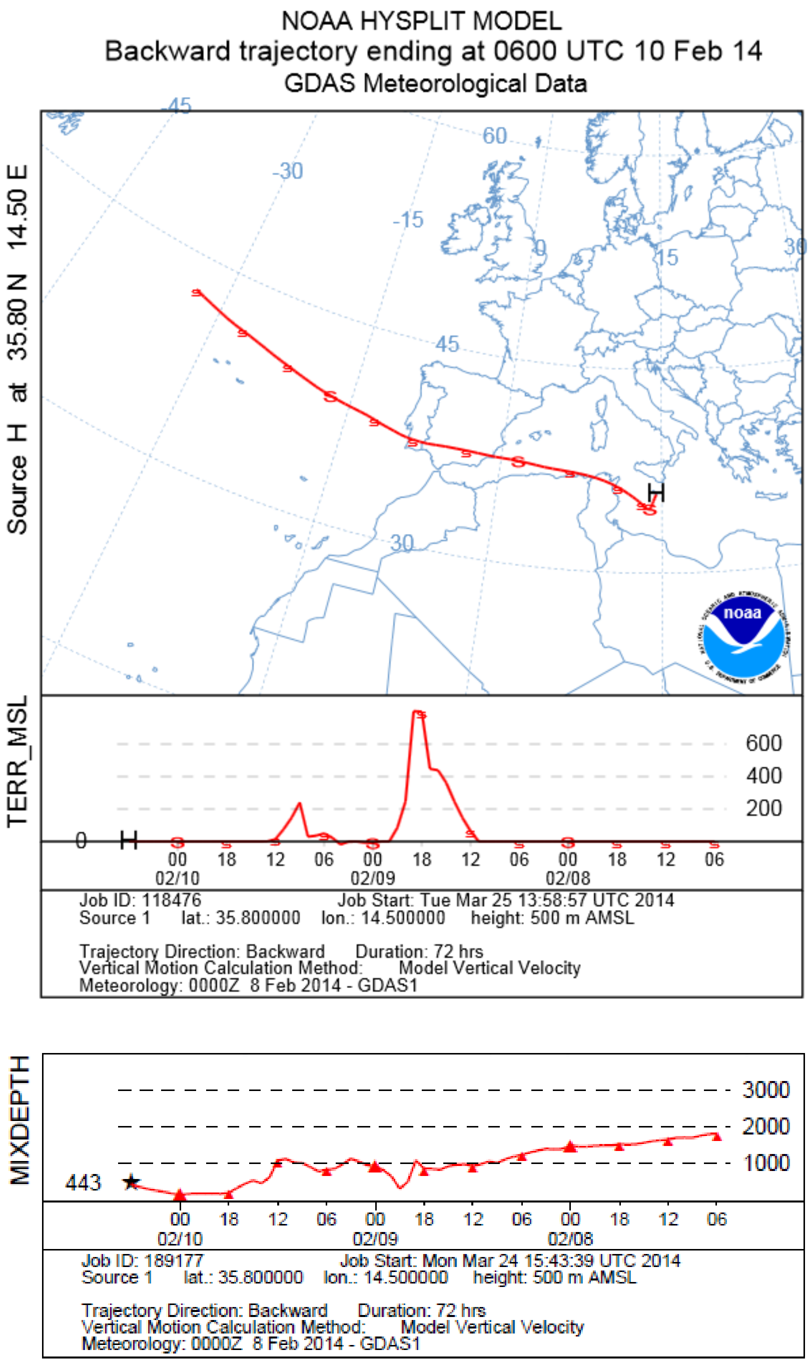


Figure 186: HYSPLIT backward trajectory at 500m on the 10 February

The backward trajectory at 500 meters above ground level is from the North Atlantic and after crossing Portugal, Spain and the south-west Mediterranean area, arrives in Malta. This backward trajectory crosses an area which is potentially a source of dust aerosols over a limited area close to the Tunisian coasts.

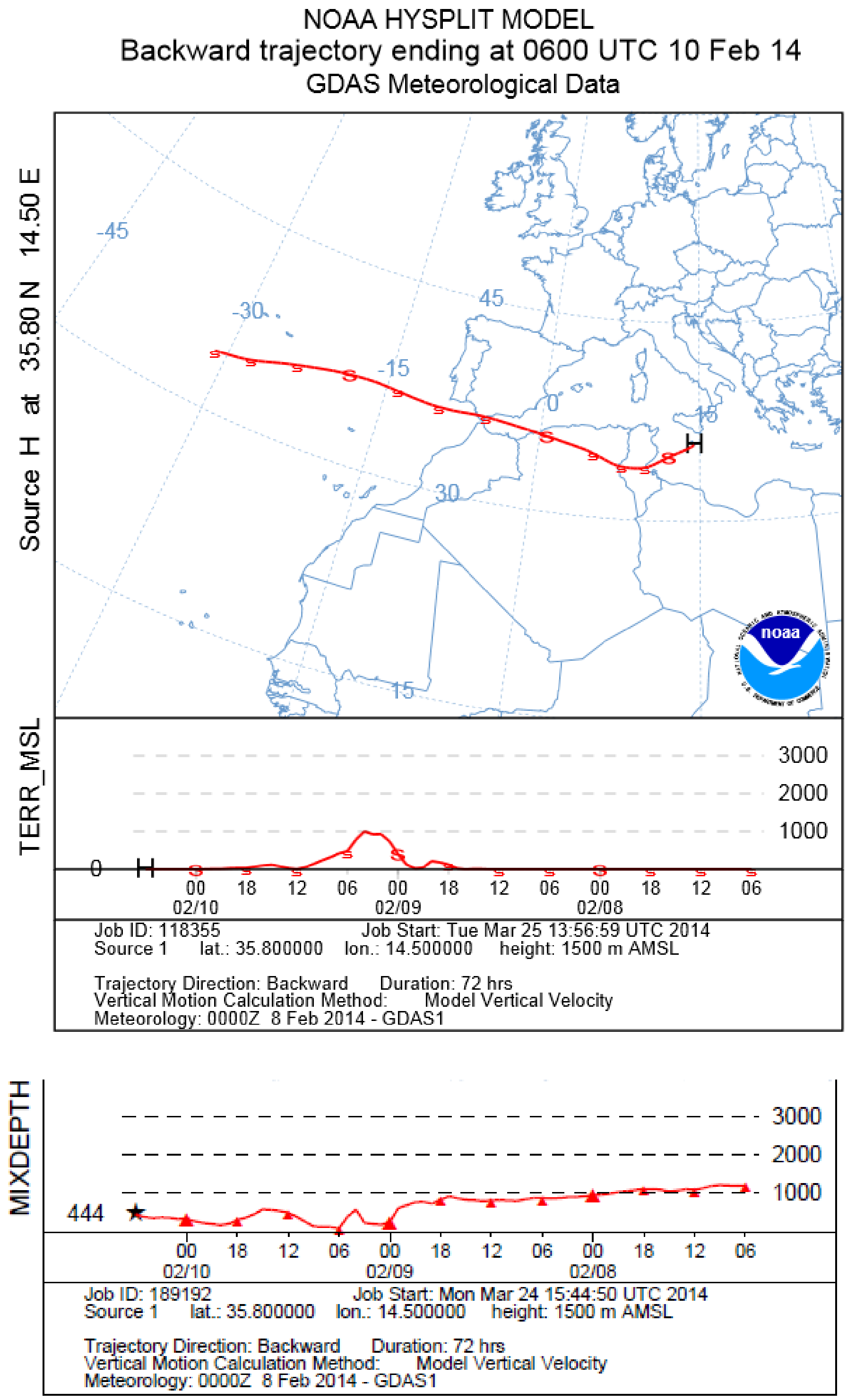
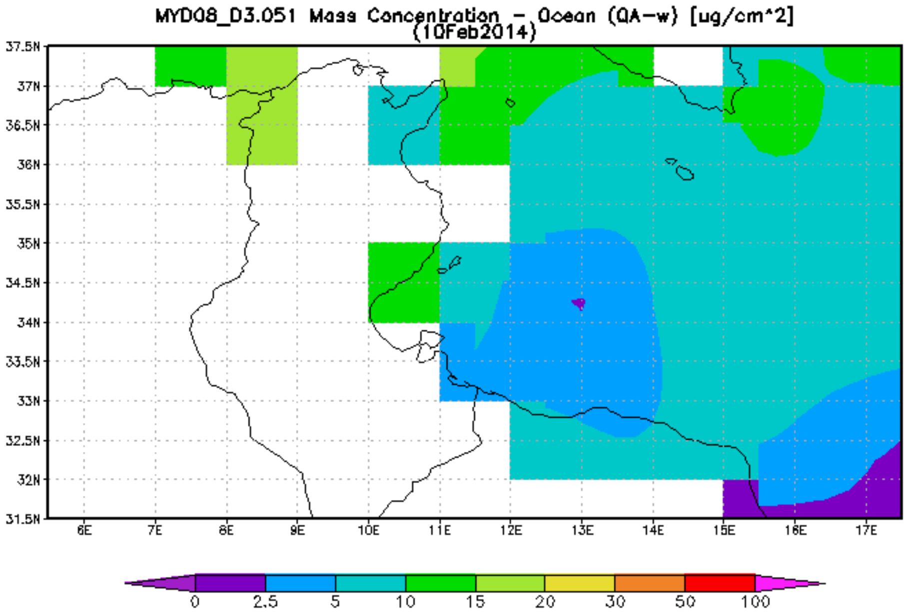


Figure 187: HYSPLIT backward trajectory at 1500m on the 10 February

The backward trajectory at the 1500 metes level was characterized by two main direction: the first one from Atlantic area downwards to Central Algeria and the second one from Algeria directly to the Maltese islands.

MODIS sensors

The MODIS data available does not confirm the presence of a Saharan dust aerosol over Malta on the 10th February. In particular, the following figures show medium values of Small Mode Fraction (between 0.04 and 0.50 μg/cm^2) and of Mass Concentration (between 5 and 10 μg/cm^2).



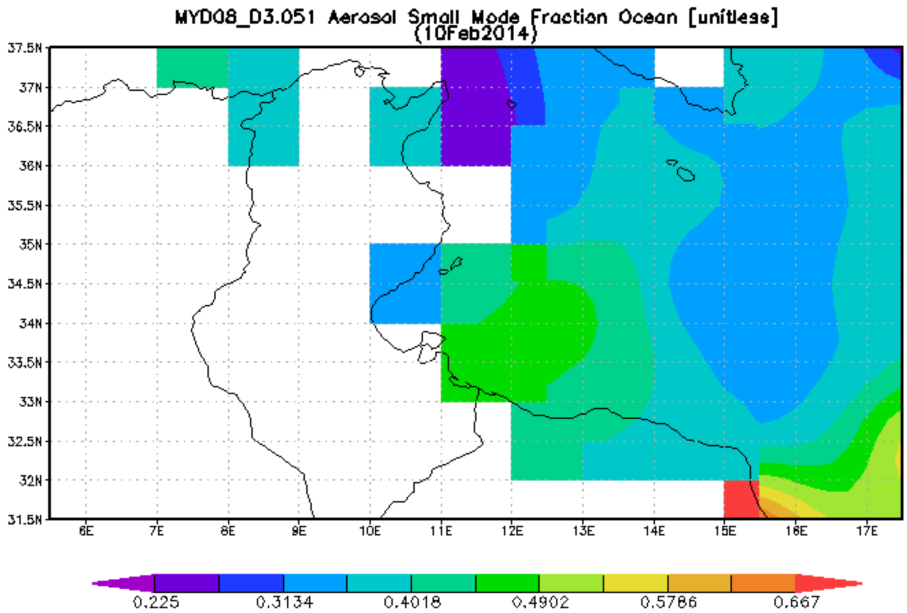


Figure 188: MODIS Terra and Aqua images on the 10 February

- ***20 February***

AERONET images

The below images represent satellite images of 250m bands for Aqua and 250m bands for Terra.

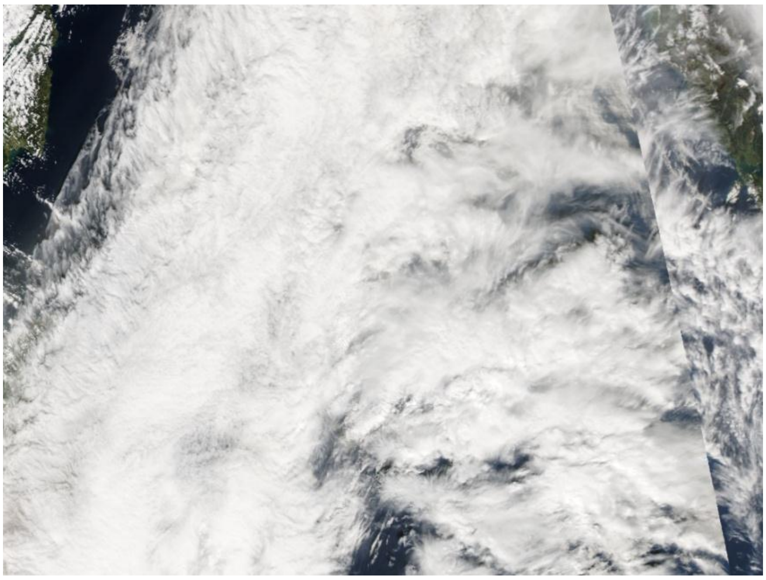


Figure 189: AERONET_ETNA 250m _AQUA

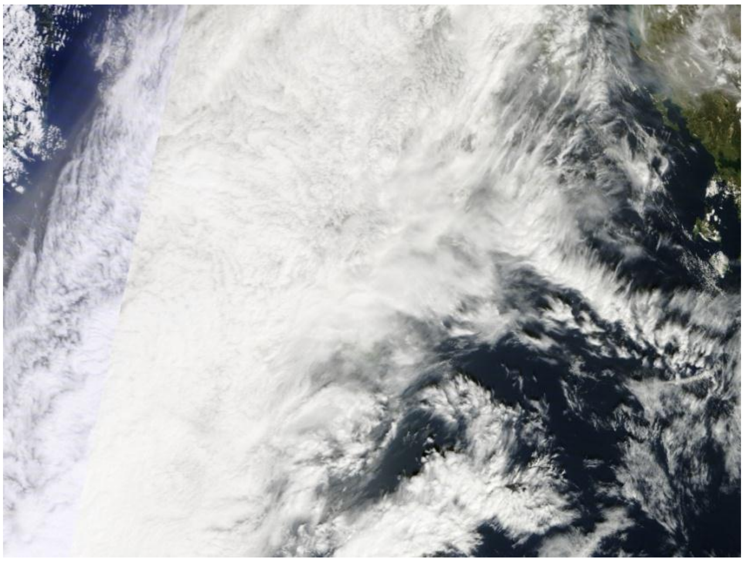


Figure 190: AERONET_ETNA 250m _TERRA

The above images do not provide clear information about the possible occurrence of a Saharan event due to the high cloudiness around the Maltese Islands.

BSC-DREAM dust model

The figure below represents the BSC-DREAM prediction of total dust expressed in terms of lowest model level dust concentration (in µg/m^3) and of dust load (in g/m^2). The dust load is in size classes between 0.1 and 10 µm over Europe at 12:00 UTC and 18.00 UTC, and superimposed on the same figure are the corresponding hourly forecasted wind vectors at 3000m height level.

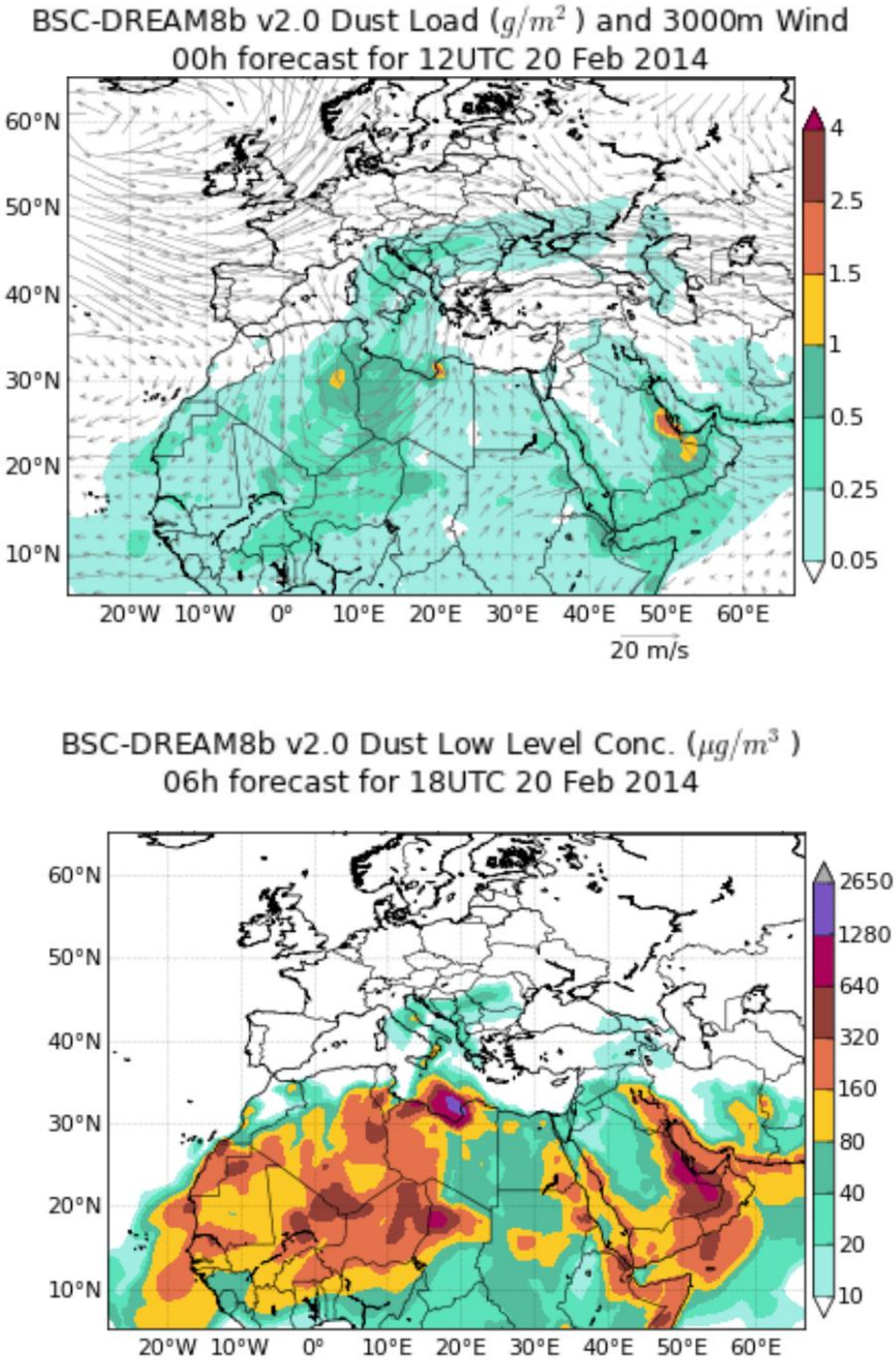


Figure 191: BSC-DREAM outputs on the 20 February.

From the dust loading image it can be noted that on the 20th February the main wind vectors originated at the Atlantic area, passed through Spain and then swifted towards the south overpassing Algeria, Tunisia and Lybia before reaching Malta and continuying towards the Balkans.

The dust concentration image shows a dust loading peak over the Libyan coasts with a contribution towards the Maltese islands.

Therefore, the BSC-DREAM output expressed in terms of dust concentration and dust deposition are consistent in showing that on the 20th February, Malta was affected by a limited Saharan dust episode.

HYSPLIT model

The following figure shows the application of HYSPLIT on the Maltese islands on the 20th of February. The HYSPLIT output is related to, defined as the moment of maximum peak of the possible dust event.

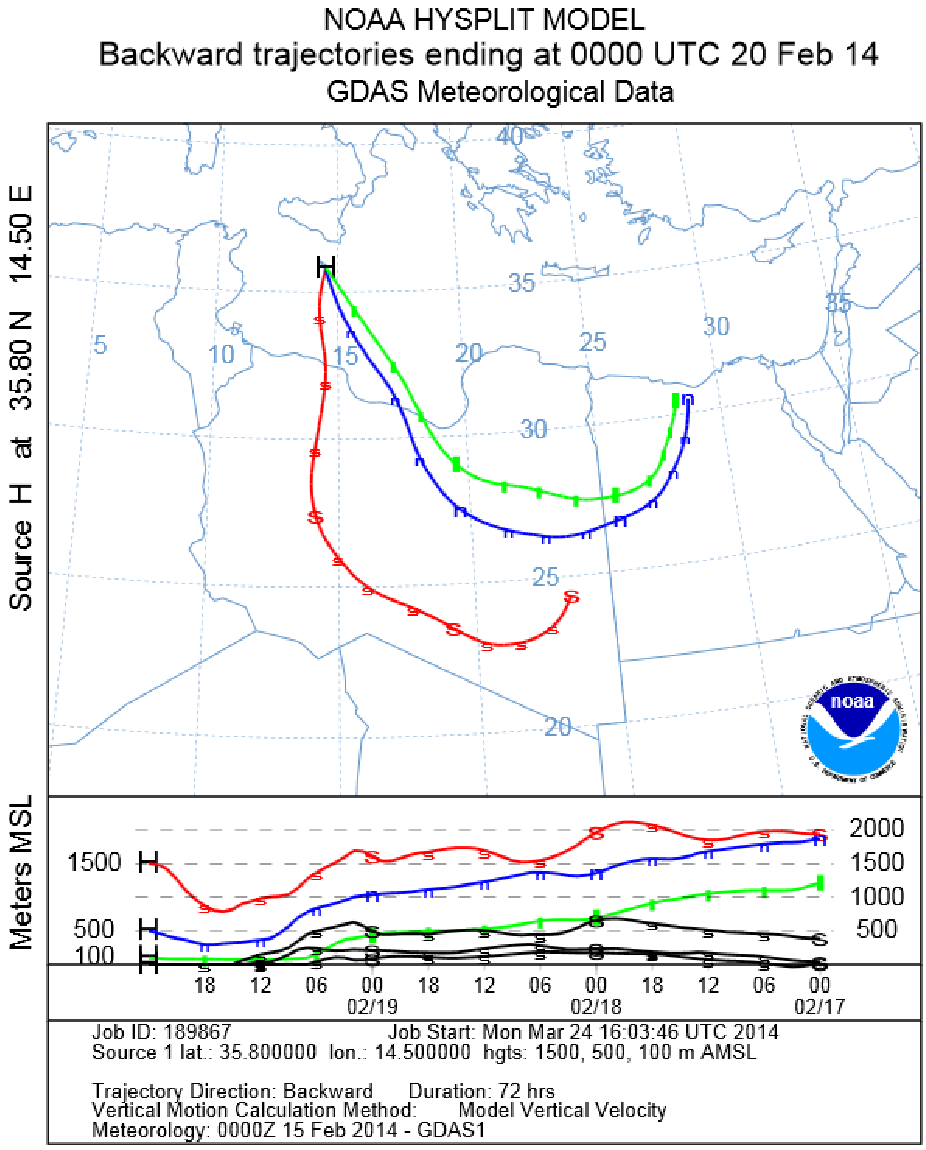


Figure 192 : HYSPLIT backward trajectory at 1500m, 500m and 100 m on the 20 February

The HYSPLIT model output related to the conditions on the 20th of Febuary showed that the backward trajectory ending over the air monitoring zone (Marsaxlokk and Birżebbuġa) at 1500, 500 and 100 meters above ground level came directly from the Saharan region and are in accordance with the wind field from BSC-DREAM.

The following figures show, for each backward trajectory, the variation of the parameters “Terrain height” and “Mixed layer depth”, along the path. This information allows some further assessment about the probable intensity of the event at the arriving-point of this trajectory:

- a reduced distance from the backward trajectory level and the terrain height is considered to be an indicator of a higher intensity event, due to a major implication of the lower level of the atmosphere;
- the presence, along the path, of many points at which the trajectory level is above the mixed layer depth is considered an indicator of a possible decrease of the intensity of the dust aerosol, even if the trajectory being always under the mixed layer depth may be affected by higher level of dust deposition along the path, with minor intensity at the ending-point of the backward trajectory;
- a mixed layer depth higher than the ending-level of each backward trajectory is an indicator of a higher level of intensity of the event;

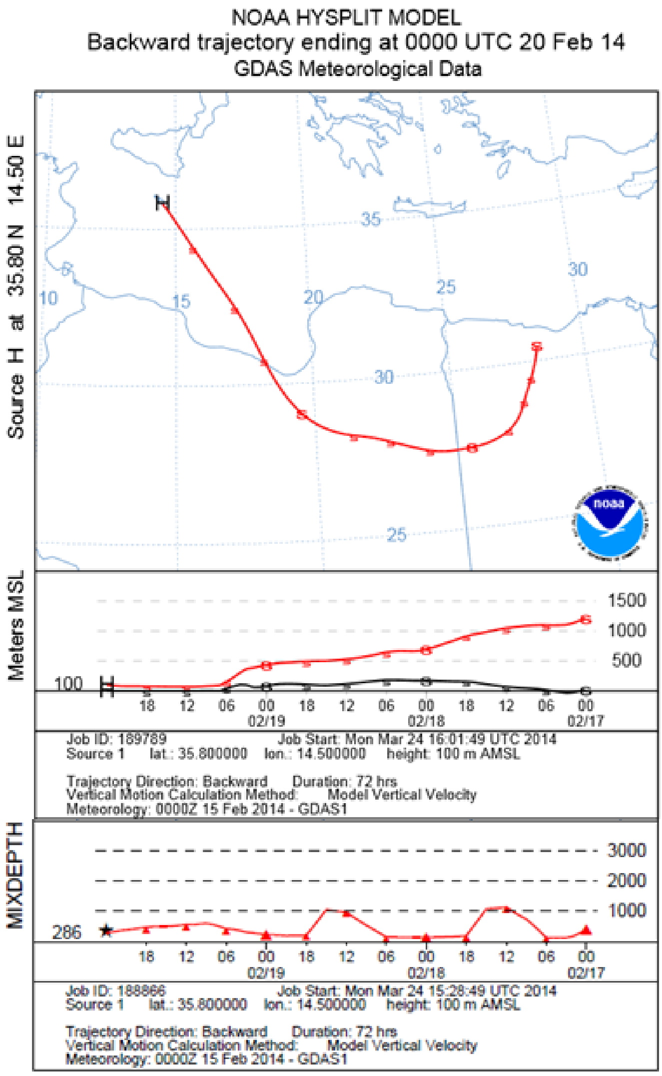


Figure 193: HYSPLIT backward trajectory at 100m on the 20 February

The backward trajectory at 100 meters above ground level is from Egypt and Southern-Eastern Libya. The mixdepth over Malta was higher than the arriving quote of this backward trajectory.

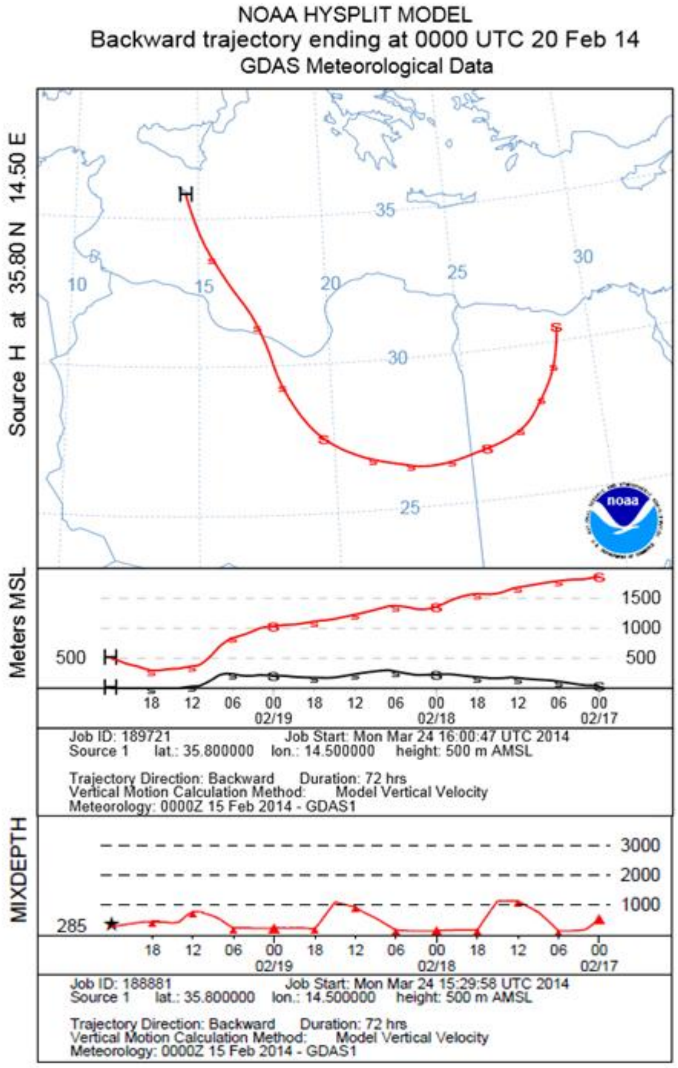


Figure 194: HYSPLIT backward trajectory at 500m on the 20 February

The backward trajectory at 500 meters above ground level is from Egypt and Southern-Eastern Libya. The mixdepth over Malta was lower than the arriving quote of this backward trajectory.

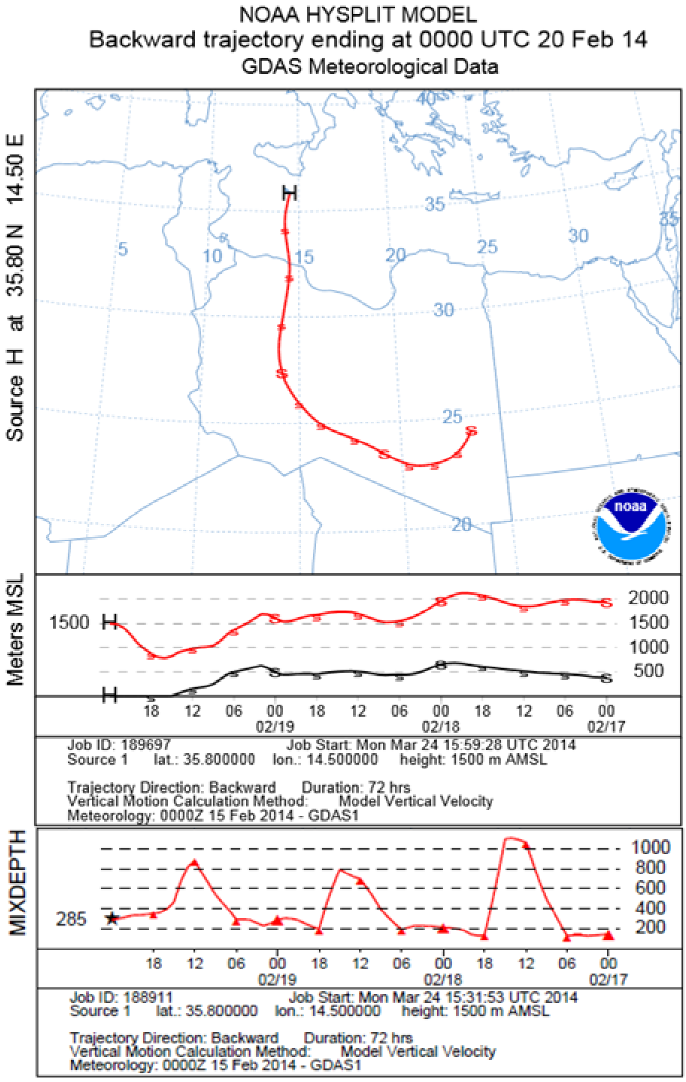
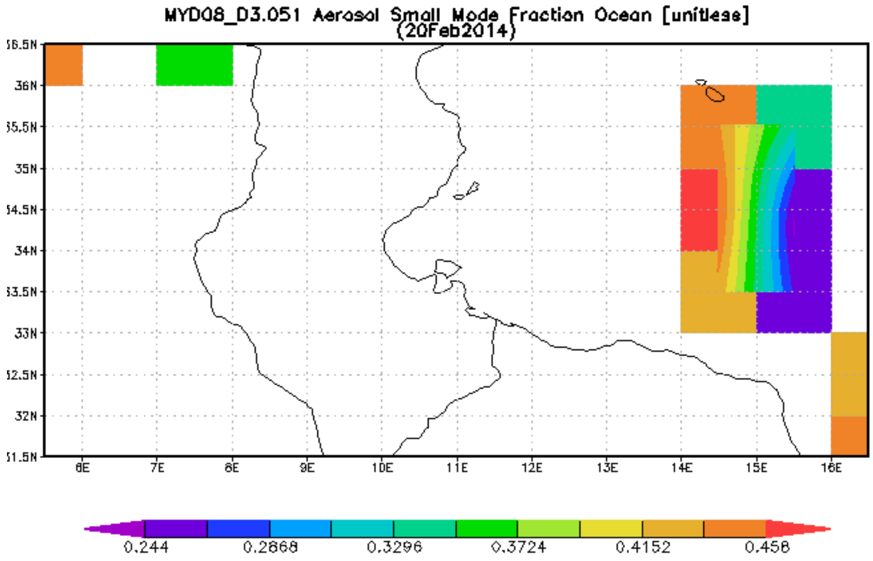


Figure 195: HYSPLIT backward trajectory at 1500m on the 20 February

The backward trajectory at 1500 meters above ground level is from Southern Libya and the mixdepth quote over the passed areas is always lower than the trajectory's quote.

MODIS sensors

The MODIS data available does confirm the possible presence of a Saharan dust aerosol over Malta on the 20th February. In particular, the following figures show medium values of Aerosol Small Mode Fraction (between 0.04 and 0.50) and of Mass Concentration (between 20 and 30 µg/cm^2).



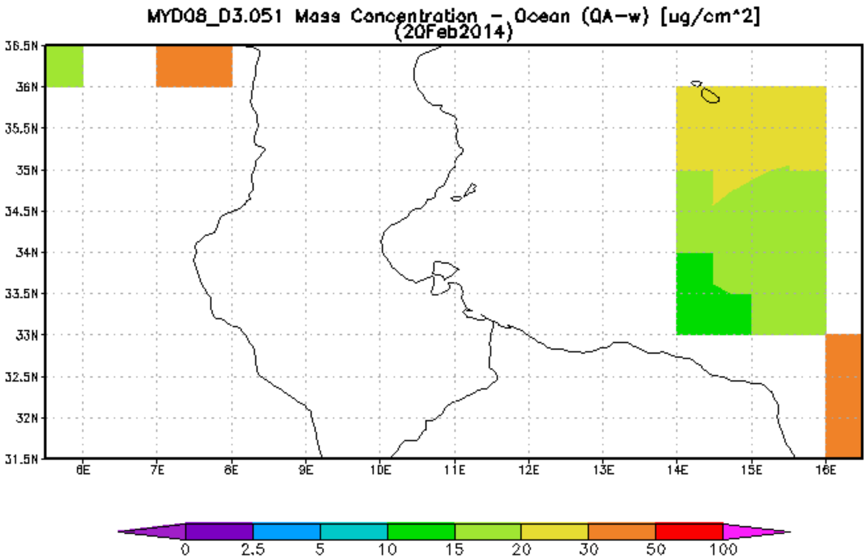


Figure 196: MODIS Terra and Aqua images on the 20 February.

- ***21 February***

AERONET images

The below images represent satellite images of 250m bands for Aqua and 250m bands for Terra.

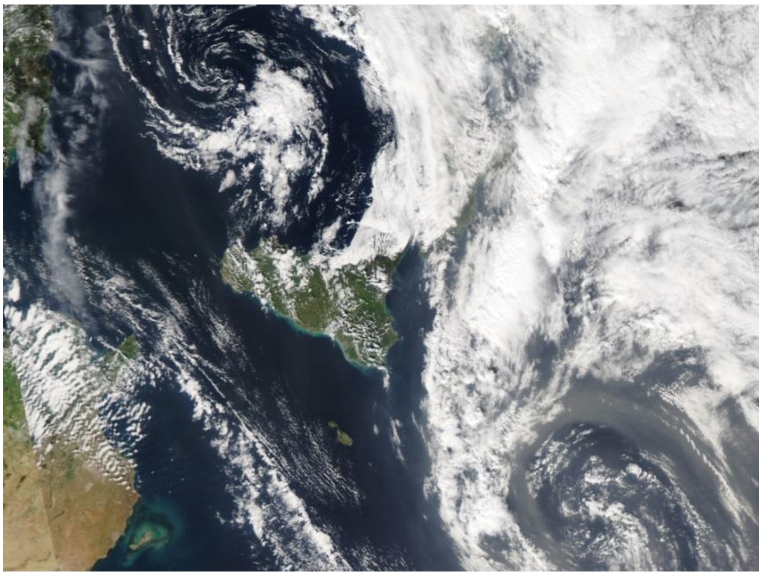


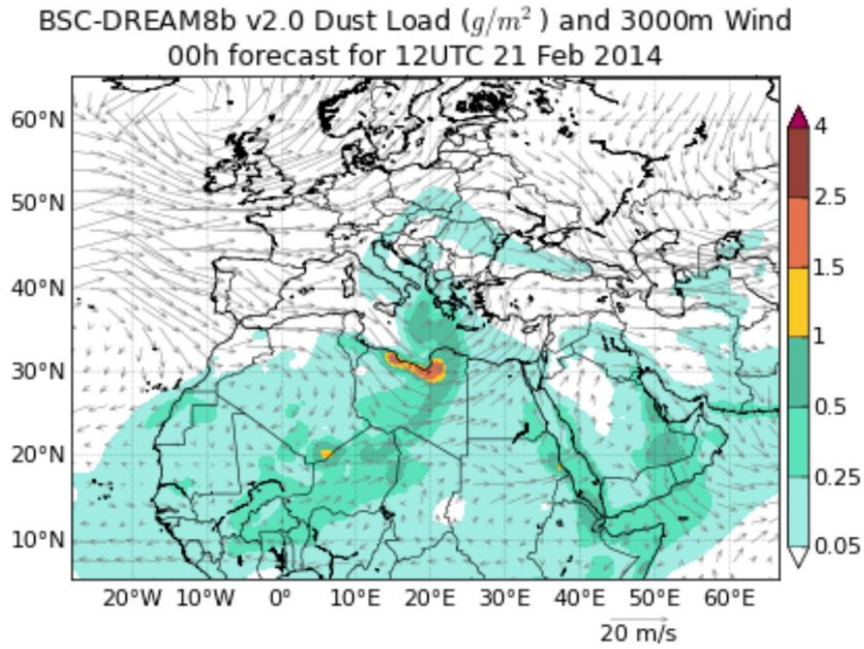
Figure 197: AERONET_ETNA 250m _AQUA

Figure 198: AERONET_ETNA 250m _TERRA

The above images do not provide clear information about the possible occurrence of a Saharan event.

BSC-DREAM dust model

The figure below represents the BSC-DREAM prediction of total dust expressed in terms of lowest model level dust concentration (in µg/m^3) and of dust load (in g/m^2). The dust load is in size classes between 0.1 and 10 µm over Europe at 12:00 UTC and 18.00 UTC, and superimposed on the same figure are the corresponding hourly forecasted wind vectors at 3000m height level.



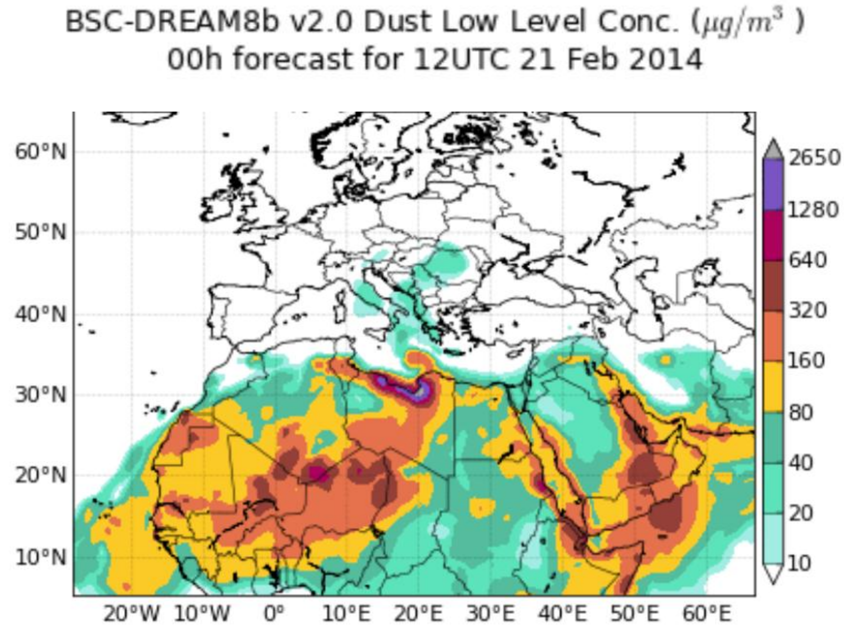


Figure 199: BSC-DREAM outputs on the 21 February

From the dust loading image it can be noted that on the 21st February, the wind field over Malta was mainly from Antlantic zone and not from Saharan region.

The dust concentration image shows that Malta on that day was not influenced by dust loading from Saharan region that appears confined in the North-Western side of Africa. Therefore, the BSC-DREAM output expressed in terms of dust concentration and dust deposition are consistent in showing that on 21th February, Malta was not affected by a Saharan dust episode.

HYSPLIT model

The following figure shows the application of HYSPLIT on the Maltese islands on the 21st February. The HYSPLIT output is related to 06.00 UTC, defined as the moment of maximum peak of the possible dust event.

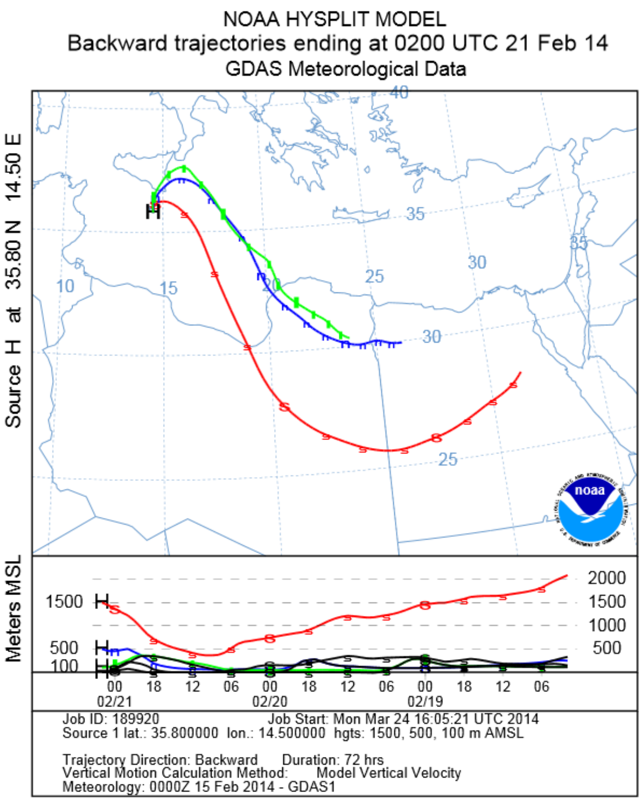


Figure 200 : HYSPLIT backward trajectory at 1500m, 500m and 100 m on the 21 February

The HYSPLIT model output related to the conditions on the 21st February shows that the backward trajectory ending over the air monitoring zone (Marsaxlokk and Birżebbuġa) at the level of 1500, 500 and 100 meters above ground level are from the Saharan region (Libya) which is not in accordance to the wind field from BSC-DREAM.

The following figures show, for each backward trajectory, the variation of the parameters "Terrain height" along the path. This information allows some further assessment about the probable intensity of the event at the arriving-point of this trajectory:

- a reduced distance from the backward trajectory level and the terrain height is considered to be an indicator of a higher intensity event, due to a major implication of the lower level of the atmosphere;
- the presence, along the path, of many points at which the trajectory level is above the mixed layer depth is considered an indicator of a possible decrease of the intensity of the dust aerosol, even if the trajectory being always under the mixed layer depth may be affected by higher level of dust deposition along the path, with minor intensity at the ending-point of the backward trajectory;
- a mixed layer depth higher than the ending-level of each backward trajectory is an indicator of a higher level of intensity of the event;

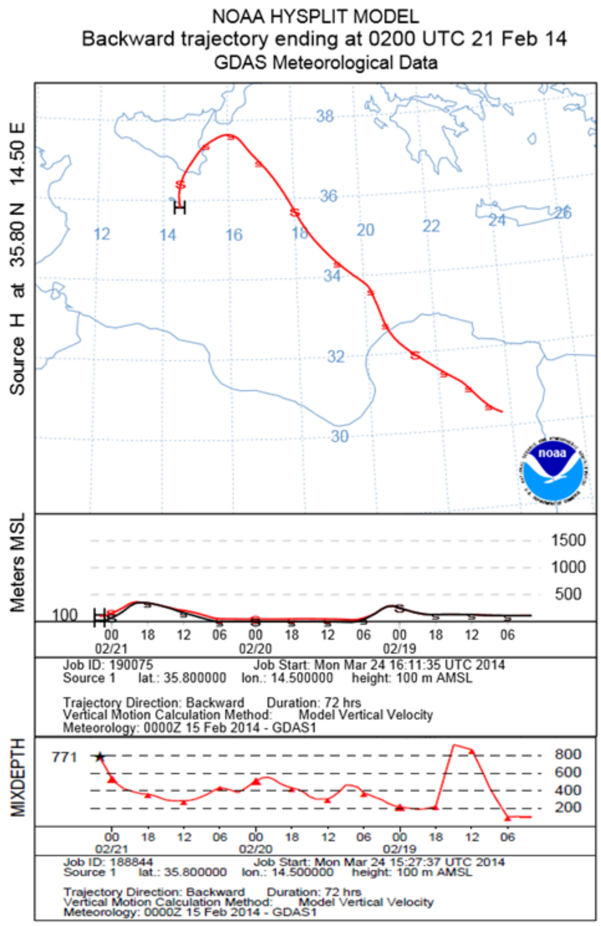


Figure 201: HYSPLIT backward trajectory at 100m on the 21 February

The backward trajectory related to 100 meters level was directly from Saharan region. The mixdepth quote over Malta was higher than the arriving quote of this backward trajectory.

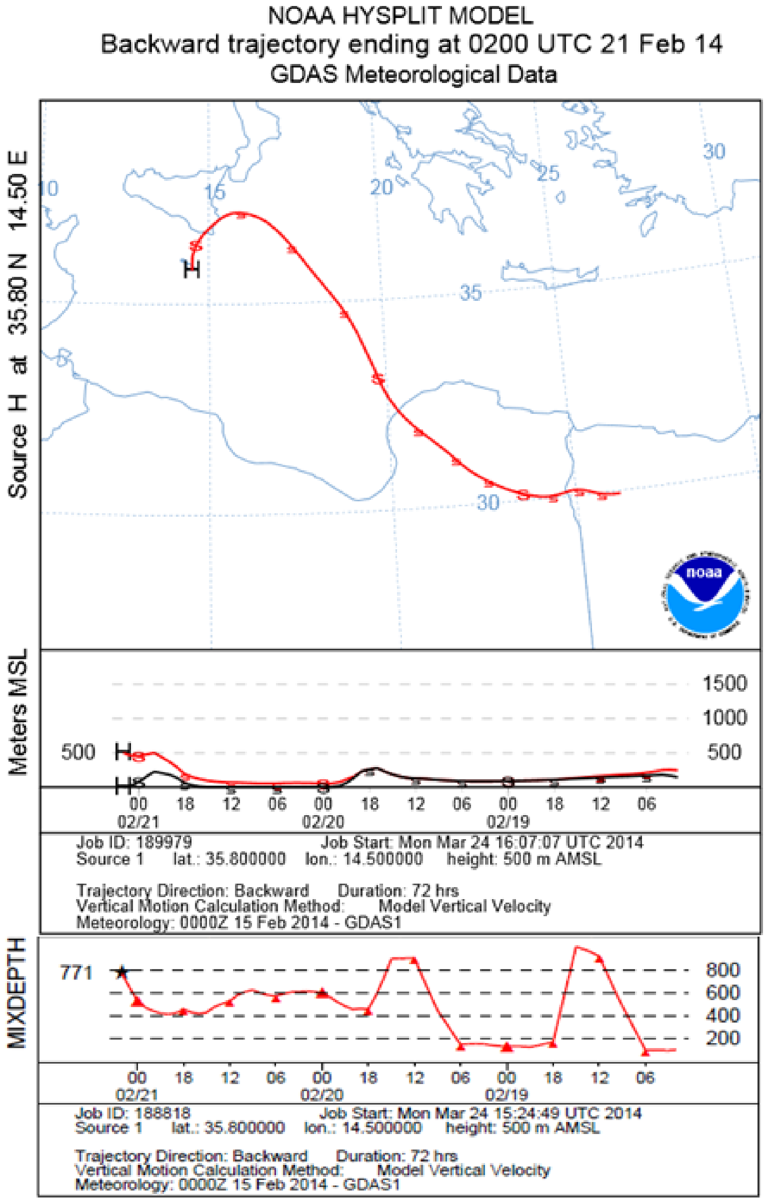


Figure 202: HYSPLIT backward trajectory at 500m on the 21 February

The backward trajectory related to 500 meters level was directly from Saharan region. The mixdepth quote over Malta was higher than the arriving quote of this backward trajectory.

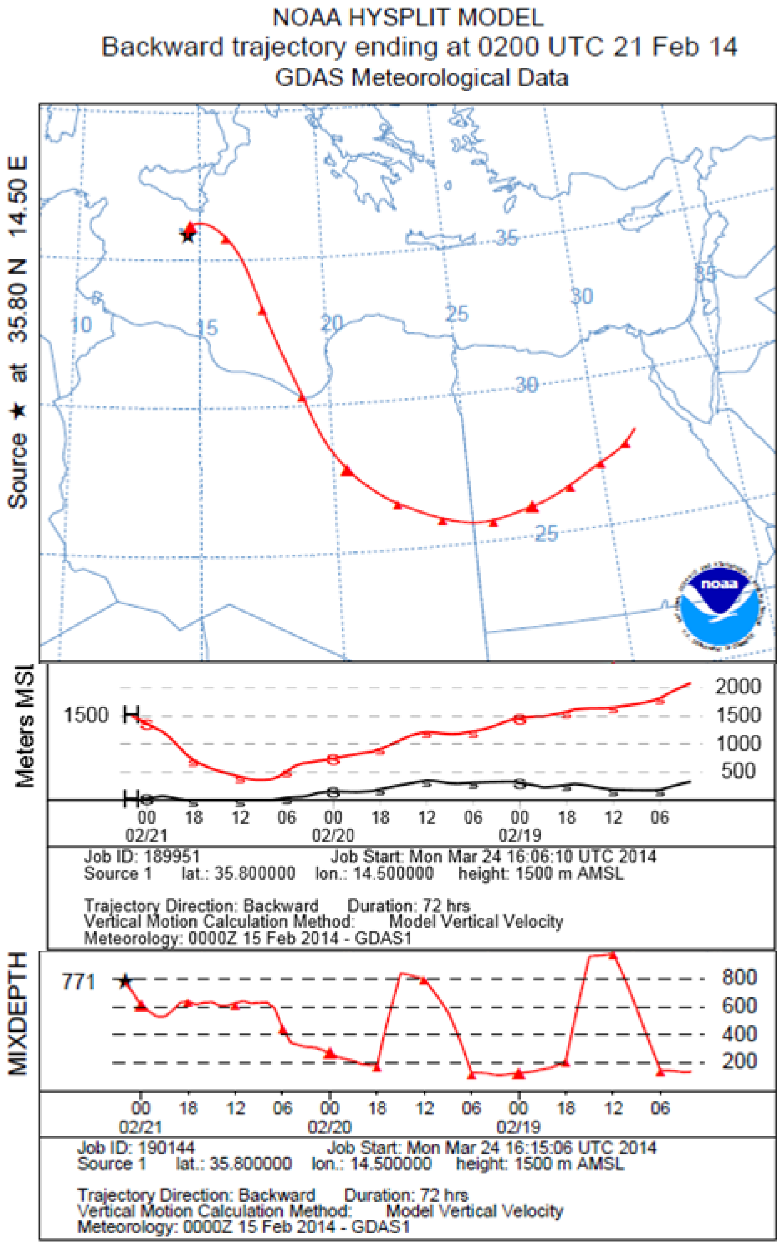


Figure 203: HYSPLIT backward trajectory at 1500m on the 21 February

The backward trajectory related to 1500 meters level across the Libyan desert and Egypt. The mixdepth quote over Malta was lower than the arriving quote of this backward trajectory. From this data we could conclude that the backwards trajectory related to 500 meters and 100 meters above ground had a strongest influence on the dust concentration over the monitoring stations than the backward trajectory of 1500 meters, as their arriving quote were lower than the mixdepth quote and there was a reduced distance to the the terrain height.

MODIS sensors

The MODIS data available does not confirm the presence of a Saharan dust aerosol over Malta on the 21st February. In particular, the following figures show medium values of Aerosol Small Mode Fraction (between 0.04 and 0.50) and of Mass Concentration (between 10 and 15 µg/cm^2).

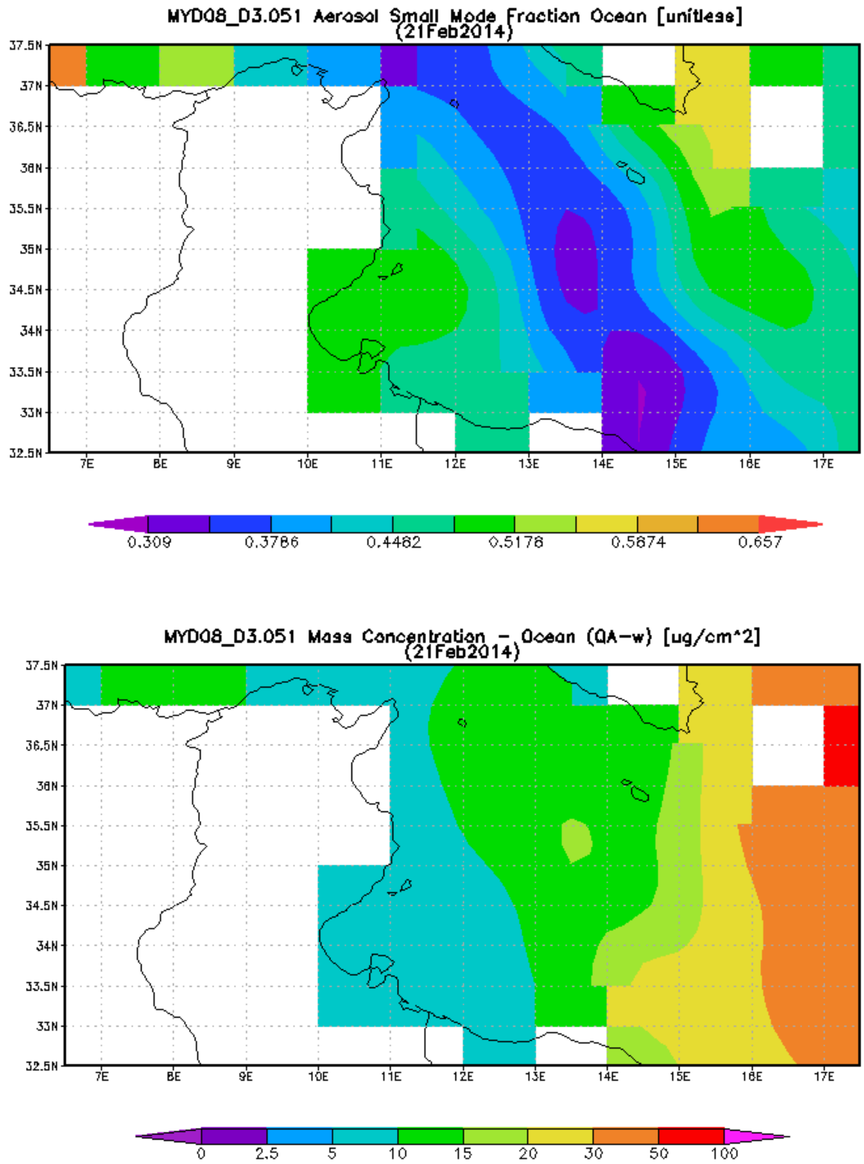


Figure 204: MODIS Terra and Aqua images on the 21 February

Conclusions

During the 1st,10th 20th and 21st February, the air monitoring going on at Marsaxlokk and Birżebbuġa recorded exceedances of the daily limit value of 50 μg/m^3 for PM_{10}. The comparison with the other MEPA air monitoring data showed that all monitoring stations also registered an exceedance of the daily limit value of PM_{10} during the 1st but not during the 10th,20th and 21st

The BSC-DREAM outputs showed that during the 1st and 10th of February, a wind field from Atlantic area that reached Malta through a path that crossed the Saharan regions (Morocco, Algeria, Tunisia and Libya),during the 21st of February Malta was influenced by a dust loading from Saharan region of limited intensity although not during the 20th .

HYSPLIT model outputs, taken over a period of 3 days prior the single analyzed day, showed that during the 1st and 10th February a wind field from Atlantic area reached Malta through a path that crossed the Saharan regions (Morocco, Algeria, Tunisia and Libya). All the HYSPLIT model outputs related to the conditions on the 20th and 21st February showed backward trajectories ending over Marsaxlokk and Birżebbuġa at several height levels originating at Saharan regions.

In conclusion, the PM_{10}-exceedances at Marsaxlokk and Birzebbuga on the 1st and 10th February could have been influenced by a Saharan dust episode. The interpretation of the analyzed data for 21st February is slightly complex, because the sources consulted were not totally coherent, however given the model outputs, it is being concluded that on the 21st February, Malta was affected by a Saharan dust episode of limited intensity as well as on the 20th February. The low dust values of this episode were probably due to the whirling path of the wind vortices that led the dust load over the Maltese Islands.

2.24. MARCH

2.24.1. Analysis for the Identification of Saharan Dust

Step 1: MEPA data analysis

The analysis of the air monitoring data during the period between the 5th March and the 19th March 2014 determined the following exceedances:

- at Birżebbuġa site, exceedance of daily limit value of PM10, occurred on
  - March 14 - daily concentration of 55.7 µg/m^3 against daily limit value of 50.0 µg/m^3

For the above day, the available information from MEPA air monitoring network was related to:

- Għarb station
- Msida station
- Żejtun station
- Kordin station

The PM_{10} daily mean values were:

- Għarb station:
  - March 14 - daily concentration of 29.38 µg/m^3 against daily limit value of 50.0 µg/m^3
- Msida station:
  - March 14 - daily concentration of 34.1 µg/m^3 against daily limit value of 50.0 µg/m^3
- Żejtun station:
  - March 14 - daily concentration of 30.73 µg/m^3 against daily limit value of 50.0 µg/m^3
- Kordin station
  - March 14 - daily concentration of 34.36 µg/m^3 against daily limit value of 50.0 µg/m^3

The following table summarizes the above information:

Date	Enemalta air monitoring stations		MEPA air monitoring network stations			
	Marsaxlokk	Birżebbuġa	Għarb	Msida	Kordin	Żejtun
14 March	39.56	55.47	29.38	34.1	34.36	30.73

Table 61: PM_{10} measurements on the 14 March 2014

The following figure shows the above information:

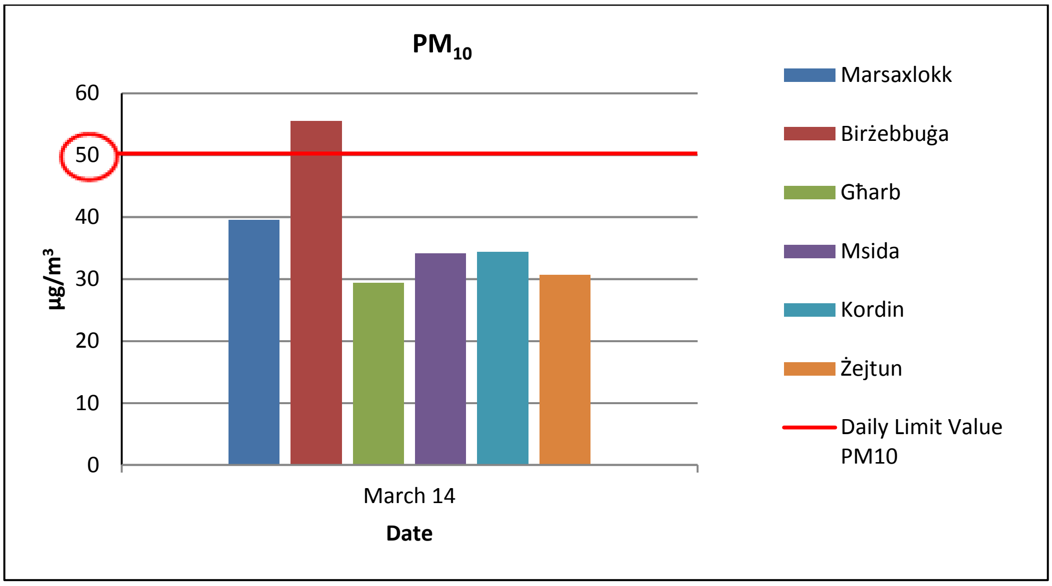


Figure 205: Air monitoring data plot on the days of exceedance

During the 14th of March none of the four stations experienced an exeedance of the Daily Limit value.

In order to assess whether or not a Saharan event took place, a detailed analysis was carried out based on the EU guidelines in Steps 2 and 3 below. Satellite images were evaluated and the mathematical model tools applied in order to reach a conclusion.

For setting up the model variables in Step 3, a PM_{10} hourly concentration analysis was applied. This information is then used to best fit the modelling with HYSPLIT and run simulations at the specific hours that present the maximum probability of the eventual episode under investigation.

The following figure shows the variation of the PM_{10} hourly concentrations for the 14th of March atall the MEPA fixed stations.

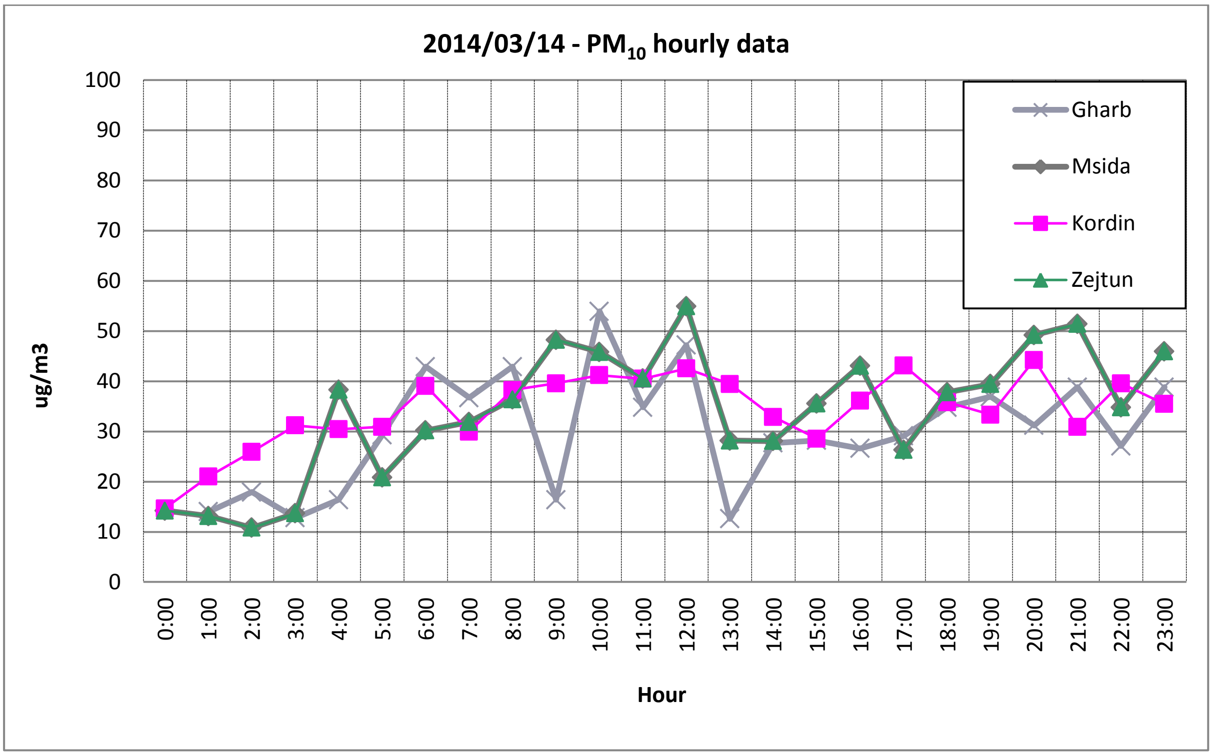


Figure 206: PM_{10} hourly data for the 14 March

From the graph above, it can be seen that the levels of PM_{10} were below the daily limit value during the entire day except between 1000hrs and1200hrs at Gharb and Msida stations. According this data, the HYSPLIT model will be specified at 11:00 UTC (corresponding to 1200hrs in Malta), defined as the moment of maximum peak of the possible dust event.

Step 2 – Satellite images

The exceedance in January has to be correlated with satellite imagery. The satellite images consulted were downloaded from the AERONET network which produces data available on the NASA website: http://rapidfire.sci.gsfc.nasa.gov/subsets/?subset=AERONET_ETNA.

The below images represent satellite images of 250m bands for Aqua and 250m bands for Terra.

Step 3 – Mathematical Modelling

The data available was analysed using the BSC-DREAM dust model (with concentration and deposition indicated) and HYSPLIT 4 model with a printout at heights of 100, 500 and 1500 metres above ground level, that show also mixing heights, taken over a period of 3 days prior to the day when the exceedance were recorded. BSC-DREAM dust model is helpful because it provides information not only on dust aerosols, but also because it provides the reconstruction of the wind field that is essential to better evaluate the HYSPLIT 4 model outputs. The BSC-DREAM outputs used are related to the Dust Loading (expressed in g/m^2) and to the Lowest Level Dust Concentrations (expressed in $\mu g/m^3$).

Step 4 - Satellite data

In cases where satellite images and mathematical modelling outputs were not enough to verify whether on the identified day, Saharan dust episodes really took place, satellite data from three different instruments: the MODIS sensor and AERONET data were analysed for the identified day.

- ***<u>14 March</u>***

AERONET images

The below images represent satellite images of 250m bands for Aqua and 250m bands for Terra.

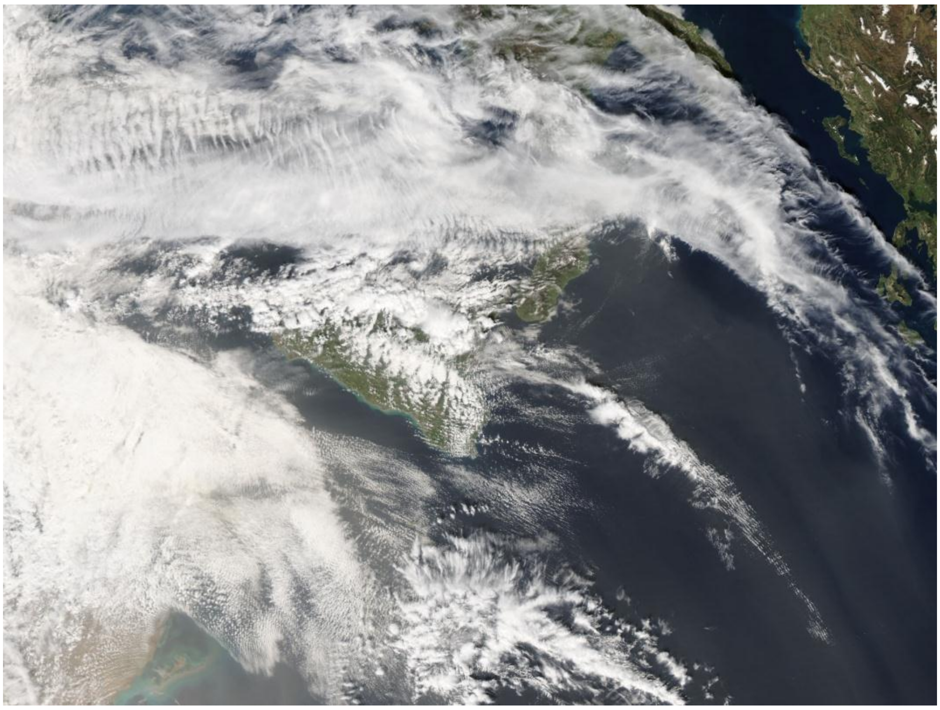


Figure 207: AERONET_ETNA 250m _AQUA

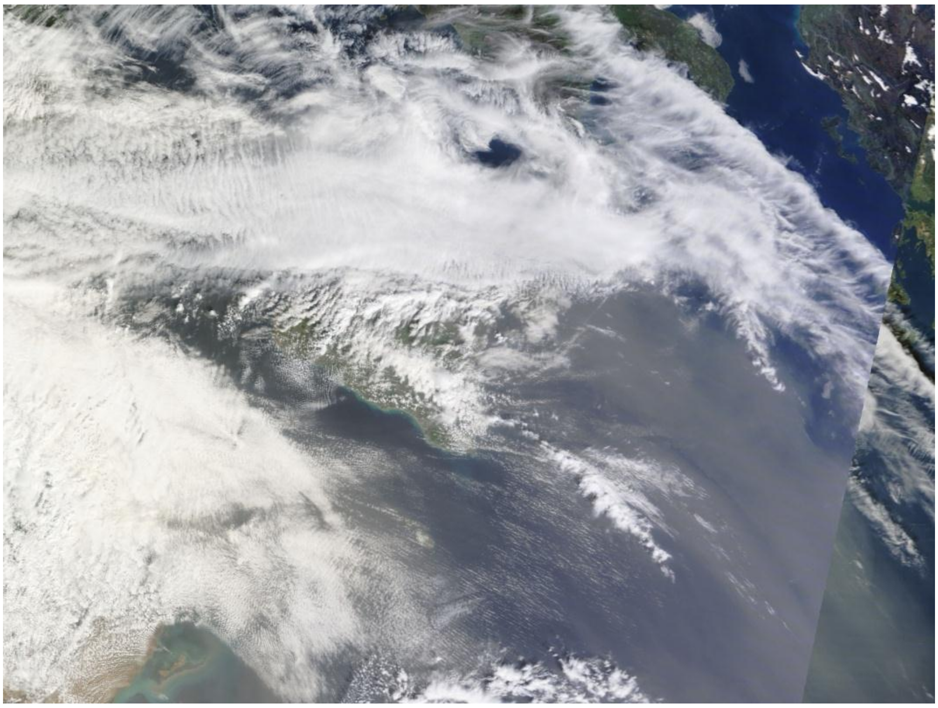
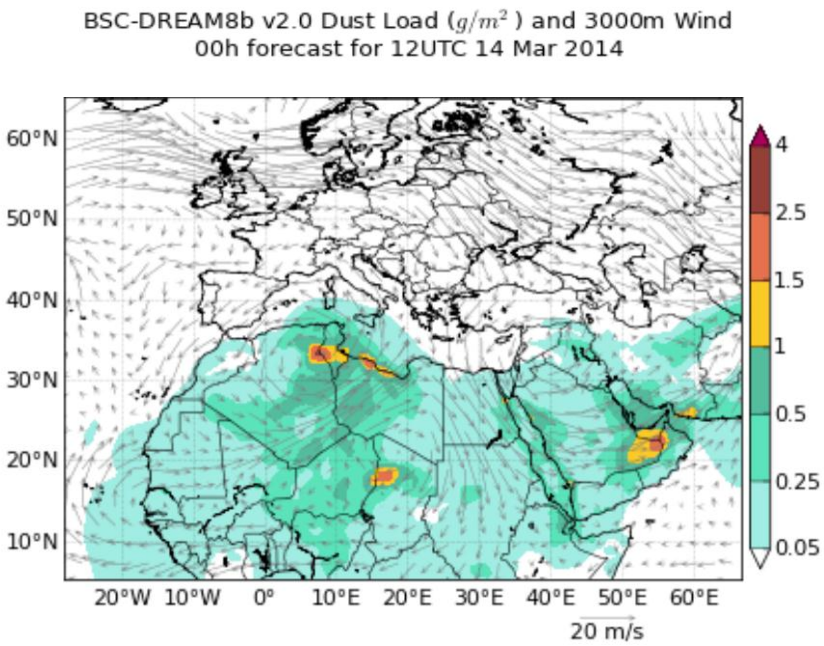


Figure 208: AERONET_ETNA 250m _TERRA

The above images do not provide clear information about the possible occurrence of a Saharan event due to the high cloudiness around the Maltese Islands.

BSC-DREAM dust model

The figure below represents the BSC-DREAM prediction of total dust expressed in terms of lowest model level dust concentration (in µg/m^3) and of dust load (in g/m^2). The dust load is in size classes between 0.1 and 10 µm over Europe at 12:00 UTC and 18.00 UTC, and superimposed on the same figure are the corresponding hourly forecasted wind vectors at 3000m height level.



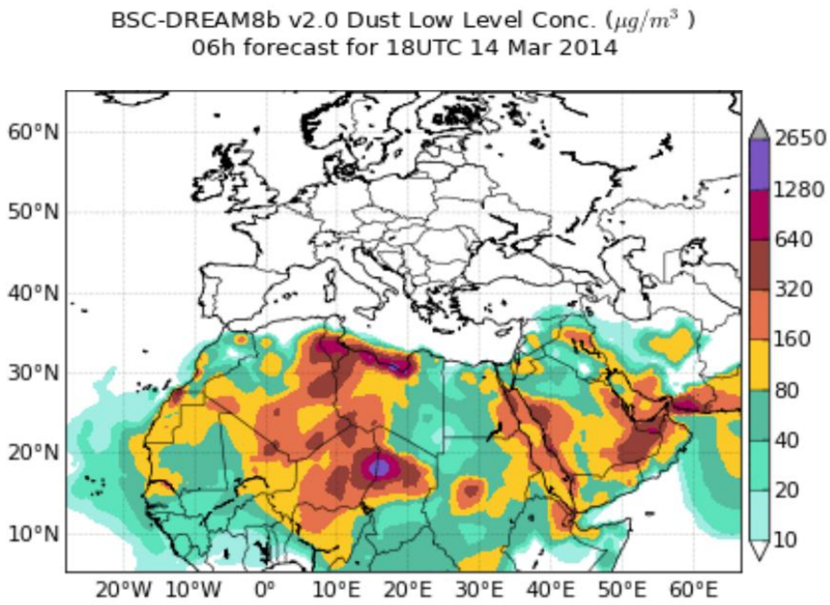


Figure 209:BSC-DREAM outputs on the 14 March.

From the dust loading image it can be noted that on the 14th of March Malta was influenced by dust loading from Saharan region of limited intensity, through wind vectors that describe a strenghtless vortex that interest the North-Western side of Africa and the Southern side of Italy.

Instead, the dust concentration image shows that Malta on that day was not influenced by dust loading from Saharan region, that appears confined in the North-Western side of Africa only.à

HYSPLIT model

The following figure shows the application of HYSPLIT on the Maltese islands on the 14th of March. The HYSPLIT output is related to 11.00 UTC, defined as the moment of maximum peak of the possible dust event.

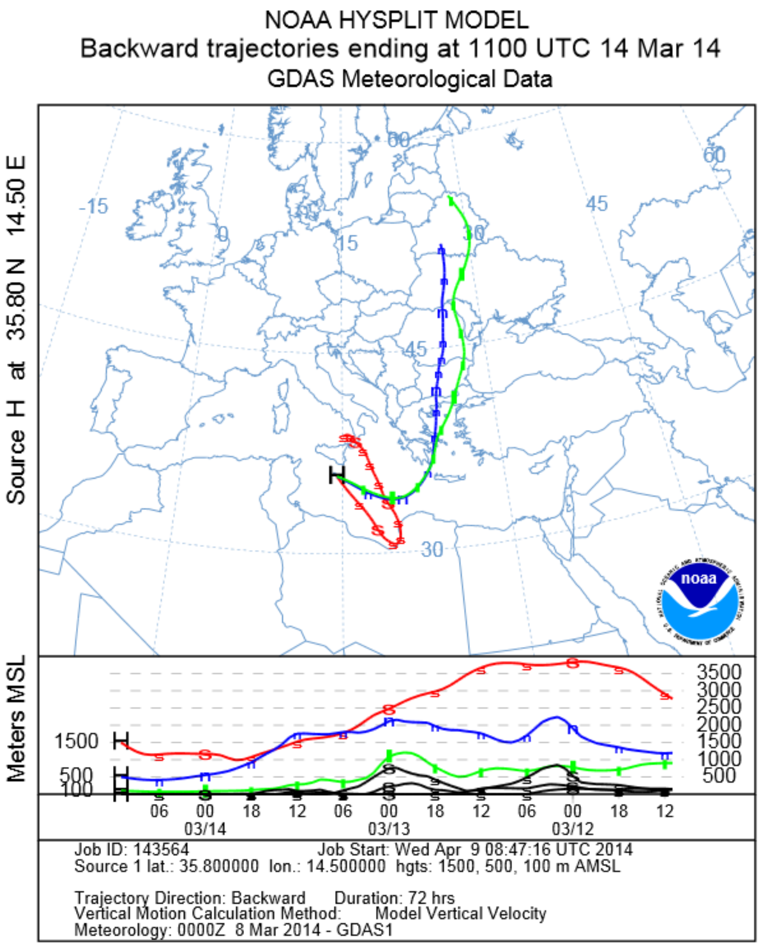


Figure 210 : HYSPLIT backward trajectory at 1500m. 500m and 100 m on the 14 March.

The HYSPLIT model outputs related to the conditions on the 14th March show that the backward trajectories ending over Marsaxlokk at 500m and 100m height were directed from North to South. These trajectories transported air and dust masses over Malta which were from the North and not from the Saharan region. The backward trajectory at 1500m, reached the coast of Lybia before reaching Malta.The following figures show, for each backward trajectory, the variation of the parameters “Terrain height” and “Mixed layer depth”, along the path. This information allows some further assessment about the probable intensity of the event at the arriving-point of this trajectory:

- a reduced distance from the backward trajectory level and the terrain height is considered to be an indicator of a higher intensity event, due to a major implication of the lower level of the atmosphere;
- the presence, along the path, of many points at which the trajectory level is above the mixed layer depth is considered an indicator of a possible decrease of the intensity of the dust aerosol, even if the trajectory being always under the mixed layer depth may be affected by higher level of dust deposition along the path, with minor intensity at the ending-point of the backward trajectory;
- a mixed layer depth higher than the ending-level of each backward trajectory is an indicator of a higher level of intensity of the event;

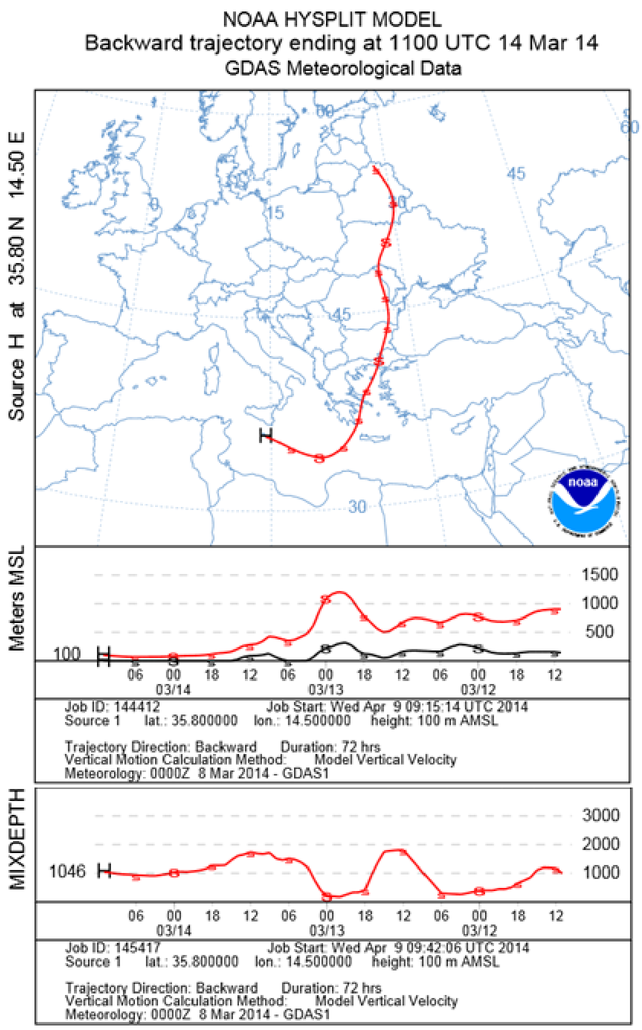


Figure 211: HYSPLIT backward trajectory at 100m on the 14 March.

The backward trajectory related to 100 meters level was from Northern Europe and reached Malta through a path quite long that crossed many Eastern European countries. Overall the final quote at the Maltese islands is lower than the starting point quote. The mixdepth quote over Malta was higher than the arriving quote of this backward trajectory.

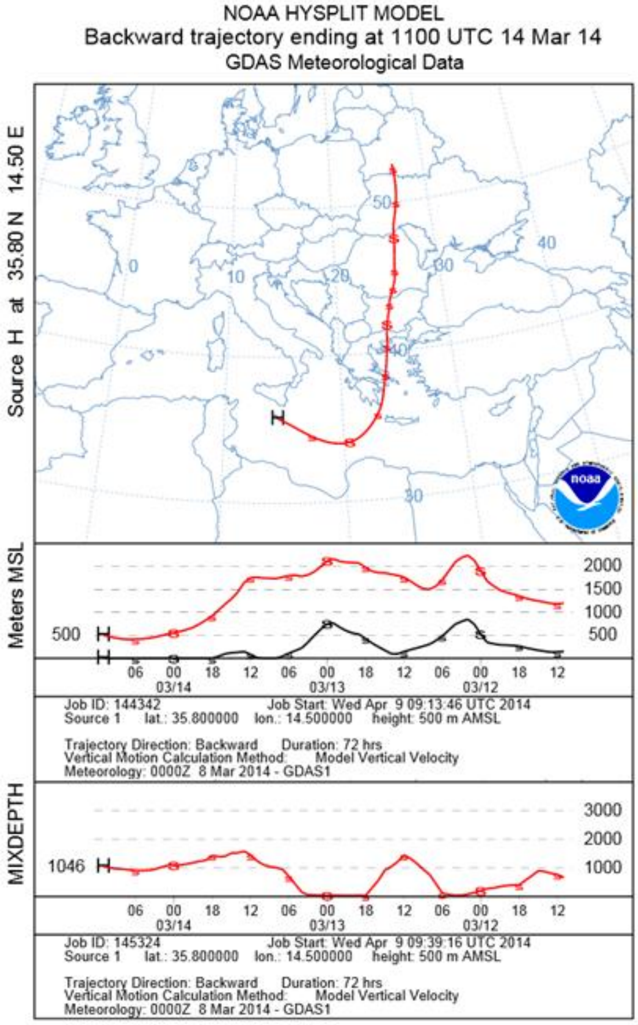


Figure 212: HYSPLIT backward trajectory at 500m on the 14 March.

The backward trajectory related to 500 meters level was very similar to the previous path described about the backwaward trajectory at 100 meters level.The mixdepth quote over Malta was higher than the arriving quote of this backward trajectory.

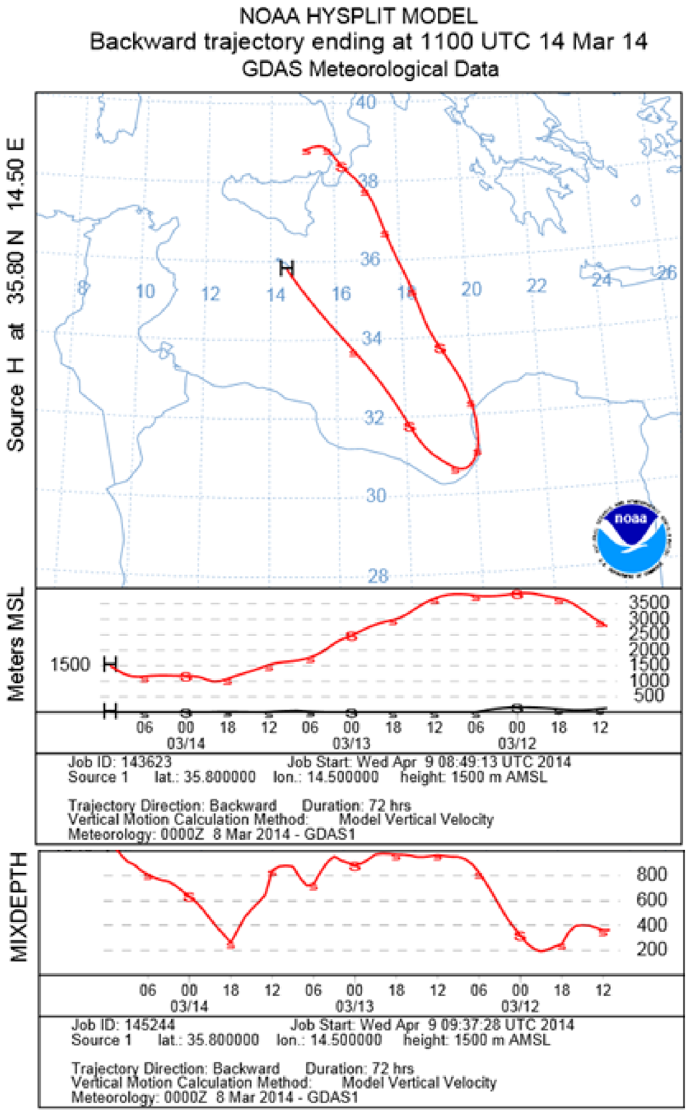
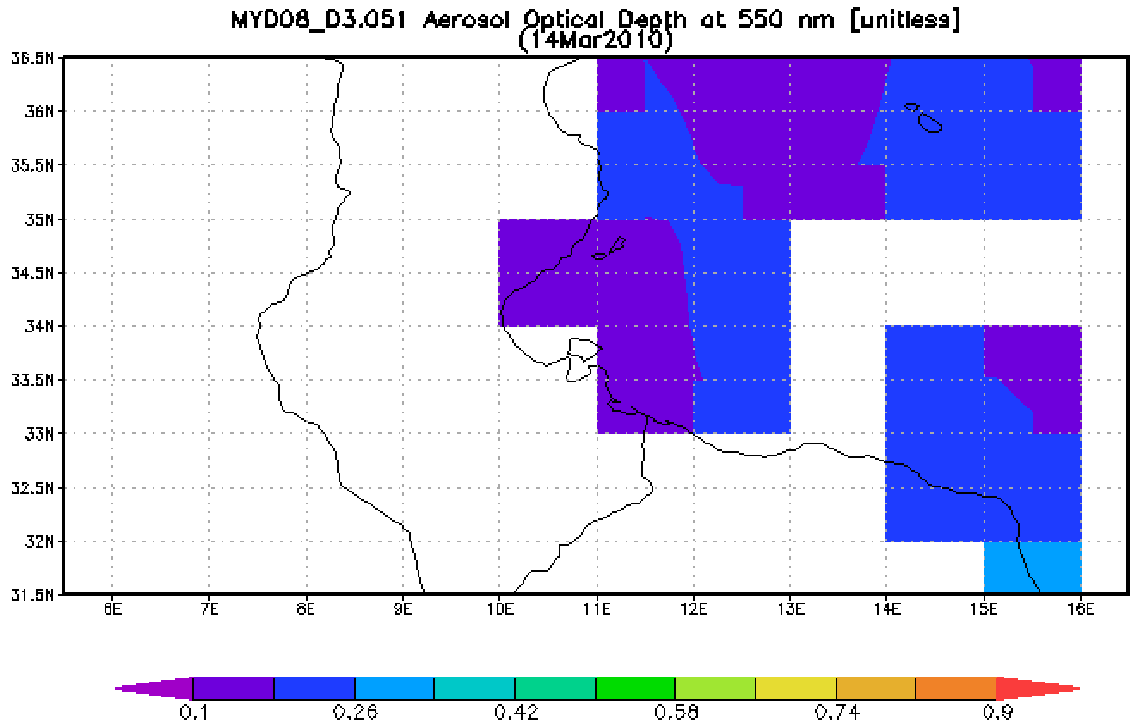


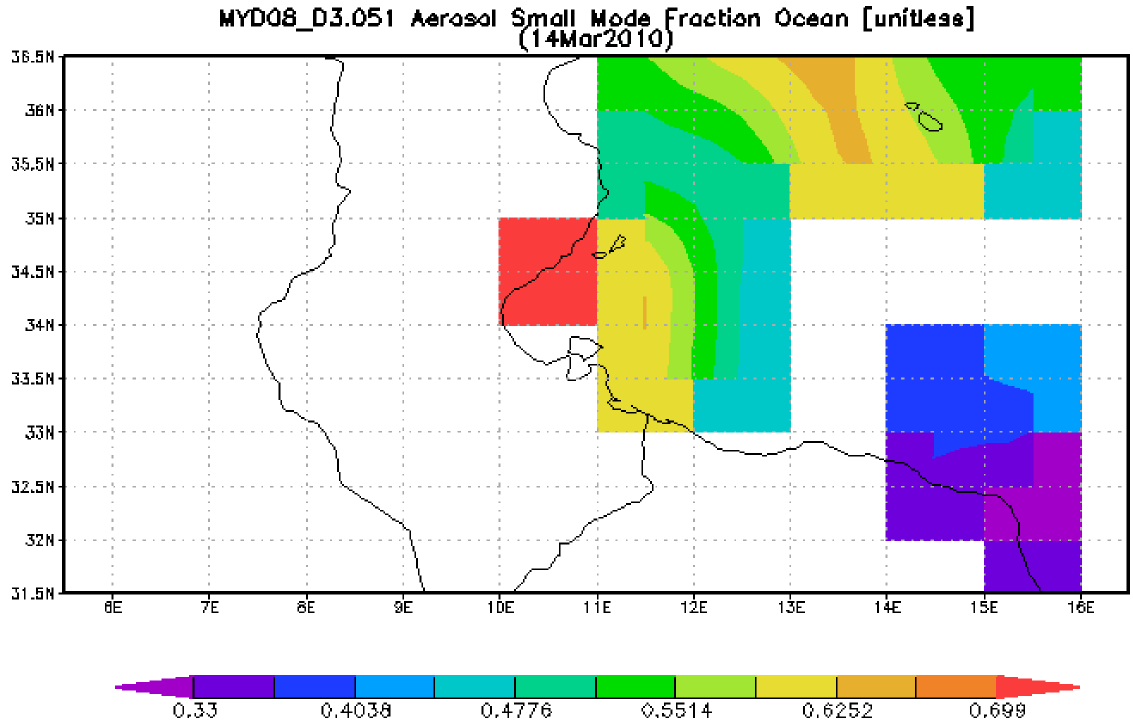
Figure 213: HYSPLIT backward trajectory at 1500m on the 14 March.

The mixed layer depth was lower than the ending-level of the 1500 m backward trajectory which originated in Italy, continued until the coast of Lybia and then turned direction towards the Maltese Islands.

ODIS sensors

The MODIS data available for the 14th March 2014 the Aerosol Optical Depth values in Malta were between 0.1 and 0.26,the Small Mode Fraction values were less than 0.6 and the Mass oncentration reached was below 15 ug/cm^2.These values indicate that a Saharan dust episode did not take place on that day.




MYD08_D3.051 Aerosol Small Mode Fraction Ocean [unitless]
(14Mar2010)
36.5N
36N
35.5N
35N
34.5N
34N
33.5N
33N
32.5N
32N
31.5N
6E
7E
8E
9E
10E
11E
12E
13E
14E
15E
16E
0.33
0.4038
0.4776
0.5514
0.6252
0.699

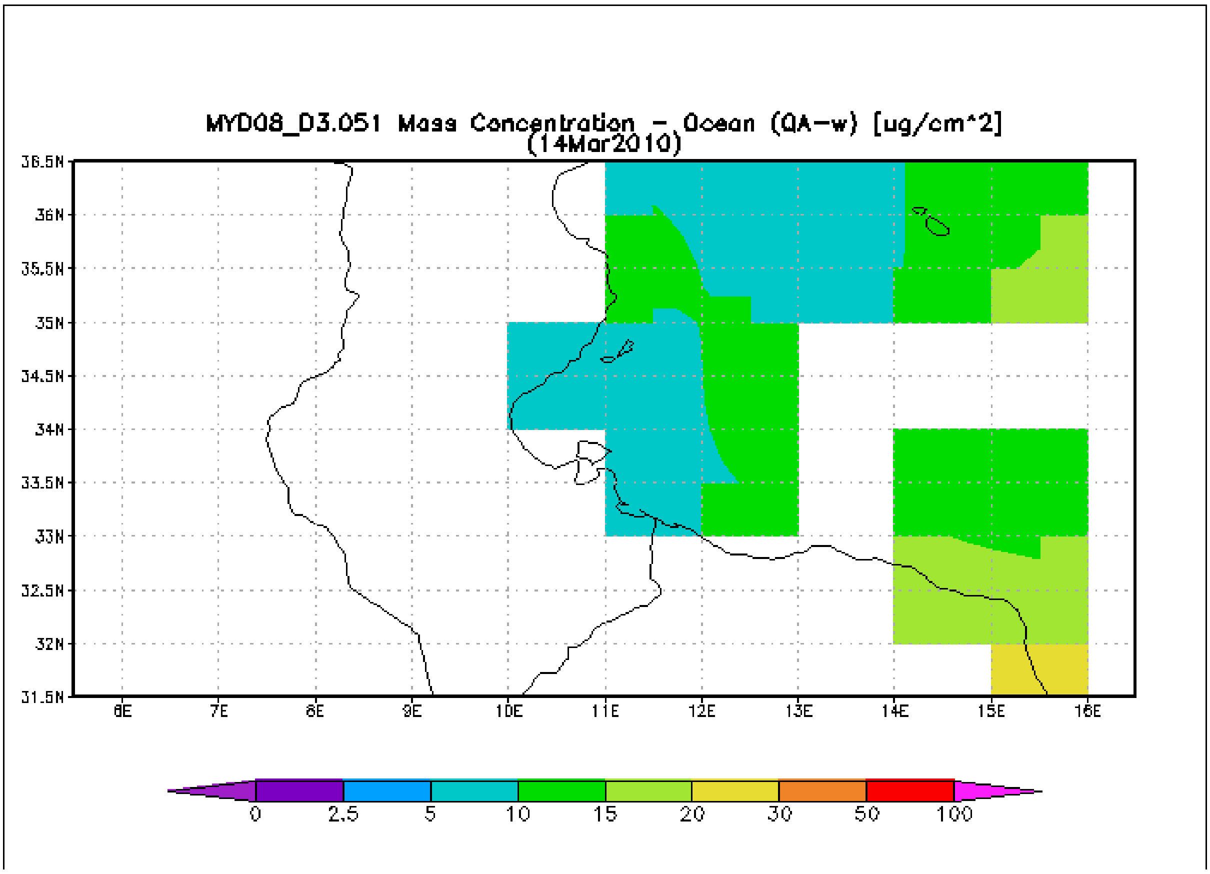


Figure 214: MODIS Terra and Aqua images on the 14 March..

Conclusions

On the 14th March the air monitoring ongoing at Birżebbuġa and Marsaxlokk stations has recorded exceedances of the daily limit value of PM_{10} in Birżebbuġa.

The exceedance was quite low (less than 10 μg/m^3 over the limit value). The comparison with the other MEPA air monitoring data shows that no exceedance took place in this day.

The mathematical model applications show that no Saharan dust intrusions affected Malta.

The satellite data analysis using the MODIS AOD_{550}, SMF and Mass concentration values have confirmed the evaluations described above related to the absence of Saharan dust episodes.

In conclusion, the PM_{10} exceedance at Birżebbuġa on the 14th March are not attributed to a Saharan dust episode.

ANNEX B – SAMPLING DETAILS

Marsaxlokk – PM_{10} Sampler Report 1

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/09/04 00:05	13/09/04 23:55	Qa 38.3300	13:38:28	34.899	38.212	0.79	58.1121	49.8545	54.5873
2	13/09/05 00:05	13/09/05 23:55	Qa 38.3300	23:48:31	34.543	38.218	0.7	58.5552	49.3484	54.5979
3	13/09/06 00:05	13/09/06 23:55	Qa 38.3300	23:48:35	34.638	38.214	0.72	58.6306	49.4825	54.5913
4	13/09/07 00:05	13/09/07 23:55	Qa 38.3300	23:48:34	34.737	38.224	0.66	58.6644	49.6212	54.6009
5	13/09/08 00:05	13/09/08 23:55	Qa 38.3300	23:48:31	34.899	38.212	0.79	58.1121	49.8545	54.5873
6	13/09/09 00:05	13/09/09 11:54	Qa 38.3300	11:48:05						
7	13/09/10 00:05	13/09/10 23:55	Qa 38.3300	23:48:27	34.688	38.217	0.75	58.458	49.5493	54.5901
8	13/09/11 00:05	13/09/11 23:55	Qa 38.3300	23:48:31	34.609	38.216	0.74	58.5046	49.4389	54.5923

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1		
2	24.97	101.03
3	27.34	100.78
4	27.56	101.14
5	27.84	101.5
6		
7	27.89	101.39
8	27.98	101.19

Marsaxlokk – $PM_{2.5}$ Sampler Report 1

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/09/04 00:05	13/09/04 23:55	Qa 38.3300	13:38:26						
2	13/09/05 00:05	13/09/05 23:55	Qa 38.3300	23:48:38	34.867	38.164	1	57.8311	49.8115	54.5225
3	13/09/06 00:05	13/09/06 14:09	Qa 38.3300	14:03:03						
4	13/09/07 00:05	13/09/07 13:06	Qa 38.3300	12:59:44						
5	13/09/08 00:05	13/09/08 11:29	Qa 38.3300	11:23:33						
6	13/09/09 00:05	13/09/09 11:26	Qa 38.3300	11:20:24						
7	13/09/10 00:05	13/09/10 23:55	Qa 38.3300	23:48:37	34.659	38.164	1.14	58.2791	49.514	54.5226
8	13/09/11 00:05	13/09/11 23:55	Qa 38.3300	23:48:35	34.573	38.165	1.1	58.1666	49.3911	54.5232

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1		
2	25.61	101.28
3		
4		
5		
6		
7	28.89	101.78
8	28.99	101.56
9		

Birżebbuġa – PM10 Sampler Report 1

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/09/04 00:05	13/09/04 23:55	Qa 38.3300	23:48:33	34.943	38.228	0.69	56.9753	49.9187	54.6105
2	13/09/05 00:05	13/09/05 23:55	Qa 38.3300	23:48:38	35.002	38.216	0.73	57.0662	50.0041	54.5965
3	13/09/06 00:05	13/09/06 23:55	Qa 38.3300	23:48:31	34.647	38.212	0.89	57.3955	49.4941	54.5858
4	13/09/07 00:05	13/09/07 23:55	Qa 38.3300	23:48:36	34.749	38.22	0.86	57.3601	49.6428	54.601
5	13/09/08 00:05	13/09/08 23:55	Qa 38.3300	23:48:37	34.814	38.221	0.83	57.4349	49.7361	54.6009
6	13/09/09 00:05	13/09/09 23:55	Qa 38.3300	23:48:33	34.832	38.221	0.85	57.659	49.76	54.6004
7	13/09/10 00:05	13/09/10 23:55	Qa 38.3300	23:48:35	34.867	38.225	0.74	57.8688	49.8105	54.6077
8	13/09/11 00:05	13/09/11 23:55	Qa 38.3300	23:48:28	34.751	38.227	0.71	57.8563	49.6396	54.6054

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1	26.6	101..67
2	25.07	101.35
3	27.4	101.12
4	27.65	101.48
5	28.18	101.85
6	28.18	101.9
7	27.59	101.79
8	28..02	101.59

Birżebbuġa – $PM_{2.5}$ Sampler Report 1

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/09/04 00:05	13/09/04 23:55	Qa 38.3300	23:48:31	34.772	38.242	0.72	56.9657	49.6729	54.6295
2	13/09/05 00:05	13/09/05 23:55	Qa 38.3300	23:48:34	34.822	38.237	0.77	56.9602	49.7457	54.6235
3	13/09/06 00:05	13/09/06 23:55	Qa 38.3300	23:48:35	34.469	38.24	077	57.2859	49.2416	54.6289
4	13/09/07 00:05	13/09/07 23:55	Qa 38.3300	23:48:36	34.559	38.241	0.75	57.2971	49.3705	54.6318
5	13/09/08 00:05	13/09/08 23:55	Qa 38.3300	23:48:31	34.648	38.242	0.79	57.3949	49.495	54.6282
6	13/09/09 00:05	13/09/09 23:55	Qa 38.3300	23:48:32	34.674	38.244	0.72	57.4783	49.5334	54.633
7	13/09/10 00:05	13/09/10 23:55	Qa 38.3300	23:48:32	34.689	38.247	0.82	57.4725	49.5539	54.6368
8	13/09/11 00:05	13/09/11 23:55	Qa 38.3300	23:48:32	34.553	38.243	0.73	57.4812	49.3602	54.6315

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1	28.04	101.62
2	26.53	101.27
3	29.09	101.09
4	29.39	101.45
5	29.74	101.83
6	29.65	101.87
7	29.16	101.74
8	29.75	101.55

Marsaxlokk – PM_{10} Sampler Report 2

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/09/12 00:05	13/09/12 10:37	Qa 38.3300							
2	13/09/13 00:05	13/09/13 23:55	Qa 38.3300	23:48:37	34.845	38.224	0.74	57.9261	49.7791	54.6075
3	13/09/14 00:05	13/09/14 23:55	Qa 38.3300	23:48:39	34.919	38.22	0.73	58.0597	49.8868	54.6006
4	13/09/15 00:05	13/09/15 23:55	Qa 38.3300	23:48:36	34.7	38.216	0.77	58.008	49.5719	54.5951
5	13/09/16 00:05	13/09/16 23:55	Qa 38.3300	23:48:38	34.514	38.216	0.75	57.7498	49.308	54.5961
6	13/09/17 00:05	13/09/17 23:55	Qa 38.3300	23:48:38	34.555	38.218	0.77	57.8882	49.3657	54.5993
7	13/09/18 00:05	13/09/18 23:55	Qa 38.3300	23:48:39	34.648	38.217	0.74	57.8782	49.5	54.5981
8	13/09/19 00:05	13/09/19 23:55	Qa 38.3300	23:48:32	34.657	38.219	0.73	57.9971	49.5109	54.5995
9	13/09/20 00:05	13/09/20 23:55	Qa 38.3300	23:48:40	34.73	38.211	0..71	58.0266	49.6179	54.5889
10	13/09/21 00:05	13/09/21 23:55	Qa 38.3300	23:48:32	34.97	38.218	0.73	58.0153	49.9569	54.5981
11	13/09/22 00:05	13/09/22 23:55	Qa 38.3300	23:48:37	35.056	38.223	0.73	57.9179	50.0815	54.6047
12	13/09/23 00:05	13/09/23 23:55	Qa 38.3300	23:48:33	35.108	38.222	0.74	58.0396	50.1528	54.6012
13	13/09/24 00:05	13/09/24 23:55	Qa 38.3300	23:48:32	35.047	38.215	0.78	58.0153	50.0674	54.592
14	13/09/25 00:05	13/09/25 23:55	Qa 38.3300	23:35:38	34.921	38.218	0.71	57.4733	49.4353	54.1023

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1		
2	26.33	101.3
3	25.97	101.41
4	26.95	101.11
5	26.86	100.54
6	26.17	100.42
7	25.47	100.46
8	25.59	100.52
9	25.54	100.74
10	24..83	101.17
11	2433	101.24
12	23.8	101.21
13	24..11	101.16
14	25.21	101.16

Marsaxlokk – $PM_{2.5}$ Sampler Report 2

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/09/12 12:06	13/09/12 23:55	Qa 38.3300							
2	13/09/13 00:05	13/09/13 23:55	Qa 38.3300	23:48:36	34.794	38.173	1.01	57.5185	49.7078	54.5352
3	13/09/14 00:05	13/09/14 23:55	Qa 38.3300	23:48:34	34.836	38.166	1	57.8151	49.7657	54.5235
4	13/09/15 00:05	13/09/15 23:55	Qa 38.3300	23:48:36	34.622	38.162	1.02	57.8122	49.4614	54.5187
5	13/09/16 00:05	13/09/16 23:55	Qa 38.3300	23:48:37	34.457	38.156	1..08	57.4104	49.2275	54.5113
6	13/09/17 00:05	13/09/17 23:55	Qa 38.3300							
7	13/09/18 00:05	13/09/18 23:55	Qa 38.3300							
8	13/09/19 00:05	13/09/19 23:55	Qa 38.3300							
9	13/09/20 00:05	13/09/20 23:55	Qa 38.3300							
10	13/09/21 00:05	13/09/21 23:55	Qa 38.3300							
11	13/09/22 00:05	13/09/22 23:55	Qa 38.3300							
12	13/09/23 00:05	13/09/23 23:55	Qa 38.3300							
13	13/09/24 00:05	13/09/24 23:55	Qa 38.3300							
14	13/09/25 00:05	13/09/25 23:55	Qa 38.3300							

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1		
2	27.19	101.58
3	27.16	101.71
4	28.12	101.42
5	27.69	100.81
6		
7		
8		
9		
10		
11		
12		
13		
14		

Birżebbuġa – PM_{10} Sampler Report 2

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/09/12 13:07	13/09/12 23:55	Qa 38.3300							
2	13/09/13 00:05	13/09/13 23:55	Qa 38.3300	23:48:35	34.916	38.229	0.69	57.8732	49.8804	54.6128
3	13/09/14 00:05	13/09/14 23:55	Qa 38.3300							
4	13/09/15 00:05	13/09/15 23:55	Qa 38.3300							
5	13/09/16 00:05	13/09/16 23:55	Qa 38.3300							
6	13/09/17 00:05	13/09/17 23:55	Qa 38.3300							
7	13/09/18 00:05	13/09/18 23:55	Qa 38.3300							
8	13/09/19 00:05	13/09/19 23:55	Qa 38.3300							
9	13/09/20 00:05	13/09/20 23:55	Qa 38.3300							
10	13/09/21 00:05	13/09/21 23:55	Qa 38.3300							
11	13/09/22 00:05	13/09/22 23:55	Qa 38.3300							
12	13/09/23 00:05	13/09/23 23:55	Qa 38.3300							
13	13/09/24 00:05	13/09/24 23:55	Qa 38.3300							
14	13/09/25 00:05	13/09/25 23:55	Qa 38.3300							

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1		
2	27.02	102.04
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		

Birżebbuġa – $PM_{2.5}$ Sampler Report 2

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/09/12 13:24	13/09/12 23:55	Qa 38.3300							
2	13/09/13 00:05	13/09/13 23:55	Qa 38.3300	23:48:38	34.783	38.243	074	57.5115	49.6939	54.6366
3	13/09/14 00:05	13/09/14 23:55	Qa 38.3300	23:48:36	34.887	38.249	0.73	57.6101	49.8392	54.6426
4	13/09/15 00:05	13/09/15 23:55	Qa 38.3300	23:48:27	34.657	38.242	0.75	57.426	49.5081	54.6283
5	13/09/16 00:05	13/09/16 23:55	Qa 38.3300	23:48:35	34.489	38.234	0.74	57.2127	49.271	54.6213
6	13/09/17 00:05	13/09/17 23:55	Qa 38.3300	23:48:32	34.528	38.247	069	57.4	49.3235	54.6375
7	13/09/18 00:05	13/09/18 23:55	Qa 38.3300	23:48:33	34.6	38.236	0.75	57.3985	49.4274	54.6217
8	13/09/19 00:05	13/09/19 23:55	Qa 38.3300	23:48:29	34.625	38.248	0.75	57.5146	49.4599	54.636
9	13/09/20 00:05	13/09/20 23:55	Qa 38.3300	23:48:42	34.645	38.243	0.76	57.5577	49.4971	54.638
10	13/09/21 00:05	13/09/21 23:55	Qa 38.3300	23:48:24	34.875	38.24	0.77	57.4778	49.8158	54.6201
11	13/09/22 00:05	13/09/22 23:55	Qa 38.3300	23:48:34	34.979	38.236	0.72	57.1374	49.9693	54.6224
12	13/09/23 00:05	13/09/23 23:55	Qa 38.3300	23:48:34	35.063	38.244	0.79	57.3851	50.0895	54.6347
13	13/09/24 00:05	13/09/24 23:55	Qa 38.3300	23:48:32	34.955	38.241	0.72	57.3842	49.9336	54.6285
14	13/09/25 00:05	13/09/25 23:55	Qa 38.3300	23:48:32	34.89	38.247	0.72	57.5152	49.8405	54.6363

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1		
2	28.07	101.66
3	27.55	101.77
4	28.53	101.45
5	28.27	100.89
6	27.68	100.77
7	27.02	100.79
8	27.11	100.86
9	27.58	101.09
10	26.74	101.49
11	25.92	101.52
12	25.21	101.5
13	25.99	101.46
14	26.71	101.5

Marsaxlokk – PM_{10} Sampler Report 3

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/09/26 00:05	13/09/26 23:55	Qa 38.3300							
2	13/09/27 00:05	13/09/27 23:55	Qa 38.3300	23:48:34	34.595	38.217	0.76	58.3396	49.4207	54.5932
3	13/09/28 00:05	13/09/28 23:55	Qa 38.3300	23:48:35	34.717	38.21	0.74	58.447	49.596	54.5858
4	13/09/29 00:05	13/09/29 23:55	Qa 38.3300	23:48:30	34.469	38.209	0.77	58.2992	49.239	54.5815
5	13/09/30 00:05	13/09/30 23:55	Qa 38.3300	23:48:28	34.42	38.221	0.75	58.0967	49.1682	54.5986
6	13/10/01 00:05	13/10/01 23:55	Qa 38.3300	23:48:34	34.531	38.216	0.8	58.0762	49.3313	54.5958
7	13/10/02 00:05	13/10/02 23:55	Qa 38.3300	23:48:33	34.647	38.222	0..73	58.2787	49.4944	54.6005
8	13/10/03 00:05	13/10/03 09:59	Qa 38.3300							

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1		
2	27.47	100.98
3	26.13	100.9
4	27.23	100.55
5	26.68	100.19
6	26.15	100.35
7	26.26	100.71
8		

Marsaxlokk – $PM_{2.5}$ Sampler Report 3

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/09/26 00:05	13/09/26 23:55	Qa 38.3300							
2	13/09/27 00:05	13/09/27 23:55	Qa 38.3300							
3	13/09/28 00:05	13/09/28 23:55	Qa 38.3300	23:48:37	34.692	38.174	0.98	58.7572	49.5629	54.5372
4	13/09/29 00:05	13/09/29 23:55	Qa 38.3300	23:48:34	34.447	38.166	0.99	58.4644	49.2102	54.5232
5	13/09/30 00:05	13/09/30 23:55	Qa 38.3300	23:48:32	34.412	38.15	1.05	58.557	49.1583	54.4993
6	13/10/01 00:05	13/10/01 23:55	Qa 38.3300	23:48:31	34.512	38.163	1	58.4064	49.3014	54.5147
7	13/10/02 00:05	13/10/02 23:55	Qa 38.3300	23:48:32	34.615	38.157	1.05	58.6162	49.449	54.5087

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1		
2		
3	27.19	101.28
4	28.16	100..91
5	27.3	100..56
6	26.9	100.69
7	27.16	101.09

Birżebbuġa – PM_{10} Sampler Report 3

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/09/26 00:05	13/09/26 23:55	Qa 38.3300							
2	13/09/27 00:05	13/09/27 23:55	Qa 38.3300							
3	13/09/28 00:05	13/09/28 23:55	Qa 38.3300							
4	13/09/29 00:05	13/09/29 23:55	Qa 38.3300							
5	13/09/30 00:05	13/09/30 23:55	Qa 38.3300							
6	13/10/01 00:05	13/10/01 23:55	Qa 38.3300							
7	13/10/02 00:05	13/10/02 23:55	Qa 38.3300							

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1		
2		
3		
4		
5		
6		
7		

Birżebbuġa – $PM_{2.5}$ Sampler Report 3

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/09/26 00:05	13/09/26 23:55	Qa 38.3300							
2	13/09/27 00:05	13/09/27 23:55	Qa 38.3300							
3	13/09/28 00:05	13/09/28 23:55	Qa 38.3300	23:48:33	34.631	38.242	0.8	57.1672	49.4721	54.6308
4	13/09/29 00:05	13/09/29 23:55	Qa 38.3300	23:48:35	34.39	38.239	0.82	56.8794	49.1225	54.6247
5	13/09/30 00:05	13/09/30 23:55	Qa 38.3300	23:48:33	34.372	38.241	0.78	57.4234	49.1014	54.6282
6	13/10/01 00:05	13/10/01 23:55	Qa 38.3300	23:48:38	34.504	38.241	0.73	57.3217	49.2945	54.6305
7	13/10/02 00:05	13/10/02 23:55	Qa 38.3300	23:48:39	34.583	38.252	0.78	57.487	49.4069	54.6489

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1		
2		
3	27.96	101.28
4	28.96	100.91
5	28.21	100.56
6	27.49	100.69
7	28.01	101.09

Marsaxlokk – PM_{10} Sampler Report 4

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/10/03 00:05	13/10/03 23:55	Qa 38.3300	22:24:23	35.392	38.231	0.81	57.5432	50.6543	54.6072
2	13/10/04 00:05	13/10/04 23:55	Qa 38.3300	23:48:40	35.394	38.228	0.81	57.4257	50.5657	54.6148
3	13/10/05 00:05	13/10/05 23:55	Qa 38.3300	23:48:37	35.334	38.226	0.81	57.6741	50.4784	54.6091
4	13/10/06 00:05	13/10/06 23:55	Qa 38.3300	23:48:31	35.178	38.225	0.78	57.9257	50.2519	54.605
5	13/10/07 00:05	13/10/07 23:55	Qa 38.3300	23:48:34	35.14	38.224	0.85	58.2008	50.1996	54.6055
6	13/10/08 00:05	13/10/08 23:55	Qa 38.3300	23:48:43	35.528	38.232	0.77	58.1591	50.7592	54.6229
7	13/10/09 00:05	13/10/09 23:55	Qa 38.3300	23:48:33	35.244	38.224	0.78	58.4719	50.3472	54.6056
8	13/10/10 00:05	13/10/10 23:55	Qa 38.3300	23:48:35	35.025	38.232	0.76	58.4656	50.0357	54.6174
9	13/10/11 00:05	13/10/11 23:55	Qa 38.3300							
10	13/10/12 00:05	13/10/12 23:55	Qa 38.3300							
11	13/10/13 00:05	13/10/13 23:55	Qa 38.3300	23:48:30	34.956	38.233	0.73	58.1732	49.9341	54.6156
12	13/10/14 00:05	13/10/14 23:55	Qa 38.3300	23:48:31	35.011	38.226	0.77	58.3848	50.0139	54.6066
13	13/10/15 00:05	13/10/15 23:55	Qa 38.3300							
14	13/10/16 00:05	13/10/16 23:55	Qa 38.3300	23:48:41	34.914	38.216	0.75	57.6687	49.8812	54.5973

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1	24.48	101.94
2	24.68	102.32
3	24.96	102.25
4	25.08	101.84
5	25.54	101.89
6	22.66	102
7	24.84	101.95
8	25.76	101.61
9		
10		
11	27.42	101.97
12	26.92	101.98
13		
14	25.72	101.32

Marsaxlokk – $PM_{2.5}$ Sampler Report 4

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/10/03 00:05	13/10/03 23:55	Qa 38.3300	22:29:23	35.428	38.18	1.12	57.9084	50.6111	54.5421
2	13/10/04 00:05	13/10/04 23:55	Qa 38.3300	23:48:34	35.253	38.172	123	57.6348	50.3601	54.5295
3	13/10/05 00:05	13/10/05 23:55	Qa 38.3300	23:48:36	35.197	38.176	113	57.6236	50.2823	54.5371
4	13/10/06 00:05	13/10/06 23:55	Qa 38.3300	23:48:36	35.063	38.177	121	57.6197	50.0896	54.5375
5	13/10/07 00:05	13/10/07 23:55	Qa 38.3300	23:48:36	35.075	38.175	118	58.0926	50.1073	54.5361
6	13/10/08 00:05	13/10/08 23:55	Qa 38.3300	23:48:36	35.428	38.18	112	57.9084	50.6111	54.5421
7	13/10/09 00:05	13/10/09 23:55	Qa 38.3300	23:48:34	35.145	38.163	124	58.2562	50.207	54.5193
8	13/10/10 00:05	13/10/10 23:55	Qa 38.3300	22:43:06	34.788	38.02	121	55.1953	47.4063	51.8115
9	13/10/11 00:05	13/10/11 23:55	Qa 38.3300							
10	13/10/12 00:05	13/10/12 23:55	Qa 38.3300							
11	13/10/13 00:05	13/10/13 23:55	Qa 38.3300							
12	13/10/14 00:05	13/10/14 23:55	Qa 38.3300							
13	13/10/15 00:05	13/10/15 23:55	Qa 38.3300							
14	13/10/16 00:05	13/10/16 23:55	Qa 38.3300							

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1	24.66	101.57
2	25.37	102.32
3	25.64	102.25
4	25.53	101.84
5	25.71	101.89
6	22.71	102
7	252	101.95
8	2619	101.61
9		
10		
11		
12		
13		
14		

Birżebbuġa – PM_{10} Sampler Report 4

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		

Birżebbuġa – $PM_{2.5}$ Sampler Report .4

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/10/03 00:05	13/10/03 23:55	Qa 38.3300	22:51:43	35.161	38.243	0.66	20.886	18.744	20.387
2	13/10/04 00:05	13/10/04 23:55	Qa 38.3300	23:48:33	35.24	38.245	0.66	55.9683	50.342	54.6352
3	13/10/05 00:05	13/10/05 23:55	Qa 38.3300	23:48:35	35.109	38.238	0.68	55.8471	50.1566	54.6249
4	13/10/06 00:05	13/10/06 23:55	Qa 38.3300	23:48:33	35.006	38.236	0.69	56.1908	50.0077	54.6225
5	13/10/07 00:05	13/10/07 23:55	Qa 38.3300	23:48:37	34.931	38.229	0.75	56.5346	49.903	54.6146
6	13/10/08 00:05	13/10/08 23:55	Qa 38.3300	23:46:13	35.383	38.226	0.76	56.3912	50.4627	54.5186
7	13/10/09 00:05	13/10/09 23:55	Qa 38.3300	23:48:37	35.129	38.23	0.78	56.4335	50.1849	54.6152
8	13/10/10 00:05	13/10/10 23:55	Qa 38.3300	23:48:33	34.873	38.24	0.73	56.2783	49.8177	54.6278
9	13/10/11 00:05	13/10/11 23:55	Qa 38.3300	22:40:10	34.716	38.234	0.72	53.6034	47.221	52.0056
10	13/10/12 00:05	13/10/12 23:55	Qa 38.3300	23:48:35	34.732	38.236	0.74	56.0355	49.6171	54.6228
11	13/10/13 00:05	13/10/13 23:55	Qa 38.3300	23:05:35	34.82	38.242	0.72	54.5732	48.2475	52.9884
12	13/10/14 00:05	13/10/14 23:55	Qa 38.3300	23:48:30	34.836	38.239	0.73	56.1883	49.7632	54.6238
13	13/10/15 00:05	13/10/15 23:55	Qa 38.3300	23:45:54	34.9	38.24	0.76	56.2259	49.7637	54.5255
14	13/10/16 00:05	13/10/16 23:55	Qa 38.3300	23:48:33	34.797	38.236	0.75	56.2641	49.7089	54.6195

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1	25.07	101.74
2	25.15	101.99
3	25.99	101.92
4	25.72	101.53
5	26.54	101.61
6	22.84	101.66
7	24.86	101.61
8	26.15	101.28
9	27.6	101.33
10	28.49	101.67
11	27.8	101.68
12	27.58	101.66
13	26.8	101.58
14	25.99	101.02

Marsaxlokk – PM_{10} Sampler Report 5

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/10/17 00:05	13/10/17 23:55	Qa 38.3300	23:44:44	35.053	38.23	0.76	57.6606	49.9413	54.4681
2	13/10/18 00:05	13/10/18 23:55	Qa 38.3300	23:48:34	35.248	38.225	0.84	57.7711	50.3546	54.6064
3	13/10/19 00:05	13/10/19 23:55	Qa 38.3300	23:48:24	35.369	38.231	0.83	57.5563	50.5206	54.6084
4	13/10/20 00:05	13/10/20 23:55	Qa 38.3300	23:48:34	35.43	38.229	0.79	57.4012	50.6146	54.6128
5	13/10/21 00:05	13/10/21 23:55	Qa 38.3300	23:34:52	35.443	38.223	0.72	56.9333	50.1465	54.0804
6	13/10/22 00:05	13/10/22 23:55	Qa 38.3300	23:48:32	35.449	38.233	0.79	57.719	50.6425	54.6184
7	13/10/23 00:05	13/10/23 23:55	Qa 38.3300	23:48:31	35.471	38.237	0.88	57.5953	50.672	54.6232
8	13/10/24 00:05	13/10/24 23:55	Qa 38.3300	23:48:40	35.476	38.235	0.85	57.5665	50.6831	54.6255
9	13/10/25 00:05	13/10/25 23:55	Qa 38.3300	23:48:34	35.33	38.234	0.85	57.609	50.4707	54.6201
10	13/10/26 00:05	13/10/26 23:55	Qa 38.3300	23:48:30	35.476	38.232	0.84	57.5838	50.6769	54.6145
11	13/10/27 00:05	13/10/27 23:55	Qa 38.3300	23:48:35	35.573	38.234	0.87	57.607	50.8192	54.6201
12	13/10/28 00:05	13/10/28 23:55	Qa 38.3300	23:48:36	35.497	38.234	0.83	57.4822	50.7114	54.6206
13	13/10/29 00:05	13/10/29 23:55	Qa 38.3300	23:48:37	35.373	38.229	0.89	57.5664	50.5344	54.6134
14	13/10/30 00:05	13/10/30 23:55	Qa 38.3300	23:48:35	35.259	38.233	0.85	57.6493	50.3705	54.6191

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1	24.83	101.38
2	24.07	101.7
3	24.27	102.1
4	24.73	102.44
5	24.26	102.33
6	23.87	102.19
7	23.52	102.12
8	23.38	102.09
9	24.54	102.07
10	23.56	102.16
11	23.02	102.25
12	23.13	102.07
13	23.08	101.71
14	23.52	101.52

Marsaxlokk – $PM_{2.5}$ Sampler Report 5

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/10/17 00:05	13/10/17 23:55	Qa 38.3300							
2	13/10/18 00:05	13/10/18 23:55	Qa 38.3300							
3	13/10/19 00:05	13/10/19 23:55	Qa 38.3300							
4	13/10/20 00:05	13/10/20 23:55	Qa 38.3300							
5	13/10/21 00:05	13/10/21 23:55	Qa 38.3300							
6	13/10/22 00:05	13/10/22 23:55	Qa 38.3300							
7	13/10/23 00:05	13/10/23 23:55	Qa 38.3300							
8	13/10/24 00:05	13/10/24 23:55	Qa 38.3300	23:48:36	35.358	38.191	1.21	58.2678	50.5122	54.5585
9	13/10/25 00:05	13/10/25 23:55	Qa 38.3300	23:48:37	35.217	38.189	1.21	58.2055	50.3111	54.5574
10	13/10/26 00:05	13/10/26 23:55	Qa 38.3300	23:48:35	35.34	38.177	1.17	58.2148	50.4867	54.5396
11	13/10/27 00:05	13/10/27 23:55	Qa 38.3300	23:48:33	35.452	38.185	1.14	58.2522	50.6449	54.5481
12	13/10/28 00:05	13/10/28 23:55	Qa 38.3300	23:48:39	35.362	38.18	1.25	58.1217	50.5201	54.5459
13	13/10/29 00:05	13/10/29 23:55	Qa 38.3300	23:48:40	35.25	38.181	1.32	58.15	50.3601	54.5476
14	13/10/30 00:05	13/10/30 23:55	Qa 38.3300	23:48:29	35.138	38.199	1.3	58.0399	50.193	54.5657

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1		
2		
3		
4		
5		
6		
7		
8	23.96	102.07
9	25.2	102.09
10	24.24	102.15
11	23.59	102.23
12	23.7	102.02
13	23.63	101.67
14	24.16	101.48

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/10/17 00:05	13/10/17 23:55	Qa 38.3300							
2	13/10/18 00:05	13/10/18 23:55	Qa 38.3300	23:48:30	35.416	38.245	0.43	57.1649	50.5074	54.5407
3	13/10/19 00:05	13/10/19 23:55	Qa 38.3300	23:47:56	35.539	38.253	0.47	57.0125	50.7677	54.6436
4	13/10/20 00:05	13/10/20 23:55	Qa 38.3300	22:28:44	35.432	38.239	0.47	56.4592	50.5945	54.6017
5	13/10/21 00:05	13/10/21 23:55	Qa 38.3300							
6	13/10/22 00:05	13/10/22 23:55	Qa 38.3300	23:48:29	35.42	38.248	0.47	52.9374	47.239	51.0108
7	13/10/23 00:05	13/10/23 23:55	Qa 38.3300	23:41:18	35.443	38.243	0.45	56.7496	50.6291	54.6281
8	13/10/24 00:05	13/10/24 23:55	Qa 38.3300	23:47:39	35.531	38.251	0.41	56.6514	50.5003	54.3653
9	13/10/25 00:05	13/10/25 23:55	Qa 38.3300	23:42:46	35.275	38.246	0.41	56.9227	50.3597	54.6025
10	13/10/26 00:05	13/10/26 23:55	Qa 38.3300	23:46:32	35.463	38.242	0.48	56.6558	50.4552	54.4076
11	13/10/27 00:05	13/10/27 23:55	Qa 38.3300	23:46:03	35.568	38.249	0.46	56.8339	50.7395	54.5609
12	13/10/28 00:05	13/10/28 23:55	Qa 38.3300	23:48:15	35.429	38.241	0.45	57.1459	50.5229	54.5321
13	13/10/29 00:05	13/10/29 23:55	Qa 38.3300	23:48:38	35.387	38.249	0.48	57.2718	50.5413	54.6295
14	13/10/30 00:05	13/10/30 23:55	Qa 38.3300	23:46:08	35.168	38.239	0.42	56.5035	50.2413	54.6295

Birżebbuġa – PM_{10} Sampler Report 5

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1		
2	21.65	101.63
3	23.45	101.98
4	23.3	101.9
5		
6	22.46	101.66
7	21.73	101.64
8	23.61	101.56
9	22.34	101.68
10	21.86	101.8
11	22.27	101.56
12	21.67	101.21
13	23.02	101.07
14	21.36	101.2

Birżebbuġa – $PM_{2.5}$ Sampler Report 5

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/10/17 00:05	13/10/17 23:55	Qa 38.3300							
2	13/10/18 00:05	13/10/18 23:55	Qa 38.3300	23:45:55	35.081	38.235	0.67	56.5826	50.0223	54.5182
3	13/10/19 00:05	13/10/19 23:55	Qa 38.3300	23:48:39	35.285	38.235	0.71	56.5207	50.4092	54.6246
4	13/10/20 00:05	13/10/20 23:55	Qa 38.3300	23:47:55	35.199	38.248	0.69	56.2097	50.2625	54.6148
5	13/10/21 00:05	13/10/21 23:55	Qa 38.3300							
6	13/10/22 00:05	13/10/22 23:55	Qa 38.3300	22:13:45	35.229	38.235	0.76	52.7554	46.9865	50.9957
7	13/10/23 00:05	13/10/23 23:55	Qa 38.3300	23:48:31	35.24	38.234	0.78	56.4967	50.3401	54.618
8	13/10/24 00:05	13/10/24 23:55	Qa 38.3300	23:41:29	35.383	38.235	0.73	56.3805	50.2969	54.3505
9	13/10/25 00:05	13/10/25 23:55	Qa 38.3300	23:47:38	35.146	38.24	0.69	56.524	50.1755	54.5926
10	13/10/26 00:05	13/10/26 23:55	Qa 38.3300	23:42:49	35.32	38.227	0.72	56.4296	50.2538	54.3896
11	13/10/27 00:05	13/10/27 23:55	Qa 38.3300	23:46:26	35.372	38.234	0.69	56.6118	50.4558	54.538
12	13/10/28 00:05	13/10/28 23:55	Qa 38.3300	23:46:03	35.305	38.231	0.72	56.5855	50.3467	54.5182
13	13/10/29 00:05	13/10/29 23:55	Qa 38.3300	23:48:19	35.246	38.236	0.72	56.7245	50.3429	54.6136
14	13/10/30 00:05	13/10/30 23:55	Qa 38.3300	23:48:33	34.976	38.24	0.73	56.2969	49.9651	54.6277

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1		
2	24.68	101.4
3	24.11	101.79
4	25.92	102.13
5		
6	24.87	101.89
7	24.57	101.82
8	23.25	101.78
9	25.32	101.79
10	23.98	101.87
11	23.86	101.96
12	23.9	101.79
13	23.36	101.42
14	25.09	101.22

Marsaxlokk – PM_{10} Sampler Report 6

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/10/31 00:05	13/10/31 23:55	Qa 38.3300	23:44:02	35.397	38.244	0.87	57.3514	50.4073	54.4605
2	13/11/01 00:05	13/11/01 23:55	Qa 38.3300	23:48:31	35.575	38.235	0.84	57.3983	50.8189	54.6187
3	13/11/02 00:05	13/11/02 23:55	Qa 38.3300	23:48:35	35.647	38.232	0.89	57.4762	50.9258	54.6187
4	13/11/03 00:05	13/11/03 23:55	Qa 38.3300	23:48:34	35.555	38.225	0.89	57.576	50.7926	54.6059
5	13/11/04 00:05	13/11/04 23:55	Qa 38.3300	23:48:35	35.323	38.236	0.89	57.3535	50.4322	54.6238
6	13/11/05 00:05	13/11/05 23:55	Qa 38.3300	23:48:29	35.269	38.24	0.92	57.1777	50.3822	54.6253
7	13/11/06 15:06	13/11/06 23:55	Qa 38.3300	23:47:26	35.149	38.225	0.93	57.1385	50.5382	54.1611
8	13/11/07 00:05	13/11/07 23:55	Qa 38.3300	23:48:39	35.41	38.239	0.79	57.4625	50.5881	54.6297
9	13/11/08 00:05	13/11/08 23:55	Qa 38.3300	23:48:30	35.56	38.232	0.94	57.3083	50.7987	54.6147
10	13/11/09 00:05	13/11/09 23:55	Qa 38.3300	23:48:34	35.451	38.232	0.93	57.2534	50.6465	54.6184
11	13/11/10 00:05	13/11/10 23:55	Qa 38.3300	23:48:33	35.462	38.237	0.88	57.3158	50.6606	54.6245
12	13/11/11 00:05	13/11/11 23:55	Qa 38.3300	23:48:38	35.599	38.238	0.82	57.1494	50.858	54.6285
13	13/11/12 00:05	13/11/12 23:55	Qa 38.3300	23:48:29	35.706	38.236	0.87	57.387	51.0074	54.6216
14	13/11/13 00:05	13/11/13 23:55	Qa 38.3300	23:48:36	35.78	38.232	0.88	57.625	51.1159	54.6181

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1	23.17	101.77
2	22.29	102
3	21.41	101.91
4	21.91	101.84
5	23.02	101.46
6	19.89	100.29
7	22.46	100.86
8	22.65	101.64
9	22.27	101.96
10	22.8	101.83
11	21.85	101.52
12	18.15	100.63
13	17.52	100.72
14	17.23	100.84

Marsaxlokk – $PM_{2.5}$ Sampler Report 6

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/10/31 00:05	13/10/31 23:55	Qa 38.3300	23:42:24	35.267	38.194	1.35	57.6852	50.1642	54.3266
2	13/11/01 00:05	13/11/01 23:55	Qa 38.3300	23:48:29	35.483	38.195	1.3	58.1916	50.6871	54.561
3	13/11/02 00:05	13/11/02 23:55	Qa 38.3300	23:48:35	35.528	38.191	1.3	58.2816	50.7544	54.5575
4	13/11/03 00:05	13/11/03 23:55	Qa 38.3300	23:48:33	35.448	38.182	1.31	58.468	50.64	54.5449
5	13/11/04 00:05	13/11/04 23:55	Qa 38.3300	23:48:37	35.204	38.194	1.34	58.2338	50.293	54.5633
6	13/11/05 00:05	13/11/05 23:55	Qa 38.3300	23:48:34	35.141	38.196	1.28	57.7434	50.2018	54.5661
7	13/11/06 15:06	13/11/06 23:55	Qa 38.3300	23:47:01	35.007	38.188	1.43	57.8393	49.9554	54.4949
8	13/11/07 00:05	13/11/07 23:55	Qa 38.3300	23:48:40	35.275	38.192	1.36	57.9536	50.3958	54.563
9	13/11/08 00:05	13/11/08 23:55	Qa 38.3300	23:48:36	35.447	38.196	1.31	57.9368	50.6391	54.5668
10	13/11/09 00:05	13/11/09 23:55	Qa 38.3300	23:48:40	35.342	38.194	1.34	57.9233	50.4907	54.5651
11	13/11/10 00:05	13/11/10 23:55	Qa 38.3300	23:48:35	35.343	38.199	1.33	57.9897	50.4918	54.5718
12	13/11/11 00:05	13/11/11 23:55	Qa 38.3300	23:48:36	35.434	38.182	1.38	57.6643	50.6209	54.5465
13	13/11/12 00:05	13/11/12 23:55	Qa 38.3300	23:48:41	35.537	38.182	1.3	57.8675	50.771	54.5508
14	13/11/13 00:05	13/11/13 23:55	Qa 38.3300	23:48:32	35.633	38.189	1.2	58.2086	50.9022	54.5538

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1	23.67	101.7
2	22.6	101.95
3	21.9	101.85
4	22.44	101.83
5	23.41	101.43
6	20.01	100.08
7	22.1	100.43
8	23.27	101.59
9	22.68	101.87
10	23.22	101.76
11	22.23	101.41
12	18.32	100.37
13	17.8	100.48
14	17.47	100.62

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Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/10/31 00:05	13/10/31 23:55	Qa 38.3300							
2	13/11/01 00:05	13/11/01 23:55	Qa 38.3300							
3	13/11/02 00:05	13/11/02 23:55	Qa 38.3300	23:32:21	35.861	38.259	0.41	56.4819	50.0612	54.8679
4	13/11/03 00:05	13/11/03 23:55	Qa 38.3300	23:48:33	35.624	38.245	0.45	57.1805	50.8898	54.635
5	13/11/04 00:05	13/11/04 23:55	Qa 38.3300	23:46:17	35.31	38.245	0.44	57.0271	50.3611	54.5497
6	13/11/05 00:05	13/11/05 23:55	Qa 38.3300	23:48:39	35.204	38.242	0.41	56.8667	50.2945	54.6352
7	13/11/06 15:06	13/11/06 23:55	Qa 38.3300	23:45:32	35.102	38.32	0.45	56.678	50.9245	54.365
8	13/11/07 00:05	13/11/07 23:55	Qa 38.3300	23:48:37	35.401	38.255	0.44	56.7911	50.5753	54.6513
9	13/11/08 00:05	13/11/08 23:55	Qa 38.3300	23:39:04	35.603	38.248	0.43	56.6562	50.5223	54.2761
10	13/11/09 00:05	13/11/09 23:55	Qa 38.3300	23:48:35	35.453	38.246	0.45	57.0744	50.6468	54.6351
11	13/11/10 00:05	13/11/10 23:55	Qa 38.3300	23:48:36	35.385	38.225	0.59	56.9666	50.5511	54.6087
12	13/11/11 00:05	13/11/11 23:55	Qa 38.3300	23:48:36	35.566	38.233	0.56	56.7912	50.8092	54.6191
13	13/11/12 00:05	13/11/12 23:55	Qa 38.3300	23:48:30	35.682	38.228	0.57	56.7938	50.9717	54.609
14	13/11/13 00:05	13/11/13 23:55	Qa 38.3300	23:48:32	35.81	38.229	0.58	56.8003	51.1555	54.6107

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1		
2		
3	18.79	101.54
4	20.26	101.41
5	21.68	101
6	19.43	99.94
7	20.19	100.34
8	21.59	101.21
9	20.8	101.53
10	21.61	101.39
11	21.21	101.11
12	17.54	100.34
13	16.79	100.42
14	16.16	100.56

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Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/10/31 00:05	13/10/31 23:55	Qa 38.3300							
2	13/11/01 00:05	13/11/01 23:55	Qa 38.3300							
3	13/11/02 00:05	13/11/02 23:55	Qa 38.3300	23:48:34	35.448	38.238	0.7	56.612	50.6392	54.6255
4	13/11/03 00:05	13/11/03 23:55	Qa 38.3300	23:46:08	35.204	38.234	0.74	56.39	50.2053	54.5268
5	13/11/04 00:05	13/11/04 23:55	Qa 38.3300	23:48:32	35.115	38.239	0.71	56.1592	50.1629	54.6262
6	13/11/05 00:05	13/11/05 23:55	Qa 38.3300	23:28:16	34.992	38.23	0.74	55.5199	49.2769	53.8378
7	13/11/06 15:06	13/11/06 23:55	Qa 38.3300	23:48:34	35.232	38.231	0.73	56.5956	50.33	54.6152
8	13/11/07 00:05	13/11/07 23:55	Qa 38.3300	23:39:03	35.446	38.234	0.72	56.3284	50.2986	54.255
9	13/11/08 00:05	13/11/08 23:55	Qa 38.3300	23:48:31	35.326	38.228	0.76	56.7089	50.4643	54.6088
10	13/11/09 00:05	13/11/09 23:55	Qa 38.3300	23:48:37	35.32	38.238	0.68	56.606	50.4582	54.6265
11	13/11/10 00:05	13/11/10 23:55	Qa 38.3300	23:48:34	35.45	38.234	0.7	56.3157	50.6435	54.6196
12	13/11/11 00:05	13/11/11 23:55	Qa 38.3300	23:48:34	35.529	38.237	0.69	56.4888	50.7552	54.6214
13	13/11/12 00:05	13/11/12 23:55	Qa 38.3300	23:48:37	35.627	38.229	0.71	56.7139	50.8974	54.6131
14	13/11/13 00:05	13/11/13 23:55	Qa 38.3300	23:48:34	35.448	38.238	0.7	56.612	50.6392	54.6255

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1		
2		
3	20.15	101.55
4	21.98	101.52
5	22.91	101.15
6	20.12	99.93
7	21.82	100.18
8	23.24	101.35
9	22.37	101.66
10	23	101.55
11	22.14	101.21
12	18.29	100.27
13	17.89	100.35
14	17.38	100.47

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Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/11/14 00:05	13/11/14 23:55	Qa 38.3300	23:39:00	35.649	38.237	0.86	57.0365	50.5867	54.2583
2	13/11/15 00:05	13/11/15 23:55	Qa 38.3300	23:48:34	35.716	38.235	0.97	57.1339	51.0233	54.6213
3	13/11/16 00:05	13/11/16 23:55	Qa 38.3300	23:48:39	35.787	38.241	0.87	57.0988	51.1261	54.6329
4	13/11/17 00:05	13/11/17 23:55	Qa 38.3300	23:48:34	35.871	38.228	0.94	57.1506	51.244	54.6106
5	13/11/18 00:05	13/11/18 23:55	Qa 38.3300	23:48:39	35.501	38.227	0.8	56.6984	50.7179	54.6143
6	13/11/19 00:05	13/11/19 23:55	Qa 38.3300	23:48:34	35.342	38.228	0.89	56.7227	50.4883	54.6104
7	13/11/20 00:05	13/11/20 23:55	Qa 38.3300	23:48:34	35.493	38.23	0.79	56.816	50.7061	54.6162
8	13/11/21 00:05	13/11/21 23:55	Qa 38.3300	23:48:35	35.569	38.239	0.86	56.9791	50.8137	54.6274
9	13/11/22 00:05	13/11/22 23:55	Qa 38.3300	23:48:35	35.575	38.229	0.88	56.8862	50.8223	54.6133
10	13/11/23 00:05	13/11/23 23:55	Qa 38.3300	23:48:34	35.658	38.239	0.89	56.9993	50.94	54.625
11	13/11/24 00:05	13/11/24 23:55	Qa 38.3300	23:48:37	35.813	38.215	0.85	56.885	51.1621	54.5944
12	13/11/25 00:05	13/11/25 23:55	Qa 38.3300	23:48:34	36.049	38.233	0.88	57.0301	51.498	54.6179
13	13/11/26 00:05	13/11/26 23:55	Qa 38.3300	23:48:35	36.255	38.235	0.9	56.9295	51.7926	54.6225
14	13/11/27 00:05	13/11/27 23:55	Qa 38.3300	23:48:37	36.593	38.23	0.88	57.1502	52.2773	54.6151

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1	19	101.07
2	18.38	101.05
3	19.18	101.51
4	19.25	101.81
5	20.62	101.23
6	20.74	100.82
7	20.06	101.01
8	18.92	100.81
9	17.81	100.47
10	17.2	100.47
11	15.72	100.45
12	14.36	100.59
13	13.8	100.96
14	13.41	101.78

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Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/11/14 00:05	13/11/14 23:55	Qa 38.3300	23:46:19	35.517	38.189	1.29	57.9564	50.6576	54.4686
2	13/11/15 00:05	13/11/15 23:55	Qa 38.3300	23:48:42	35.533	38.174	1.06	57.6395	50.765	54.5396
3	13/11/16 00:05	13/11/16 23:55	Qa 38.3300	23:48:38	35.601	38.167	1.16	57.6108	50.8627	54.5274
4	13/11/17 00:05	13/11/17 23:55	Qa 38.3300	23:48:35	35.704	38.174	1.18	57.7087	51.006	54.5347
5	13/11/18 00:05	13/11/18 23:55	Qa 38.3300	23:48:38	35.323	38.166	1.07	57.0351	50.4631	54.5267
6	13/11/19 00:05	13/11/19 23:55	Qa 38.3300	23:48:35	35.17	38.163	1.12	57.0021	50.2442	54.5192
7	13/11/20 00:05	13/11/20 23:55	Qa 38.3300	23:48:34	35.336	38.179	1.15	57.1514	50.479	54.5406
8	13/11/21 00:05	13/11/21 23:55	Qa 38.3300	23:48:35	35.408	38.192	1.26	57.4097	50.5833	54.5601
9	13/11/22 00:05	13/11/22 23:55	Qa 38.3300	23:48:24	35.411	38.195	1.44	57.3038	50.5802	54.5573
10	13/11/23 00:05	13/11/23 23:55	Qa 38.3300	23:48:33	35.502	38.211	1.44	57.4222	50.7162	54.5857
11	13/11/24 00:05	13/11/24 23:55	Qa 38.3300	23:48:32	35.642	38.197	1.44	57.3082	50.9149	54.5658
12	13/11/25 00:05	13/11/25 23:55	Qa 38.3300	23:48:33	35.872	38.209	1.45	57.532	51.2441	54.5827
13	13/11/26 00:05	13/11/26 23:55	Qa 38.3300	23:48:35	36.042	38.198	1.62	57.3646	51.4892	54.5692
14	13/11/27 00:05	13/11/27 23:55	Qa 38.3300	23:48:39	36.407	38.214	1.45	57.7262	52.0123	54.5946

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1	19.2	100.89
2	18.73	100.81
3	19.52	101.3
4	19.63	101.61
5	20.96	101
6	21.09	100.62
7	20.36	100.8
8	19.22	100.58
9	18.06	100.18
10	17.43	100.18
11	15.96	100.1
12	14.45	100.19
13	14.01	100.54
14	13.63	101.38

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Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/11/14 00:05	13/11/14 23:55	Qa 38.3300	23:41:11	35.74	38.232	0.54	56.5237	50.7933	54.3347
2	13/11/15 00:05	13/11/15 23:55	Qa 38.3300	23:48:35	35.716	38.237	0.52	56.9015	51.023	54.6237
3	13/11/16 00:05	13/11/16 23:55	Qa 38.3300	23:48:34	35.745	38.249	0.43	56.9271	51.0631	54.6404
4	13/11/17 00:05	13/11/17 23:55	Qa 38.3300	23:48:37	35.909	38.245	0.47	56.6445	51.3012	54.6392
5	13/11/18 00:05	13/11/18 23:55	Qa 38.3300	23:48:36	35.41	38.23	0.41	56.1717	50.5872	54.6152
6	13/11/19 00:05	13/11/19 23:55	Qa 38.3300	23:48:32	35.286	38.25	0.45	57.0277	50.4063	54.6408
7	13/11/20 00:05	13/11/20 23:55	Qa 38.3300	23:48:39	35.429	38.246	0.5	57.195	50.6152	54.6407
8	13/11/21 00:05	13/11/21 23:55	Qa 38.3300	23:48:42	35.472	38.249	0.44	57.3245	50.6786	54.6458
9	13/11/22 00:05	13/11/22 23:55	Qa 38.3300	23:48:40	35.538	38.245	0.47	57.1458	50.771	54.6407
10	13/11/23 00:05	13/11/23 23:55	Qa 38.3300	23:48:38	35.627	38.249	0.49	57.3579	50.8975	54.641
11	13/11/24 00:05	13/11/24 23:55	Qa 38.3300	23:48:29	35.785	38.25	0.47	57.2727	51.1176	54.639
12	13/11/25 00:05	13/11/25 23:55	Qa 38.3300	23:48:34	36.058	38.249	0.48	57.4293	51.5113	54.6411
13	13/11/26 00:05	13/11/26 23:55	Qa 38.3300	23:48:36	36.269	38.249	0.49	57.2295	51.8134	54.6416
14	13/11/27 00:05	13/11/27 23:55	Qa 38.3300	23:48:37	36.622	38.244	0.44	57.4911	52.3186	54.6353

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1	17.27	17.27
2	17.5	17.5
3	18.6	18.6
4	18.13	18.13
5	20.54	20.54
6	20.33	20.33
7	19.7	19.7
8	18.78	18.78
9	17.38	17.38
10	16.66	16.66
11	15.43	15.43
12	13.75	13.75
13	13.16	13.16
14	12.67	12.67

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Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/11/14 00:05	13/11/14 23:55	Qa 38.33	23:46:19	35.514	38.238	0.69	56.6426	50.6537	54.5396
2	13/11/15 00:05	13/11/15 23:55	Qa 38.3300	23:48:30	35.515	38.238	0.67	56.7601	50.7326	54.6226
3	13/11/16 00:05	13/11/16 23:55	Qa 38.3300	23:48:39	35.582	38.231	0.7	56.7611	50.8355	54.6207
4	13/11/17 00:05	13/11/17 23:55	Qa 38.3300	23:48:32	35.621	38.236	0.73	56.578	50.8856	54.6206
5	13/11/18 00:05	13/11/18 23:55	Qa 38.3300	23:48:37	35.258	38.239	0.73	56.0401	50.3702	54.6282
6	13/11/19 00:05	13/11/19 23:55	Qa 38.3300	23:48:34	35.189	38.238	0.67	56.0129	50.2699	54.6249
7	13/11/20 00:05	13/11/20 23:55	Qa 38.3300	23:48:28	35.336	38.236	0.71	56.1353	50.4767	54.6195
8	13/11/21 00:05	13/11/21 23:55	Qa 38.3300	23:48:36	35.38	38.232	0.72	56.356	50.5433	54.6177
9	13/11/22 00:05	13/11/22 23:55	Qa 38.3300	23:48:38	35.394	38.231	0.73	56.3071	50.5648	54.6182
10	13/11/23 00:05	13/11/23 23:55	Qa 38.3300	23:48:36	35.499	38.235	0.7	56.3458	50.7137	54.6228
11	13/11/24 00:05	13/11/24 23:55	Qa 38.3300	23:48:29	35.641	38.239	0.66	56.2837	50.914	54.6244
12	13/11/25 00:05	13/11/25 23:55	Qa 38.3300	23:48:32	35.88	38.23	0.73	56.5567	51.2561	54.6129
13	13/11/26 00:05	13/11/26 23:55	Qa 38.3300	23:48:35	36.079	38.236	0.65	56.4372	51.5419	54.6232
14	13/11/27 00:05	13/11/27 23:55	Qa 38.3300	23:48:32	36.395	38.23	0.71	56.841	51.9921	54.6134

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1	19.11	100.72
2	19.1	100.72
3	19.83	101.18
4	20.38	101.47
5	21.7	100.88
6	21.07	100.47
7	20.39	100.66
8	19.44	100.47
9	18.27	100.11
10	17.41	100.1
11	16.16	100.06
12	14.57	100.2
13	14	100.54
14	13.84	101.38

Marsaxlokk – PM_{10} Sampler Report 8

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/11/28 00:05	13/11/28 23:55	Qa 38.3300							
2	13/11/29 00:05	13/11/29 23:55	Qa 38.3300							
3	13/11/30 00:05	13/11/30 23:55	Qa 38.3300							
4	13/12/01 00:05	13/12/01 23:55	Qa 38.3300							
5	13/12/02 00:05	13/12/02 23:55	Qa 38.3300							
6	13/12/03 00:05	13/12/03 23:55	Qa 38.3300							
7	13/12/04 00:05	13/12/04 23:55	Qa 38.3300							
8	13/12/05 00:05	13/12/05 23:55	Qa 38.3300							
9	13/12/06 00:05	13/12/06 23:55	Qa 38.3300							
10	13/12/07 00:05	13/12/07 23:55	Qa 38.3300							
11	13/12/08 00:05	13/12/08 23:55	Qa 38.3300							
12	13/12/09 00:05	13/12/09 23:55	Qa 38.3300							
13	13/12/10 00:05	13/12/10 23:55	Qa 38.3300							
14	13/12/11 00:05	13/12/11 23:55	Qa 38.3300							

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1		
2		
3		
4		
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11		
12		
13		
14		

Marsaxlokk – $PM_{2.5}$ Sampler Report 8

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/11/28 00:05	13/11/28 23:55	Qa 38.3300							
2	13/11/29 00:05	13/11/29 23:55	Qa 38.3300							
3	13/11/30 00:05	13/11/30 23:55	Qa 38.3300							
4	13/12/01 00:05	13/12/01 23:55	Qa 38.3300							
5	13/12/02 00:05	13/12/02 23:55	Qa 38.3300							
6	13/12/03 00:05	13/12/03 23:55	Qa 38.3300							
7	13/12/04 00:05	13/12/04 23:55	Qa 38.3300							
8	13/12/05 00:05	13/12/05 23:55	Qa 38.3300							
9	13/12/06 00:05	13/12/06 23:55	Qa 38.3300							
10	13/12/07 00:05	13/12/07 23:55	Qa 38.3300							
11	13/12/08 00:05	13/12/08 23:55	Qa 38.3300							
12	13/12/09 00:05	13/12/09 23:55	Qa 38.3300							
13	13/12/10 00:05	13/12/10 23:55	Qa 38.3300							
14	13/12/11 00:05	13/12/11 23:55	Qa 38.3300							

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1		
2		
3		
4		
5		
6		
7		
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9		
10		
11		
12		
13		
14		

Birżebbuġa – PM_{10} Sampler Report 8

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/11/28 00:05	13/11/28 23:55	Qa 38.3300							
2	13/11/29 00:05	13/11/29 23:55	Qa 38.3300							
3	13/11/30 00:05	13/11/30 23:55	Qa 38.3300							
4	13/12/01 00:05	13/12/01 23:55	Qa 38.3300							
5	13/12/02 00:05	13/12/02 23:55	Qa 38.3300							
6	13/12/03 00:05	13/12/03 23:55	Qa 38.3300							
7	13/12/04 00:05	13/12/04 23:55	Qa 38.3300							
8	13/12/05 00:05	13/12/05 23:55	Qa 38.3300							
9	13/12/06 00:05	13/12/06 23:55	Qa 38.3300							
10	13/12/07 00:05	13/12/07 23:55	Qa 38.3300							
11	13/12/08 00:05	13/12/08 23:55	Qa 38.3300							
12	13/12/09 00:05	13/12/09 23:55	Qa 38.3300							
13	13/12/10 00:05	13/12/10 23:55	Qa 38.3300							
14	13/12/11 00:05	13/12/11 23:55	Qa 38.3300							

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1		
2		
3		
4		
5		
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9		
10		
11		
12		
13		
14		

Birżebbuġa – $PM_{2.5}$ Sampler Report 8

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/11/28 00:05	13/11/28 23:55	Qa 38.3300							
2	13/11/29 00:05	13/11/29 23:55	Qa 38.3300							
3	13/11/30 00:05	13/11/30 23:55	Qa 38.3300							
4	13/12/01 00:05	13/12/01 23:55	Qa 38.3300							
5	13/12/02 00:05	13/12/02 23:55	Qa 38.3300							
6	13/12/03 00:05	13/12/03 23:55	Qa 38.3300							
7	13/12/04 00:05	13/12/04 23:55	Qa 38.3300							
8	13/12/05 00:05	13/12/05 23:55	Qa 38.3300							
9	13/12/06 00:05	13/12/06 23:55	Qa 38.3300							
10	13/12/07 00:05	13/12/07 23:55	Qa 38.3300							
11	13/12/08 00:05	13/12/08 23:55	Qa 38.3300							
12	13/12/09 00:05	13/12/09 23:55	Qa 38.3300							
13	13/12/10 00:05	13/12/10 23:55	Qa 38.3300							
14	13/12/11 00:05	13/12/11 23:55	Qa 38.3300							

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		

Marsaxlokk – PM_{10} Sampler Report 9

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/12/12 00:05	13/12/12 23:55	Qa 38.3300							
2	13/12/13 00:05	13/12/13 23:55	Qa 38.3300	23:48:40	36.573	38.223	0.83	57.1468	52.2511	54.6081
3	13/12/14 00:05	13/12/14 23:55	Qa 38.3300	23:48:32	36.651	38.228	0.82	57.1676	52.3583	54.6114
4	13/12/15 00:05	13/12/15 23:55	Qa 38.3300	23:48:33	36.765	38.232	0.83	57.1861	52.5205	54.6164
5	13/12/16 00:05	13/12/16 23:55	Qa 38.3300	23:45:38	36.76	38.23	0.81	57.1336	52.4072	54.5027
6	13/12/17 00:05	13/12/17 23:55	Qa 38.3300	23:48:33	36.73	38.233	0.85	57.2882	52.47	54.6174
7	13/12/18 00:05	13/12/18 23:55	Qa 38.3300	23:48:34	36.647	38.23	0.93	57.3173	52.3518	54.614
8	13/12/19 00:05	13/12/19 23:55	Qa 38.3300	23:48:31	36.649	38.23	0.82	57.1968	52.3539	54.6124
9	13/12/20 00:05	13/12/20 23:55	Qa 38.3300	23:48:35	36.465	38.235	0.81	57.0806	52.0932	54.6218
10	13/12/21 00:05	13/12/21 23:55	Qa 38.3300	23:48:27	36.569	38.24	0.87	57.1113	52.2372	54.6237
11	13/12/22 00:05	13/12/22 23:55	Qa 38.3300	23:48:35	36.587	38.244	0.83	57.1664	52.2672	54.6339

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1		
2	15.28	102.87
3	14.92	102.98
4	14.83	102.94
5	14.95	102.92
6	14.88	102.63
7	14.41	102.49
8	16.04	102.67
9	16.69	103.01
10	16.55	103.04
11	15.15	102.54

Marsaxlokk – $PM_{2.5}$ Sampler Report 9

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/12/12 00:05	13/12/12 23:55	Qa 38.3300							
2	13/12/13 00:05	13/12/13 23:55	Qa 38.3300	23:48:35	36.382	38.211	1.61	57.6559	51.977	54.5873
3	13/12/14 00:05	13/12/14 23:55	Qa 38.3300	23:48:38	36.457	38.211	1.59	57.6752	52.0842	54.5911
4	13/12/15 00:05	13/12/15 23:55	Qa 38.3300	23:48:39	36.57	38.206	1.73	57.7184	52.2458	54.5826
5	13/12/16 00:05	13/12/16 23:55	Qa 38.3300	23:27:13	36.605	38.221	1.57	56.9608	51.5111	53.7845
6	13/12/17 00:05	13/12/17 23:55	Qa 38.3300	23:48:27	36.562	38.211	1.64	57.9582	52.2266	54.5823
7	13/12/18 00:05	13/12/18 23:55	Qa 38.3300	23:48:34	36.488	38.21	1.62	57.9934	52.1257	54.5855
8	13/12/19 00:05	13/12/19 23:55	Qa 38.3300	23:48:29	36.466	38.213	1.69	58.0355	52.0903	54.5863
9	13/12/20 00:05	13/12/20 23:55	Qa 38.3300	23:48:36	36.294	38.22	1.59	57.6173	51.8487	54.6003
10	13/12/21 00:05	13/12/21 23:55	Qa 38.3300	23:48:36	36.398	38.214	1.57	57.6848	52.0003	54.594
11	13/12/22 00:05	13/12/22 23:55	Qa 38.3300	23:48:31	36.415	38.215	1.61	57.5897	52.0199	54.591

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1		
2	15.57	102.45
3	15.73	102.72
4	15.27	102.8
5	15.05	102.79
6	15.29	102.86
7	15.16	102.55
8	14.88	102.45
9	16.41	102.37
10	17.06	102.86
11	16.85	102.86

Birżebbuġa – PM_{10} Sampler Report 9

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/12/12 00:05	13/12/12 23:55	Qa 38.3300							
2	13/12/13 00:05	13/12/13 23:55	Qa 38.3300	23:48:37	36.711	38.244	0.44	56.9429	52.4469	54.6358
3	13/12/14 00:05	13/12/14 23:55	Qa 38.3300	23:48:33	36.808	38.246	0.47	56.9402	52.5817	54.6364
4	13/12/15 00:05	13/12/15 23:55	Qa 38.3300	23:48:35	36.886	38.258	0.47	57.0101	52.6944	54.6544
5	13/12/16 00:05	13/12/16 23:55	Qa 38.3300	23:37:43	36.851	38.25	0.48	56.604	52.2445	54.2278
6	13/12/17 00:05	13/12/17 23:55	Qa 38.3300	23:48:29	36.8	38.249	0.48	57.2471	52.5684	54.6378
7	13/12/18 00:05	13/12/18 23:55	Qa 38.3300	23:48:31	36.671	38.247	0.53	57.264	52.3843	54.6363
8	13/12/19 00:05	13/12/19 23:55	Qa 38.3300	23:48:40	36.793	38.253	0.48	57.6755	52.5648	54.6502
9	13/12/20 00:05	13/12/20 23:55	Qa 38.3300	23:48:29	36.438	38.248	0.48	56.8347	52.05	54.6364
10	13/12/21 00:05	13/12/21 23:55	Qa 38.3300	23:48:35	36.524	38.245	0.45	56.7596	52.1784	54.6366
11	13/12/22 00:05	13/12/22 23:55	Qa 38.3300	23:48:28	36.569	38.236	0.47	56.5321	52.2367	54.6184

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1		
2	13.63	102.38
3	13.57	102.73
4	13.61	102.76
5	13.71	102.71
6	13.93	102.66
7	14.2	102.46
8	12.81	102.22
9	15.65	102.49
10	16.38	102.81
11	15.96	102.81

Birżebbuġa – $PM_{2.5}$ Sampler Report 9

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/12/12 00:05	13/12/12 23:55	Qa 38.3300							
2	13/12/13 00:05	13/12/13 23:55	Qa 38.3300	23:48:35	36.454	38.232	0.7	56.6413	52.0769	54.6161
3	13/12/14 00:05	13/12/14 23:55	Qa 38.3300	23:48:31	36.545	38.242	0.66	56.7421	52.205	54.6263
4	13/12/15 00:05	13/12/15 23:55	Qa 38.3300	23:48:33	36.632	38.227	0.71	56.7765	52.3303	54.6087
5	13/12/16 00:05	13/12/16 23:55	Qa 38.3300	23:41:12	36.61	38.236	0.72	56.3274	52.0308	54.3409
6	13/12/17 00:05	13/12/17 23:55	Qa 38.3300	23:48:36	36.568	38.234	0.73	56.7359	52.24	54.6213
7	13/12/18 00:05	13/12/18 23:55	Qa 38.3300	23:48:39	36.447	38.23	0.73	56.6896	52.0698	54.6149
8	13/12/19 00:05	13/12/19 23:55	Qa 38.3300	23:48:35	36.53	38.251	0.66	57.2604	52.1854	54.6438
9	13/12/20 00:05	13/12/20 23:55	Qa 38.3300	23:48:37	36.259	38.229	0.7	56.7965	51.7998	54.6146
10	13/12/21 00:05	13/12/21 23:55	Qa 38.3300	23:48:37	36.361	38.23	0.69	56.7634	51.9457	54.6166
11	13/12/22 00:05	13/12/22 23:55	Qa 38.3300	23:48:33	36.408	38.235	0.65	56.86	52.0105	54.6206

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1		
2	14.97	102.19
3	15.05	102.45
4	14.83	102.66
5	14.87	102.48
6	15.14	102.55
7	15.37	102.26
8	14.46	102.19
9	16.56	102.28
10	17.23	102.65
11	16.89	102.73

Marsaxlokk – PM_{10} Sampler Report 10

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/12/23 00:05	13/12/23 23:55	Qa 38.3300	23:39:23	36.426	38.233	0.9	56.83	51.7038	54.2683
2	13/12/24 00:05	13/12/24 23:55	Qa 38.3300	23:48:35	36.301	38.235	0.84	57.2651	51.8584	54.6196
3	13/12/25 00:05	13/12/25 23:55	Qa 38.3300	23:48:36	36.186	38.244	0.79	57.248	51.6957	54.6347
4	13/12/26 00:05	13/12/26 23:55	Qa 38.3300	23:48:34	36.03	38.236	0.88	57.0051	51.4706	54.6208
5	13/12/27 00:05	13/12/27 23:55	Qa 38.3300	23:48:31	36.374	38.231	0.82	57.137	51.9611	54.6133
6	13/12/28 00:05	13/12/28 23:55	Qa 38.3300	23:48:33	36.417	38.22	0.84	57.3512	52.0248	54.6004
7	13/12/29 00:05	13/12/29 23:55	Qa 38.3300	23:48:34	36.411	38.228	0.88	57.3001	52.0159	54.6104
8	13/12/30 00:05	13/12/30 23:55	Qa 38.3300	23:48:36	36.368	38.234	0.8	57.333	51.9556	54.6206
9	13/12/31 00:05	13/12/31 23:55	Qa 38.3300	23:34:27	36.589	38.232	0.78	56.6996	51.7528	54.0767
10	14/01/01 00:05	14/01/01 23:55	Qa 38.3300	23:48:34	36.412	38.229	0.81	57.2841	52.0185	54.6124
11	14/01/02 00:05	14/01/02 23:55	Qa 38.3300	23:48:37	36.571	38.229	0.79	57.3836	52.2455	54.6138
12	14/01/03 00:05	14/01/03 23:55	Qa 38.3300	23:48:27	36.428	38.232	0.8	57.3475	52.0351	54.6119
13	14/01/04 00:05	14/01/04 23:55	Qa 38.3300	23:48:35	36.412	38.226	0.79	57.288	52.0184	54.6099
14	14/01/05 00:05	14/01/05 23:55	Qa 38.3300	23:48:34	36.271	38.231	0.79	57.2073	51.8178	54.617
15	14/01/06 00:05	14/01/06 23:55	Qa 38.3300	23:48:31	36.554	38.228	0.82	57.3388	52.2177	54.61

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1	15.88	102.6
2	15.72	101.9
3	16.51	101.92
4	14.9	101.38
5	12	101.17
6	13.79	101.71
7	14.91	102.01
8	15.27	101.92
9	13.01	101.78
10	14.68	101.95
11	14	102.08
12	15.66	102.29
13	16.11	102.51
14	15.62	102.02
15	12.78	101.8

Marsaxlokk – $PM_{2.5}$ Sampler Report 10

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/12/23 00:05	13/12/23 23:55	Qa 38.3300	23:46:40	36.245	38.2	1.74	57.5014	51.7089	54.4985
2	13/12/24 00:05	13/12/24 23:55	Qa 38.3300	23:48:39	36.119	38.197	1.74	57.5826	51.6022	54.5703
3	13/12/25 00:05	13/12/25 23:55	Qa 38.3300	23:48:36	36.015	38.214	1.68	57.8537	51.4505	54.5918
4	13/12/26 00:05	13/12/26 23:55	Qa 38.3300	23:48:33	35.832	38.192	1.73	57.3537	51.187	54.5592
5	13/12/27 00:05	13/12/27 23:55	Qa 38.3300	23:48:28	36.177	38.214	1.64	57.6035	51.6777	54.5874
6	13/12/28 00:05	13/12/28 23:55	Qa 38.3300	23:48:29	36.249	38.216	1.62	58.0285	51.7817	54.5905
7	13/12/29 00:05	13/12/29 23:55	Qa 38.3300	23:48:26	36.24	38.212	1.62	58.0814	51.7661	54.5822
8	13/12/30 00:05	13/12/30 23:55	Qa 38.3300	23:48:35	36.205	38.213	1.56	58.0186	51.7219	54.5902
9	13/12/31 00:05	13/12/31 23:55	Qa 38.3300	23:34:26	36.389	38.213	1.57	57.1422	51.4694	54.0488
10	14/01/01 00:05	14/01/01 23:55	Qa 38.3300	23:48:36	36.238	38.205	1.62	57.7938	51.7694	54.5786
11	14/01/02 00:05	14/01/02 23:55	Qa 38.3300	23:48:35	36.386	38.199	1.52	58.1508	51.9806	54.57
12	14/01/03 00:05	14/01/03 23:55	Qa 38.3300	23:48:35	36.258	38.198	1.6	58.0417	51.7976	54.5687
13	14/01/04 00:05	14/01/04 23:55	Qa 38.3300	23:48:36	36.26	38.211	1.43	57.951	51.8029	54.5893
14	14/01/05 00:05	14/01/05 23:55	Qa 38.3300	23:48:27	36.102	38.209	1.63	57.5998	51.5701	54.5796
15	14/01/06 00:05	14/01/06 23:55	Qa 38.3300	23:48:35	36.359	38.209	1.63	57.731	51.9416	54.5849

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1	16.14	102.19
2	15.98	101.68
3	16.89	101.85
4	15.02	100.99
5	12.09	100.73
6	14.09	101.45
7	15.27	101.93
8	15.53	101.69
9	13.22	101.54
10	14.92	101.72
11	14.27	102
12	15.96	102.25
13	16.38	102.5
14	15.81	101.64
15	12.95	101.36

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Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/12/23 00:05	13/12/23 23:55	Qa 38.3300	23:45:54	36.396	38.244	0.49	56.3989	51.8913	54.5325
2	13/12/24 00:05	13/12/24 23:55	Qa 38.3300	23:48:38	36.283	38.245	0.47	56.6073	51.8353	54.6388
3	13/12/25 00:05	13/12/25 23:55	Qa 38.3300	23:48:30	36.243	38.246	0.49	57.2409	51.773	54.6342
4	13/12/26 00:05	13/12/26 23:55	Qa 38.3300	23:48:32	36.003	38.244	0.48	56.8262	51.4304	54.6328
5	13/12/27 00:05	13/12/27 23:55	Qa 38.3300	23:48:29	36.439	38.249	0.49	57.0352	52.0527	54.6384
6	13/12/28 00:05	13/12/28 23:55	Qa 38.3300	23:48:35	36.539	38.265	0.45	57.2536	52.1989	54.6643
7	13/12/29 00:05	13/12/29 23:55	Qa 38.3300	23:48:31	36.565	38.253	0.45	57.2298	52.2336	54.6441
8	13/12/30 00:05	13/12/30 23:55	Qa 38.3300	23:48:30	36.408	38.253	0.51	57.3384	52.0085	54.6439
9	13/12/31 00:05	13/12/31 23:55	Qa 38.3300	23:48:24	36.613	38.25	0.51	57.1354	52.2971	54.6365
10	14/01/01 00:05	14/01/01 23:55	Qa 38.3300	23:48:30	36.454	38.25	0.45	57.0486	52.074	54.6404
11	14/01/02 00:05	14/01/02 23:55	Qa 38.3300	23:48:32	36.688	38.242	0.48	57.2629	52.4111	54.6316
12	14/01/03 00:05	14/01/03 23:55	Qa 38.3300	23:48:33	36.592	38.247	0.43	57.3066	52.2737	54.6382
13	14/01/04 00:05	14/01/04 23:55	Qa 38.3300							
14	14/01/05 00:05	14/01/05 23:55	Qa 38.3300							
15	14/01/06 00:05	14/01/06 23:55	Qa 38.3300							

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1	15.53	102.45
2	15.24	101.71
3	15.25	101.65
4	14.53	101.15
5	11.12	101.03
6	12.49	101.57
7	13.21	101.72
8	14.42	101.72
9	12.4	101.64
10	13.87	101.81
11	12.54	101.83
12	13.72	102.06
13	15.53	102.45
14	15.24	101.71
15	15.25	101.65

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Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	13/12/23 00:05	13/12/23 23:55	Qa 38.3300	23:41:35	36.227	38.234	0.73	56.097	51.4989	54.3517
2	13/12/24 00:05	13/12/24 23:55	Qa 38.3300	23:48:37	36.115	38.238	0.68	56.092	51.595	54.6278
3	13/12/25 00:05	13/12/25 23:55	Qa 38.3300	23:48:34	36.094	38.234	0.74	57.0884	51.5632	54.6203
4	13/12/26 00:05	13/12/26 23:55	Qa 38.3300	23:48:33	35.862	38.232	0.71	56.6203	51.2303	54.6166
5	13/12/27 00:05	13/12/27 23:55	Qa 38.3300	23:48:30	36.256	38.232	0.69	56.8076	51.792	54.6151
6	13/12/28 00:05	13/12/28 23:55	Qa 38.3300	23:48:38	36.325	38.244	0.68	57.04	51.8954	54.6348
7	13/12/29 00:05	13/12/29 23:55	Qa 38.3300	23:48:34	36.328	38.238	0.72	57.0403	51.897	54.6251
8	13/12/30 00:05	13/12/30 23:55	Qa 38.3300	23:48:32	36.249	38.249	0.66	57.15	51.7822	54.6392
9	13/12/31 00:05	13/12/31 23:55	Qa 38.3300	23:48:32	36.441	38.235	0.69	56.8946	52.0581	54.6218
10	14/01/01 00:05	14/01/01 23:55	Qa 38.3300	23:48:33	36.296	38.239	0.67	56.8433	51.8512	54.627
11	14/01/02 00:05	14/01/02 23:55	Qa 38.3300	23:48:37	36.484	38.248	0.68	57.1909	52.121	54.6415
12	14/01/03 00:05	14/01/03 23:55	Qa 38.3300	23:48:33	36.39	38.244	0.64	57.1539	51.9845	54.6336
13	14/01/04 00:05	14/01/04 23:55	Qa 38.3300							
14	14/01/05 00:05	14/01/05 23:55	Qa 38.3300							
15	14/01/06 00:05	14/01/06 23:55	Qa 38.3300							

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1	14.99	16.31
2	13.68	16.04
3	12.01	16.15
4	9.35	15.08
5	7.39	11.69
6	8.1	13.58
7	9.31	14.57
8	12.09	15.31
9	10.56	13.04
10	10.92	14.55
11	9.82	13.73
12	10.6	14.98
13		
14		
15		

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Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	14/01/07 00:05	14/01/07 23:55	Qa 38.3300	23:47:16	36.505	38.227	0.79	57.4117	52.1018	54.5605
2	14/01/08 00:05	14/01/08 23:55	Qa 38.3300	23:48:40	36.664	38.231	0.89	57.3583	52.3807	54.6169
3	14/01/09 00:05	14/01/09 23:55	Qa 38.3300	23:03:05	36.695	38.227	0.83	53.0461	48.5499	50.577
4	14/01/10 00:05	14/01/10 23:55	Qa 38.3300	23:48:34	36.397	38.228	0.84	57.2399	51.9952	54.6112
5	14/01/11 00:05	14/01/11 23:55	Qa 38.3300	23:48:30	36.263	38.23	0.78	57.2535	51.8026	54.6114
6	14/01/12 00:05	14/01/12 23:55	Qa 38.3300	23:48:39	36.198	38.233	0.76	57.3014	51.714	54.6207
7	14/01/13 00:05	14/01/13 23:55	Qa 38.3300	23:48:31	36.296	38.238	0.76	57.4058	51.8498	54.6243
8	14/01/14 00:05	14/01/14 23:55	Qa 38.3300	23:48:36	36.203	38.23	0.79	57.3378	51.72	54.6157
9	14/01/15 00:05	14/01/15 23:55	Qa 38.3300	23:48:34	36.279	38.225	0.85	57.4046	51.8272	54.6071
10	14/01/16 00:05	14/01/16 23:55	Qa 38.3300	23:48:28	36.535	38.231	0.75	57.488	52.1882	54.6116
11	14/01/17 00:05	14/01/17 23:55	Qa 38.3300	23:48:36	36.379	38.218	0.79	57.1353	51.9701	54.5977
12	14/01/18 00:05	14/01/18 23:55	Qa 38.3300	23:48:31	35.889	38.22	0.76	56.9249	51.2669	54.5976
13	14/01/19 00:05	14/01/19 23:55	Qa 38.3300	23:24:33	35.636	38.223	0.76	56.0565	50.0523	53.6863
14	14/01/20 00:05	14/01/20 23:55	Qa 38.3300	23:48:38	35.835	38.223	0.76	57.094	51.196	54.6065
15	14/01/21 00:05	14/01/21 23:55	Qa 38.3300	23:48:39	36.321	38.221	0.8	57.2393	51.8891	54.6039

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1	15.16	102.38
2	14.68	102.67
3	14	102.5
4	15.85	102.26
5	16.84	102.28
6	16.76	102.02
7	15.31	101.71
8	15.22	101.52
9	14.01	101.34
10	13.57	101.91
11	15.21	102.1
12	17.5	101.68
13	18.11	100.96
14	16.8	101.14
15	14.19	101.62

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Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	14/01/07 00:05	14/01/07 23:55	Qa 38.3300	23:40:50	36.335	38.209	1.63	57.5136	51.6252	54.2861
2	14/01/08 00:05	14/01/08 23:55	Qa 38.3300	23:48:35	36.465	38.21	1.51	57.9939	52.0938	54.5871
3	14/01/09 00:05	14/01/09 23:55	Qa 38.3300	23:03:01	36.477	38.212	1.62	53.6308	48.2598	50.5546
4	14/01/10 00:05	14/01/10 23:55	Qa 38.3300	23:48:30	36.226	38.211	1.55	57.8325	51.7489	54.5847
5	14/01/11 00:05	14/01/11 23:55	Qa 38.3300	23:48:34	36.058	38.186	1.22	57.7781	51.5121	54.5489
6	14/01/12 00:05	14/01/12 23:55	Qa 38.3300	23:48:39	35.977	38.171	1.18	57.912	51.3981	54.5338
7	14/01/13 00:05	14/01/13 23:55	Qa 38.3300	23:48:36	36.091	38.182	1.19	57.9128	51.5595	54.5457
8	14/01/14 00:05	14/01/14 23:55	Qa 38.3300	23:48:34	35.993	38.184	1.2	57.9285	51.4193	54.5484
9	14/01/15 00:05	14/01/15 23:55	Qa 38.3300	23:48:35	36.07	38.182	1.28	57.9806	51.5281	54.5458
10	14/01/16 00:05	14/01/16 23:55	Qa 38.3300	23:48:35	36.297	38.182	1.28	58.0456	51.8554	54.5463
11	14/01/17 00:05	14/01/17 23:55	Qa 38.3300	23:48:39	36.151	38.175	1.3	57.5985	51.647	54.5385
12	14/01/18 00:05	14/01/18 23:55	Qa 38.3300	23:48:40	35.697	38.172	1.32	57.2704	50.9995	54.5346
13	14/01/19 00:05	14/01/19 23:55	Qa 38.3300	23:24:34	35.455	38.178	1.21	56.4546	49.7977	53.6231
14	14/01/20 00:05	14/01/20 23:55	Qa 38.3300	23:48:30	35.66	38.178	1.18	57.412	50.9415	54.5372
15	14/01/21 00:05	14/01/21 23:55	Qa 38.3300	23:48:37	36.135	38.199	1.34	57.6244	51.6221	54.572

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1	15.48	102.21
2	15.26	102.6
3	14.61	102.51
4	16.26	102.21
5	17.4	102.23
6	17.42	101.88
7	15.69	101.5
8	15.72	101.39
9	14.44	101.09
10	14.13	101.81
11	15.76	101.97
12	17.88	101.31
13	18.5	100.68
14	17.1	100.85
15	14.51	101.27

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Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	14/01/07 00:05	14/01/07 23:55	Qa 38.3300							
2	14/01/08 00:05	14/01/08 23:55	Qa 38.3300	23:48:38	36.78	38.246	0.46	57.1288	52.5454	54.6372
3	14/01/09 00:05	14/01/09 23:55	Qa 38.3300	23:06:59	36.838	38.242	0.44	53.0906	48.8835	50.7464
4	14/01/10 00:05	14/01/10 23:55	Qa 38.3300	23:48:32	36.39	38.245	0.48	57.2625	51.9847	54.6349
5	14/01/11 00:05	14/01/11 23:55	Qa 38.3300	23:48:37	36.212	38.243	0.47	57.0182	51.7324	54.6343
6	14/01/12 00:05	14/01/12 23:55	Qa 38.3300	23:48:33	36.182	38.247	0.5	57.0505	51.6874	54.6373
7	14/01/13 00:05	14/01/13 23:55	Qa 38.3300	23:48:37	36.286	38.242	0.49	57.0157	51.8391	54.6319
8	14/01/14 00:05	14/01/14 23:55	Qa 38.3300	23:48:36	36.239	38.247	0.47	57.2871	51.7713	54.6392
9	14/01/15 00:05	14/01/15 23:55	Qa 38.3300	23:48:34	36.28	38.245	0.48	57.144	51.8286	54.6354
10	14/01/16 00:05	14/01/16 23:55	Qa 38.3300	23:48:34	36.54	38.248	0.46	57.122	52.1992	54.6374
11	14/01/17 00:05	14/01/17 23:55	Qa 38.3300	23:48:37	36.308	38.244	0.46	56.8404	51.8693	54.6354
12	14/01/18 00:05	14/01/18 23:55	Qa 38.3300	23:48:32	35.852	38.243	0.46	56.5279	51.2147	54.6311
13	14/01/19 00:05	14/01/19 23:55	Qa 38.3300	23:48:31	35.588	38.246	0.48	56.9393	50.8377	54.6351
14	14/01/20 00:05	14/01/20 23:55	Qa 38.3300	23:48:41	35.793	38.245	0.45	57.0251	51.1371	54.6405
15	14/01/21 00:05	14/01/21 23:55	Qa 38.3300	23:48:39	36.298	38.245	0.48	57.0988	51.8575	54.639

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1	13.24	102.41
2	12.38	102.25
3	15.24	102.05
4	16.53	101.99
5	16.2	101.83
6	14.7	101.5
7	14.29	101.37
8	13.47	101.19
9	12.94	101.78
10	15.26	101.81
11	17.17	101.47
12	17.78	100.73
13	16.48	100.91
14	13.84	101.45
15	13.24	102.41

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Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	14/01/07 00:05	14/01/07 23:55	Qa 38.3300							
2	14/01/08 00:05	14/01/08 23:55	Qa 38.3300	23:48:31	36.563	38.233	0.71	56.7176	52.2308	54.6164
3	14/01/09 00:05	14/01/09 23:55	Qa 38.3300	23:46:54	36.602	38.239	0.69	52.7612	48.567	50.7394
4	14/01/10 00:05	14/01/10 23:55	Qa 38.3300	23:48:41	36.233	38.235	0.68	56.6983	51.7654	54.6256
5	14/01/11 00:05	14/01/11 23:55	Qa 38.3300	23:48:36	36.018	38.241	0.65	56.6965	51.4545	54.6314
6	14/01/12 00:05	14/01/12 23:55	Qa 38.3300	23:48:39	35.962	38.235	0.69	56.8167	51.3771	54.6245
7	14/01/13 00:05	14/01/13 23:55	Qa 38.3300	23:48:36	36.111	38.231	0.72	56.8436	51.589	54.6176
8	14/01/14 00:05	14/01/14 23:55	Qa 38.3300	23:48:35	36.064	38.235	0.68	56.926	51.5192	54.6214
9	14/01/15 00:05	14/01/15 23:55	Qa 38.3300	23:48:37	36.1	38.229	0.71	56.8801	51.5741	54.617
10	14/01/16 00:05	14/01/16 23:55	Qa 38.3300	23:48:42	36.331	38.232	0.7	56.9009	51.9053	54.6209
11	14/01/17 00:05	14/01/17 23:55	Qa 38.3300	23:48:37	36.128	38.232	0.72	56.5518	51.6126	54.6193
12	14/01/18 00:05	14/01/18 23:55	Qa 38.3300	23:48:33	35.68	38.223	0.74	56.4444	50.97	54.6023
13	14/01/19 00:05	14/01/19 23:55	Qa 38.3300	23:48:29	35.475	38.24	0.64	56.7309	50.6747	54.6239
14	14/01/20 00:05	14/01/20 23:55	Qa 38.3300	23:48:35	35.676	38.23	0.71	56.5227	50.9661	54.6157
15	14/01/21 00:05	14/01/21 23:55	Qa 38.3300	23:48:37	36.147	38.237	0.66	56.5296	51.6421	54.6288

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1	14.32	102.33
2	13.61	102.15
3	16.1	101.92
4	17.85	101.95
5	17.65	101.7
6	15.62	101.36
7	15.26	101.17
8	14.33	100.91
9	14.02	101.57
10	16.21	101.73
11	18.15	101.26
12	18.54	100.58
13	17.06	100.71
14	14.47	101.18
15	14.32	102.33

Marsaxlokk – PM_{10} Sampler Report 12

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	14/01/22 00:05	14/01/22 23:55	Qa 38.3300	23:46:23	36.329	38.236	0.73	57.2516	51.819	54.5394
2	14/01/23 00:05	14/01/23 23:55	Qa 38.3300	23:48:36	36.123	38.225	0.73	57.3462	51.6056	54.6085
3	14/01/24 00:05	14/01/24 23:55	Qa 38.3300	23:48:32	36.096	38.23	0.86	57.3537	51.563	54.6116
4	14/01/25 00:05	14/01/25 23:55	Qa 38.3300	23:48:38	36.137	38.237	0.85	57.1303	51.6271	54.6262
5	14/01/26 00:05	14/01/26 23:55	Qa 38.3300	23:48:36	36.092	38.229	0.8	57.3577	51.5608	54.6142
6	14/01/27 00:05	14/01/27 23:55	Qa 38.3300	23:48:31	36.005	38.231	0.78	57.3855	51.4332	54.613
7	14/01/28 00:05	14/01/28 23:55	Qa 38.3300	23:38:34	35.992	38.223	0.84	56.8643	51.0571	54.2214
8	14/01/29 00:05	14/01/29 23:55	Qa 38.3300	23:48:37	36.086	38.223	0.8	57.319	51.5527	54.6057
9	14/01/30 00:05	14/01/30 23:55	Qa 38.3300	23:48:33	35.936	38.226	0.86	57.0038	51.3365	54.6079
10	14/01/31 00:05	14/01/31 23:55	Qa 38.3300	23:48:41	35.657	38.23	0.84	57.2002	50.9417	54.618
11	14/02/01 00:05	14/02/01 23:55	Qa 38.3300	23:48:38	35.98	38.225	0.91	57.2661	51.4017	54.6086
12	14/02/02 00:05	14/02/02 23:55	Qa 38.3300	23:48:36	35.859	38.221	0.8	57.4158	51.2279	54.5999
13	14/02/03 00:05	14/02/03 23:55	Qa 38.3300	23:48:40	36.369	38.223	0.86	57.3827	51.9644	54.6076
14	14/02/04 00:05	14/02/04 23:55	Qa 38.3300	23:48:32	36.431	38.224	0.8	57.4049	52.0428	54.6032
15	14/02/05 00:05	14/02/05 23:55	Qa 38.3300	23:48:39	36.463	38.228	0.81	57.4242	52.0876	54.6086

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1	15.26	101.87
2	16.62	101.79
3	15.42	101.47
4	13	100.74
5	13.99	100.95
6	14.41	100.84
7	13.02	100.45
8	14.79	101.11
9	16.1	101.14
10	17.24	100.9
11	14.42	100.97
12	14.66	100.9
13	13.51	101.53
14	14.44	101.97
15	14.08	101.76

Marsaxlokk – $PM_{2.5}$ Sampler Report 12

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	14/01/22 00:05	14/01/22 23:55	Qa 38.3300	23:42:02	36.134	38.205	1.36	57.4674	51.3843	54.3279
2	14/01/23 00:05	14/01/23 23:55	Qa 38.3300	23:48:36	35.911	38.176	1.25	57.4795	51.3025	54.538
3	14/01/24 00:05	14/01/24 23:55	Qa 38.3300	23:48:29	35.894	38.188	1.26	57.5548	51.2735	54.5503
4	14/01/25 00:05	14/01/25 23:55	Qa 38.3300	23:48:29	35.902	38.189	1.39	57.3693	51.2845	54.5517
5	14/01/26 00:05	14/01/26 23:55	Qa 38.3300	23:48:33	35.864	38.182	1.27	57.5969	51.2327	54.5442
6	14/01/27 00:05	14/01/27 23:55	Qa 38.3300	23:48:35	35.78	38.182	1.27	57.5996	51.115	54.5458
7	14/01/28 00:05	14/01/28 23:55	Qa 38.3300	23:38:33	35.778	38.186	1.32	57.2728	50.7527	54.1669
8	14/01/29 00:05	14/01/29 23:55	Qa 38.3300	23:48:37	35.874	38.174	1.25	57.6389	51.2548	54.5363
9	14/01/30 00:05	14/01/30 23:55	Qa 38.3300	23:48:29	35.722	38.169	1.17	57.151	51.0287	54.524
10	14/01/31 00:05	14/01/31 23:55	Qa 38.3300	23:48:33	35.463	38.171	1.14	57.481	50.6659	54.5268
11	14/02/01 00:05	14/02/01 23:55	Qa 38.3300	23:48:32	35.786	38.188	1.35	57.7109	51.1207	54.5519
12	14/02/02 00:05	14/02/02 23:55	Qa 38.3300	23:48:40	35.668	38.188	1.24	57.9353	50.9579	54.5583
13	14/02/03 00:05	14/02/03 23:55	Qa 38.3300	23:48:36	36.162	38.193	1.36	57.8078	51.6619	54.5628
14	14/02/04 00:05	14/02/04 23:55	Qa 38.3300	23:48:37	36.24	38.189	1.29	57.9419	51.7729	54.5569
15	14/02/05 00:05	14/02/05 23:55	Qa 38.3300	23:48:38	36.254	38.186	1.41	57.9605	51.7928	54.5532

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1	15.66	101.79
2	17.01	101.69
3	15.72	101.13
4	13.2	100.25
5	14.34	100.71
6	14.78	100.7
7	13.21	99.99
8	15.12	101.04
9	16.39	100.77
10	17.55	100.62
11	14.55	100.63
12	15.07	100.48
13	13.87	101.24
14	14.7	101.88
15	14.4	101.66

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Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	14/01/22 00:05	14/01/22 23:55	Qa 38.3300	23:46:32	36.318	38.251	0.5	57.2264	51.808	54.5665
2	14/01/23 00:05	14/01/23 23:55	Qa 38.3300	23:48:39	36.082	38.234	0.51	56.8172	51.5507	54.6251
3	14/01/24 00:05	14/01/24 23:55	Qa 38.3300	23:48:33	36.067	38.249	0.47	57.0767	51.5237	54.6381
4	14/01/25 00:05	14/01/25 23:55	Qa 38.3300	23:48:31	36.124	38.244	0.5	56.9938	51.6042	54.632
5	14/01/26 00:05	14/01/26 23:55	Qa 38.3300	23:48:27	36.094	38.25	0.46	57.1134	51.558	54.6383
6	14/01/27 00:05	14/01/27 23:55	Qa 38.3300	23:48:33	35.988	38.25	0.46	57.2114	51.4096	54.6418
7	14/01/28 00:05	14/01/28 23:55	Qa 38.3300	23:48:35	35.996	38.249	0.45	57.1677	51.4237	54.6426
8	14/01/29 00:05	14/01/29 23:55	Qa 38.3300	23:48:35	36.049	38.242	0.5	57.2666	51.5036	54.6314
9	14/01/30 00:05	14/01/30 23:55	Qa 38.3300	23:48:35	35.892	38.233	0.47	56.4657	51.2746	54.6187
10	14/01/31 00:05	14/01/31 23:55	Qa 38.3300	23:48:37	35.647	38.253	0.46	56.7973	50.9257	54.6493
11	14/02/01 00:05	14/02/01 23:55	Qa 38.3300	23:48:34	35.95	38.243	0.47	56.8821	51.3564	54.6322
12	14/02/02 00:05	14/02/02 23:55	Qa 38.3300	23:37:55	35.804	38.24	0.47	56.5168	50.7669	54.222
13	14/02/03 00:05	14/02/03 23:55	Qa 38.3300	23:48:36	36.365	38.25	0.49	57.2831	51.9509	54.6443
14	14/02/04 00:05	14/02/04 23:55	Qa 38.3300	23:48:37	36.426	38.246	0.47	57.4358	52.0388	54.6389
15	14/02/05 00:05	14/02/05 23:55	Qa 38.3300	23:48:29	36.425	38.252	0.47	57.3214	52.0319	54.6421

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1	14.67	101.54
2	16.16	101.52
3	14.98	101.26
4	12.53	100.56
5	13.39	100.63
6	13.92	100.54
7	12.5	100.26
8	14.4	100.88
9	15.76	100.91
10	16.63	100.67
11	14.11	100.77
12	14.4	100.74
13	13.04	101.39
14	13.83	101.55
15	13.8	101.52

Birżebbuġa – $PM_{2.5}$ Sampler Report 12

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	14/01/22 00:05	14/01/22 23:55	Qa 38.3300	23:38:33	36.166	38.236	0.66	56.2659	51.3041	54.2403
2	14/01/23 00:05	14/01/23 23:55	Qa 38.3300	23:48:37	35.905	38.234	0.66	56.8211	51.2942	54.6217
3	14/01/24 00:05	14/01/24 23:55	Qa 38.3300	23:48:30	35.925	38.236	0.68	56.8486	51.3152	54.6201
4	14/01/25 00:05	14/01/25 23:55	Qa 38.3300	23:48:33	35.986	38.234	0.66	56.5256	51.4062	54.6173
5	14/01/26 00:05	14/01/26 23:55	Qa 38.3300	23:48:36	35.954	38.233	0.68	56.7177	51.3648	54.62
6	14/01/27 00:05	14/01/27 23:55	Qa 38.3300	23:48:38	35.851	38.241	0.68	56.9668	51.2174	54.6321
7	14/01/28 00:05	14/01/28 23:55	Qa 38.3300	23:48:34	35.847	38.24	0.69	56.9752	51.2098	54.6284
8	14/01/29 00:05	14/01/29 23:55	Qa 38.3300	23:48:32	35.901	38.234	0.69	56.9098	51.2851	54.6188
9	14/01/30 00:05	14/01/30 23:55	Qa 38.3300	23:48:33	35.724	38.226	0.69	56.7719	51.0328	54.6069
10	14/01/31 00:05	14/01/31 23:55	Qa 38.3300	23:48:39	35.473	38.23	0.67	56.8935	50.6783	54.6171
11	14/02/01 00:05	14/02/01 23:55	Qa 38.3300	23:48:38	35.809	38.239	0.69	56.975	51.1572	54.6288
12	14/02/02 00:05	14/02/02 23:55	Qa 38.3300	23:37:50	35.65	38.245	0.69	56.614	50.5444	54.2245
13	14/02/03 00:05	14/02/03 23:55	Qa 38.3300	23:48:35	36.203	38.225	0.77	57.0042	51.7192	54.6072
14	14/02/04 00:05	14/02/04 23:55	Qa 38.3300	23:48:29	36.269	38.237	0.71	57.4994	51.8102	54.6204
15	14/02/05 00:05	14/02/05 23:55	Qa 38.3300	23:48:36	36.276	38.236	0.7	57.573	51.8258	54.6263

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1	15.36	101.52
2	17.33	101.43
3	15.74	101.06
4	12.98	100.29
5	13.97	100.61
6	14.63	100.51
7	13.13	100.02
8	15.3	100.86
9	16.72	100.74
10	17.67	100.53
11	14.75	100.57
12	15.39	100.48
13	13.7	101.13
14	14.8	101.67
15	14.63	101.54

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Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	14/02/07 00:05	14/02/07 23:55	Qa 38.3300	23:48:40	36.396	38.237	0.8	57.6422	51.9978	54.628
2	14/02/08 00:05	14/02/08 23:55	Qa 38.3300	23:48:36	36.321	38.22	0.82	57.7608	51.8876	54.6006
3	14/02/09 00:05	14/02/09 23:55	Qa 38.3300	23:48:29	36.255	38.22	0.82	57.6596	51.7895	54.5964
4	14/02/10 00:05	14/02/10 23:55	Qa 38.3300	23:48:31	36.048	38.219	0.8	57.5822	51.4951	54.5962
5	14/02/11 00:05	14/02/11 23:55	Qa 38.3300	23:48:36	35.902	38.224	0.77	57.4506	51.2904	54.609
6	14/02/12 00:05	14/02/12 23:55	Qa 38.3300	23:48:33	36.347	38.228	0.77	57.5656	51.9236	54.6079
7	14/02/13 00:05	14/02/13 23:55	Qa 38.3300	23:48:34	36.409	38.223	0.79	57.6688	52.0124	54.6049
8	14/02/14 00:05	14/02/14 23:55	Qa 38.3300	23:48:35	36.158	38.227	0.7	57.5838	51.6543	54.6094
9	14/02/15 00:05	14/02/15 23:55	Qa 38.3300	23:48:35	36.194	38.218	0.73	57.7582	51.7052	54.5973
10	14/02/16 00:05	14/02/16 23:55	Qa 38.3300	23:48:34	36.158	38.226	0.7	57.6968	51.6565	54.6097
11	14/02/17 00:05	14/02/17 23:55	Qa 38.3300	23:48:34	36.122	38.216	0.79	57.6947	51.6047	54.5959

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1	15.16	101.83
2	15.06	101.63
3	15.3	101.53
4	16.09	101.23
5	15.39	100.56
6	13.85	101.26
7	14.08	101.52
8	16.18	101.55
9	16.6	101.82
10	17.48	102.01
11	17.67	102

Marsaxlokk – $PM_{2.5}$ Sampler Report 13

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	14/02/07 00:05	14/02/07 23:55	Qa 38.3300	23:48:35	36.177	38.191	1.52	57.856	51.6814	54.5587
2	14/02/08 00:05	14/02/08 23:55	Qa 38.3300	23:48:28	36.136	38.199	1.42	58.0547	51.6185	54.5665
3	14/02/09 00:05	14/02/09 23:55	Qa 38.3300							
4	14/02/10 00:05	14/02/10 23:55	Qa 38.3300							
5	14/02/11 00:05	14/02/11 23:55	Qa 38.3300							
6	14/02/12 00:05	14/02/12 23:55	Qa 38.3300							
7	14/02/13 00:05	14/02/13 23:55	Qa 38.3300							
8	14/02/14 00:05	14/02/14 23:55	Qa 38.3300							
9	14/02/15 00:05	14/02/15 23:55	Qa 38.3300							
10	14/02/16 00:05	14/02/16 23:55	Qa 38.3300							
11	14/02/17 00:05	14/02/17 23:55	Qa 38.3300							

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1	15.59	101.49
2	15.47	101.31
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Birżebbuġa – PM_{10} Sampler Report 13

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	14/02/07 00:05	14/02/07 23:55	Qa 38.3300	23:48:39	36.425	38.243	0.48	57.3614	52.0382	54.6358
2	14/02/08 00:05	14/02/08 23:55	Qa 38.3300	23:48:28	36.317	38.253	0.5	57.6601	51.8776	54.6428
3	14/02/09 00:05	14/02/09 23:55	Qa 38.3300	23:48:27	36.217	38.253	0.44	57.6218	51.734	54.6421
4	14/02/10 00:05	14/02/10 23:55	Qa 38.3300	23:48:33	36.024	38.251	0.43	57.2001	51.4623	54.6433
5	14/02/11 00:05	14/02/11 23:55	Qa 38.3300	23:48:33	35.877	38.252	0.47	57.3205	51.252	54.6419
6	14/02/12 00:05	14/02/12 23:55	Qa 38.3300	23:48:33	36.325	38.251	0.47	57.4923	51.8933	54.6431
7	14/02/13 00:05	14/02/13 23:55	Qa 38.3300	23:48:31	36.358	38.249	0.51	57.4796	51.9379	54.6391
8	14/02/14 00:05	14/02/14 23:55	Qa 38.3300	23:48:33	36.094	38.254	0.49	57.4392	51.5615	54.6474
9	14/02/15 00:05	14/02/15 23:55	Qa 38.3300	23:48:33	36.184	38.255	0.48	57.6076	51.6907	54.6491
10	14/02/16 00:05	14/02/16 23:55	Qa 38.3300	23:48:35	36.122	38.251	0.45	57.4726	51.6035	54.6446
11	14/02/17 00:05	14/02/17 23:55	Qa 38.3300	23:48:37	36.106	38.245	0.46	56.9639	51.5812	54.6366

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1	14.1	101.52
2	14.43	101.31
3	14.94	101.21
4	15.58	100.9
5	14.89	100.25
6	13.38	100.97
7	13.85	101.23
8	15.96	101.22
9	15.93	101.46
10	16.88	101.63
11	17.02	101.65

Birżebbuġa – $PM_{2.5}$ Sampler Report 13

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	14/02/07 00:05	14/02/07 23:55	Qa 38.3300	23:48:32	36.425	38.243	0.48	57.3614	52.0382	54.6358
2	14/02/08 00:05	14/02/08 23:55	Qa 38.3300	23:48:33	36.317	38.253	0.5	57.6601	51.8776	54.6428
3	14/02/09 00:05	14/02/09 23:55	Qa 38.3300	23:48:38	36.217	38.253	0.44	57.6218	51.734	54.6421
4	14/02/10 00:05	14/02/10 23:55	Qa 38.3300	23:48:29	36.024	38.251	0.43	57.2001	51.4623	54.6433
5	14/02/11 00:05	14/02/11 23:55	Qa 38.3300	23:48:34	35.877	38.252	0.47	57.3205	51.252	54.6419
6	14/02/12 00:05	14/02/12 23:55	Qa 38.3300	23:48:36	36.325	38.251	0.47	57.4923	51.8933	54.6431
7	14/02/13 00:05	14/02/13 23:55	Qa 38.3300	23:48:31	36.358	38.249	0.51	57.4796	51.9379	54.6391
8	14/02/14 00:05	14/02/14 23:55	Qa 38.3300	23:48:28	36.094	38.254	0.49	57.4392	51.5615	54.6474
9	14/02/15 00:05	14/02/15 23:55	Qa 38.3300	23:48:41	36.184	38.255	0.48	57.6076	51.6907	54.6491
10	14/02/16 00:05	14/02/16 23:55	Qa 38.3300	23:48:28	36.122	38.251	0.45	57.4726	51.6035	54.6446
11	14/02/17 00:05	14/02/17 23:55	Qa 38.3300	23:48:33	36.106	38.245	0.46	56.9639	51.5812	54.6366

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1	15.64	101.42
2	15.28	101.23
3	15.82	101.12
4	16.85	100.83
5	15.69	100.16
6	14.1	100.84
7	14.47	101.12
8	16.47	101.16
9	17.66	101.49
10	18.16	101.66
11	18.65	101.64

Marsaxlokk – PM_{10} Sampler Report 14

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	14/02/18 00:05	14/02/18 23:55	Qa 38.3300							
2	14/02/19 00:05	14/02/19 23:55	Qa 38.3300							
3	14/02/20 00:05	14/02/20 23:55	Qa 38.3300	23:53:32	35.715	38.23	0.84	57.908	51.1994	54.8022
4	14/02/21 00:05	14/02/21 23:55	Qa 38.3300	23:53:36	35.687	38.223	0.84	58.043	51.1613	54.7968
5	14/02/22 00:05	14/02/22 23:55	Qa 38.3300	23:53:38	35.871	38.225	0.85	58.0225	51.4255	54.8013
6	14/02/23 00:05	14/02/23 23:55	Qa 38.3300	23:53:36	36.116	38.226	0.8	58.0663	51.7763	54.8009
7	14/02/24 00:05	14/02/24 23:55	Qa 38.3300	23:53:27	36.237	38.229	0.82	58.133	51.9432	54.7975
8	14/02/25 00:05	14/02/25 23:55	Qa 38.3300	23:53:34	36.257	38.224	0.8	58.2227	51.9759	54.7963
9	14/02/26 00:05	14/02/26 23:55	Qa 38.3300	23:53:36	36.222	38.221	0.77	58.1599	51.9285	54.7931
10	14/02/27 00:05	14/02/27 23:55	Qa 38.3300	23:53:33	36.223	38.221	0.77	58.1688	51.9269	54.7923
11	14/02/28 00:05	14/02/28 23:55	Qa 38.3300	23:53:38	36.497	38.218	0.77	58.1488	52.3223	54.7905
12	14/03/01 00:05	14/03/01 23:55	Qa 38.3300	23:53:39	36.27	38.21	0.81	58.2262	51.9986	54.7789
13	14/03/02 00:05	14/03/02 23:55	Qa 38.3300	23:53:37	36.052	38.222	0.76	58.0376	51.6852	54.7958
14	14/03/03 00:05	14/03/03 23:55	Qa 38.3300	23:53:36	35.861	38.218	0.77	58.1012	51.4101	54.7893
15	14/03/04 00:05	14/03/04 23:55	Qa 38.3300	23:53:38	35.707	38.215	0.76	58.0552	51.1904	54.7857

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1		
2		
3	16.68	100.41
4	15.56	100.53
5	15.17	101.08
6	14.51	101.18
7	14.55	101.26
8	14.91	101.3
9	15.54	101.52
10	13.18	101.46
11	13.51	100.97
12	12.68	100.04
13	12.05	99.3
14	13.89	99.52
15	12.76	99.58

Marsaxlokk – $PM_{2.5}$ Sampler Report 14

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	14/02/18 00:05	14/02/18 23:55	Qa 38.3300	23:48:31	35.738	38.206	1.53	57.5238	51.0528	54.578
2	14/02/19 00:05	14/02/19 23:55	Qa 38.3300	23:48:30	35.718	38.206	1.48	57.7687	51.0236	54.5772
3	14/02/20 00:05	14/02/20 23:55	Qa 38.3300	23:48:35	35.885	38.208	1.57	57.6631	51.2695	54.5836
4	14/02/21 00:05	14/02/21 23:55	Qa 38.3300	23:48:34	36.121	38.2	1.53	58.1637	51.6017	54.5699
5	14/02/22 00:05	14/02/22 23:55	Qa 38.3300	23:48:41	36.235	38.202	1.53	58.226	51.7683	54.5765
6	14/02/23 00:05	14/02/23 23:55	Qa 38.3300	23:48:38	36.236	38.185	1.42	58.3792	51.7673	54.5522
7	14/02/24 00:05	14/02/24 23:55	Qa 38.3300	23:48:32	36.205	38.194	1.52	58.2322	51.7192	54.5613
8	14/02/25 00:05	14/02/25 23:55	Qa 38.3300	23:48:33	36.22	38.192	1.42	58.0027	51.7427	54.5586
9	14/02/26 00:05	14/02/26 23:55	Qa 38.3300	23:48:36	36.479	38.193	1.53	58.0111	52.1126	54.5613
10	14/02/27 00:05	14/02/27 23:55	Qa 38.3300	23:48:33	36.266	38.2	1.49	57.9963	51.8093	54.5719
11	14/02/28 00:05	14/02/28 23:55	Qa 38.3300	23:48:33	36.032	38.214	1.5	57.8496	51.4728	54.5907
12	14/03/01 00:05	14/03/01 23:55	Qa 38.3300	23:48:31	35.854	38.217	1.54	57.9442	51.2184	54.591
13	14/03/02 00:05	14/03/02 23:55	Qa 38.3300	23:48:26	35.703	38.209	1.45	57.7233	50.9985	54.5776
14	14/03/03 00:05	14/03/03 23:55	Qa 38.3300	23:48:39	35.84	38.194	1.54	57.6676	51.2017	54.5646
15	14/03/04 00:05	14/03/04 23:55	Qa 38.3300	23:48:31	35.738	38.206	1.53	57.5238	51.0528	54.578

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1		
2		
3	17.22	100.73
4	16.12	100.82
5	15.81	101.39
6	15.17	101.48
7	15.36	101.59
8	15.79	101.63
9	16.27	101.85
10	13.75	101.68
11	14.18	101.22
12	13.3	100.22
13	12.57	99.47
14	14.51	99.74
15	13.3	99.74

Birżebbuġa – PM_{10} Sampler Report 14

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	14/02/18 00:05	14/02/18 23:55	Qa 38.3300							
2	14/02/19 00:05	14/02/19 23:55	Qa 38.3300							
3	14/02/20 00:05	14/02/20 23:55	Qa 38.3300	23:48:32	35.88	38.249	0.42	56.7456	51.2558	54.6395
4	14/02/21 00:05	14/02/21 23:55	Qa 38.3300	23:48:38	36.007	38.244	0.47	57.0393	51.4404	54.6365
5	14/02/22 00:05	14/02/22 23:55	Qa 38.3300	23:48:31	36.285	38.251	0.43	57.2346	51.8343	54.6414
6	14/02/23 00:05	14/02/23 23:55	Qa 38.3300	23:48:33	36.399	38.251	0.45	57.2668	51.9973	54.6433
7	14/02/24 00:05	14/02/24 23:55	Qa 38.3300	23:48:37	36.431	38.249	0.45	57.2954	52.0455	54.6403
8	14/02/25 00:05	14/02/25 23:55	Qa 38.3300	23:48:40	36.47	38.243	0.45	57.0597	52.1042	54.6373
9	14/02/26 00:05	14/02/26 23:55	Qa 38.3300	23:48:38	36.434	38.243	0.46	56.9965	52.0513	54.6353
10	14/02/27 00:05	14/02/27 23:55	Qa 38.3300	23:48:33	36.736	38.252	0.4	56.9826	52.4787	54.6441
11	14/02/28 00:05	14/02/28 23:55	Qa 38.3300	23:48:37	36.462	38.25	0.46	57.221	52.0903	54.6449
12	14/03/01 00:05	14/03/01 23:55	Qa 38.3300	23:48:34	36.249	38.248	0.49	57.2453	51.7841	54.64
13	14/03/02 00:05	14/03/02 23:55	Qa 38.3300	23:48:26	36.093	38.25	0.44	57.1141	51.5569	54.6373
14	14/03/03 00:05	14/03/03 23:55	Qa 38.3300	23:48:32	35.856	38.248	0.49	57.1967	51.2219	54.6368
15	14/03/04 00:05	14/03/04 23:55	Qa 38.3300	23:48:32	36.049	38.25	0.48	57.2286	51.4974	54.642

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1		
2		
3	16.12	100.69
4	15.41	100.81
5	14.89	101.39
6	14.28	101.49
7	14.14	101.54
8	13.97	101.6
9	14.93	101.84
10	12.63	101.84
11	13.21	101.29
12	12.29	100.38
13	11.42	99.64
14	13.71	99.79
15	12.46	99.88

Birżebbuġa – $PM_{2.5}$ Sampler Report 14

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	14/02/18 00:05	14/02/18 23:55	Qa 38.3300							
2	14/02/19 00:05	14/02/19 23:55	Qa 38.3300							
3	14/02/20 00:05	14/02/20 23:55	Qa 38.3300	23:48:30	35.756	38.232	0.69	56.501	51.0787	54.6154
4	14/02/21 00:05	14/02/21 23:55	Qa 38.3300	23:48:33	35.958	38.236	0.7	56.7425	51.3668	54.6183
5	14/02/22 00:05	14/02/22 23:55	Qa 38.3300	23:48:32	36.198	38.246	0.67	57.2589	51.7084	54.6345
6	14/02/23 00:05	14/02/23 23:55	Qa 38.3300	23:48:29	36.317	38.24	0.68	57.3318	51.8808	54.6271
7	14/02/24 00:05	14/02/24 23:55	Qa 38.3300	23:48:30	36.351	38.244	0.67	57.4776	51.9374	54.6421
8	14/02/25 00:05	14/02/25 23:55	Qa 38.3300	23:48:42	36.273	38.24	0.71	57.4094	51.8241	54.6339
9	14/02/26 00:05	14/02/26 23:55	Qa 38.3300	23:48:44	36.28	38.248	0.65	57.3755	51.8303	54.6414
10	14/02/27 00:05	14/02/27 23:55	Qa 38.3300	23:48:36	36.556	38.236	0.73	57.2764	52.223	54.6234
11	14/02/28 00:05	14/02/28 23:55	Qa 38.3300	23:48:36	36.318	38.237	0.74	57.5209	51.8869	54.6296
12	14/03/01 00:05	14/03/01 23:55	Qa 38.3300	23:48:42	36.135	38.25	0.68	57.19	51.6179	54.6392
13	14/03/02 00:05	14/03/02 23:55	Qa 38.3300	23:48:29	35.906	38.239	0.72	57.2677	51.2943	54.6274
14	14/03/03 00:05	14/03/03 23:55	Qa 38.3300	23:48:35	35.813	38.241	0.68	57.0229	51.1615	54.6293
15	14/03/04 00:05	14/03/04 23:55	Qa 38.3300	23:48:34	35.973	38.239	0.71	56.9477	51.3854	54.6227

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1		
2	16.62	100.56
3	15.44	100.71
4	15.27	101.29
5	14.5	101.37
6	14.52	101.46
7	15.22	101.5
8	15.85	101.72
9	13.3	101.62
10	13.94	101.18
11	12.72	100.21
12	12.28	99.45
13	13.75	99.7
14	12.58	99.74
15	16.62	100.56

Marsaxlokk – PM_{10} Sampler Report 15

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	14/03/05 00:05	14/03/05 23:55	Qa 38.3300							
2	14/03/06 00:05	14/03/06 23:55	Qa 38.3300							
3	14/03/07 00:05	14/03/07 23:55	Qa 38.3300	23:48:38	36.104	38.215	0.69	58.5879	51.5788	54.5955
4	14/03/08 00:05	14/03/08 23:55	Qa 38.3300	23:48:35	36.201	38.221	0.67	58.4556	51.716	54.6017
5	14/03/09 00:05	14/03/09 23:55	Qa 38.3300	23:48:32	36.343	38.216	0.7	58.3485	51.9176	54.5927
6	14/03/10 00:05	14/03/10 23:55	Qa 38.3300	23:48:34	36.163	38.21	0.69	58.5861	51.6616	54.5862
7	14/03/11 00:05	14/03/11 23:55	Qa 38.3300	23:48:34	36.3	38.214	0.7	58.4634	51.8557	54.5911
8	14/03/12 00:05	14/03/12 23:55	Qa 38.3300	23:48:38	36.393	38.219	0.67	58.5335	51.9929	54.6011
9	14/03/13 00:05	14/03/13 23:55	Qa 38.3300	23:48:39	36.373	38.216	0.73	58.0711	51.9637	54.5976
10	14/03/14 00:05	14/03/14 23:55	Qa 38.3300	23:48:34	36.065	38.221	0.72	57.9554	51.5217	54.6014
11	14/03/15 00:05	14/03/15 23:55	Qa 38.3300	23:48:27	35.948	38.219	0.71	58.29	51.3492	54.594
12	14/03/16 00:05	14/03/16 23:55	Qa 38.3300	23:48:39	35.94	38.218	0.69	58.5232	51.3458	54.5997
13	14/03/17 00:05	14/03/17 23:55	Qa 38.3300	23:48:32	36.004	38.208	0.75	58.5159	51.433	54.5811
14	14/03/18 00:05	14/03/18 23:55	Qa 38.3300	23:48:32	35.897	38.219	0.67	58.5275	51.2804	54.5963
15	14/03/19 00:05	14/03/19 23:55	Qa 38.3300	23:48:32	36.005	38.218	0.67	58.5365	51.4362	54.5978

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1		
2		
3	14.02	100.67
4	14.03	100.93
5	13.35	101.1
6	13.71	100.74
7	13.74	101.12
8	14.96	101.8
9	14.65	101.64
10	16.14	101.29
11	16.07	100.94
12	15.89	100.86
13	16.76	101.37
14	18.22	101.55
15	17.26	101.52

Marsaxlokk – $PM_{2.5}$ Sampler Report 15

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	14/03/05 00:05	14/03/05 23:55	Qa 38.3300							
2	14/03/06 00:05	14/03/06 23:55	Qa 38.3300							
3	14/03/07 00:05	14/03/07 23:55	Qa 38.3300	23:48:35	36.09	38.186	1.34	58.0157	51.5564	54.5517
4	14/03/08 00:05	14/03/08 23:55	Qa 38.3300	23:48:26	36.192	38.199	1.34	57.8812	51.6978	54.5642
5	14/03/09 00:05	14/03/09 23:55	Qa 38.3300	23:48:38	36.321	38.191	1.31	57.8016	51.8886	54.5597
6	14/03/10 00:05	14/03/10 23:55	Qa 38.3300	23:48:37	36.148	38.176	1.35	58.0416	51.6404	54.5395
7	14/03/11 00:05	14/03/11 23:55	Qa 38.3300	23:48:28	36.309	38.212	1.56	58.0723	51.8673	54.5848
8	14/03/12 00:05	14/03/12 23:55	Qa 38.3300	23:48:37	36.404	38.208	1.43	58.0672	52.0068	54.5843
9	14/03/13 00:05	14/03/13 23:55	Qa 38.3300	23:48:37	36.365	38.211	1.56	57.6285	51.9509	54.5879
10	14/03/14 00:05	14/03/14 23:55	Qa 38.3300	23:48:36	36.042	38.184	1.44	57.4411	51.4907	54.5509
11	14/03/15 00:05	14/03/15 23:55	Qa 38.3300	23:48:35	35.954	38.195	1.36	57.7699	51.3631	54.5652
12	14/03/16 00:05	14/03/16 23:55	Qa 38.3300	23:48:30	35.935	38.19	1.26	57.9346	51.3334	54.5544
13	14/03/17 00:05	14/03/17 23:55	Qa 38.3300	23:48:32	36.01	38.183	1.39	57.9944	51.4417	54.5462
14	14/03/18 00:05	14/03/18 23:55	Qa 38.3300	23:48:30	35.911	38.181	1.29	58.0549	51.2997	54.5418
15	14/03/19 00:05	14/03/19 23:55	Qa 38.3300	23:48:37	36.011	38.181	1.35	58.06	51.446	54.5457

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1		
2		
3	14.57	100.9
4	14.56	101.15
5	13.79	101.26
6	14.18	100.95
7	14.21	101.32
8	15.53	102.06
9	15.18	101.82
10	16.76	101.54
11	16.64	101.22
12	16.55	101.15
13	17.44	101.69
14	18.88	101.92
15	17.87	101.85

Birżebbuġa – PM_{10} Sampler Report 15

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	14/03/05 00:05	14/03/05 23:55	Qa 38.3300							
2	14/03/06 00:05	14/03/06 23:55	Qa 38.3300							
1	14/03/07 00:05	14/03/07 23:55	Qa 38.3300	23:48:37	36.256	38.255	0.45	57.2963	51.7956	54.6511
2	14/03/08 00:05	14/03/08 23:55	Qa 38.3300	23:48:25	36.43	38.253	0.43	57.1949	52.0391	54.6426
3	14/03/09 00:05	14/03/09 23:55	Qa 38.3300	23:48:33	36.547	38.253	0.45	57.0328	52.2099	54.6458
4	14/03/10 00:05	14/03/10 23:55	Qa 38.3300	23:48:33	36.437	38.252	0.46	57.3132	52.0523	54.643
5	14/03/11 00:05	14/03/11 23:55	Qa 38.3300	23:48:36	36.619	38.248	0.44	57.5695	52.3143	54.6392
6	14/03/12 00:05	14/03/12 23:55	Qa 38.3300	23:48:35	36.72	38.255	0.44	57.1829	52.4581	54.6506
7	14/03/13 00:05	14/03/13 23:55	Qa 38.3300	23:48:40	36.561	38.237	0.45	56.5906	52.2331	54.6273
8	14/03/14 00:05	14/03/14 23:55	Qa 38.3300	23:48:37	36.274	38.239	0.4	56.5427	51.8206	54.6289
9	14/03/15 00:05	14/03/15 23:55	Qa 38.3300	23:48:39	36.174	38.245	0.44	56.7692	51.6794	54.6381
10	14/03/16 00:05	14/03/16 23:55	Qa 38.3300	23:48:33	36.023	38.245	0.47	57.1139	51.4628	54.6367
11	14/03/17 00:05	14/03/17 23:55	Qa 38.3300	23:48:39	36.098	38.244	0.47	57.1185	51.5715	54.6367
12	14/03/18 00:05	14/03/18 23:55	Qa 38.3300	23:48:28	36.119	38.246	0.47	57.0098	51.5935	54.633
13	14/03/19 00:05	14/03/19 23:55	Qa 38.3300	23:23:13	36.27	38.249	0.45	56.3129	50.8941	53.6721

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1		
2		
3	14.27	100.92
4	13.8	101.23
5	13.28	101.45
6	13.34	101.05
7	12.84	101.42
8	14.3	102.08
9	14.74	101.98
10	15.77	101.58
11	15.9	101.23
12	15.97	101.06
13	16.94	101.55
14	17.77	101.73
15	16.17	101.69

Birżebbuġa – $PM_{2.5}$ Sampler Report 15

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	14/03/05 00:05	14/03/05 23:55	Qa 38.3300							
2	14/03/06 00:05	14/03/06 23:55	Qa 38.3300							
3	14/03/07 00:05	14/03/07 23:55	Qa 38.3300	23:48:27	36.159	38.246	0.7	57.0866	51.6504	54.6321
4	14/03/08 00:05	14/03/08 23:55	Qa 38.3300	23:48:38	36.292	38.237	0.7	56.6988	51.8481	54.6269
5	14/03/09 00:05	14/03/09 23:55	Qa 38.3300	23:48:28	36.412	38.233	0.72	56.6119	52.0133	54.6152
6	14/03/10 00:05	14/03/10 23:55	Qa 38.3300	23:48:30	36.275	38.233	0.72	56.8663	51.8182	54.616
7	14/03/11 00:05	14/03/11 23:55	Qa 38.3300	23:48:38	36.492	38.244	0.67	57.1964	52.1338	54.636
8	14/03/12 00:05	14/03/12 23:55	Qa 38.3300	23:48:33	36.543	38.232	0.75	56.9981	52.2079	54.6155
9	14/03/13 00:05	14/03/13 23:55	Qa 38.3300	23:48:33	36.431	38.241	0.63	56.6146	52.0441	54.6292
10	14/03/14 00:05	14/03/14 23:55	Qa 38.3300	23:48:40	36.171	38.231	0.66	56.6953	51.6758	54.6192
11	14/03/15 00:05	14/03/15 23:55	Qa 38.3300	23:48:30	36.034	38.232	0.72	56.58	51.4753	54.6148
12	14/03/16 00:05	14/03/16 23:55	Qa 38.3300	23:48:33	36.023	38.24	0.67	57.1471	51.4602	54.6283
13	14/03/17 00:05	14/03/17 23:55	Qa 38.3300	23:48:37	36.085	38.239	0.69	57.2001	51.5507	54.6269
14	14/03/18 00:05	14/03/18 23:55	Qa 38.3300	23:48:35	36.052	38.245	0.66	57.2342	51.505	54.6377
15	14/03/19 00:05	14/03/19 23:55	Qa 38.3300	23:23:28	36.237	38.244	0.69	56.3489	50.8569	53.6746

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1		
2		
3	14.27	100.83
4	13.8	101.06
5	13.28	101.22
6	13.34	100.86
7	12.84	101.26
8	14.3	101.96
9	14.74	101.77
10	15.77	101.43
11	15.9	101.09
12	15.97	101.06
13	16.94	101.58
14	17.77	101.76
15	16.17	101.72

Marsaxlokk – PM10 Sampler Report 16

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	14/03/20 00:05	14/03/20 23:55	Qa 38.3300	23:41:57	36.08	38.215	0.75	58.2525	51.3037	54.3394
2	14/03/21 00:05	14/03/21 23:55	Qa 38.3300	23:48:35	36.011	38.219	0.74	58.4038	51.4447	54.598
3	14/03/22 00:05	14/03/22 23:55	Qa 38.3300	23:48:31	35.968	38.219	0.76	58.2228	51.3806	54.5966
4	14/03/23 00:05	14/03/23 23:55	Qa 38.3300	23:48:33	35.779	38.22	0.75	58.0991	51.1114	54.5988
5	14/03/24 00:05	14/03/24 23:55	Qa 38.3300	23:48:36	36.025	38.206	0.75	58.161	51.465	54.5813
6	14/03/25 00:05	14/03/25 23:55	Qa 38.3300	23:48:40	35.881	38.222	0.7	57.9856	51.2611	54.6059
7	14/03/26 00:05	14/03/26 23:55	Qa 38.3300	23:48:29	35.759	38.221	0.69	57.9829	51.0807	54.5987
8	14/03/27 00:05	14/03/27 23:55	Qa 38.3300	23:48:33	35.762	38.231	0.68	57.991	51.0871	54.615
9	14/03/28 00:05	14/03/28 23:55	Qa 38.3300	23:48:40	36.005	38.22	0.72	58.1053	51.4407	54.6061
10	14/03/29 00:05	14/03/29 23:55	Qa 38.3300	23:48:34	36.002	38.222	0.67	58.252	51.4304	54.6017
11	14/03/30 00:05	14/03/30 23:55	Qa 38.3300	23:48:33	35.792	38.216	0.67	58.1373	51.1298	54.5929
12	14/03/31 00:05	14/03/31 23:55	Qa 38.3300	23:48:39	35.755	38.206	0.74	58.3684	51.0834	54.5845
13	14/04/01 00:05	14/04/01 23:55	Qa 38.3300	23:48:36	35.825	38.214	0.76	58.2607	51.1792	54.5918
14	14/04/02 00:05	14/04/02 23:55	Qa 38.3300	23:48:34	35.826	38.228	0.69	58.1917	51.1803	54.6116

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1	16.66	101.53
2	17.07	101.47
3	16.68	101.21
4	16.98	100.78
5	15.18	100.88
6	15.74	100.63
7	15.8	100.31
8	15.62	100.23
9	15.39	100.86
10	16.14	101.11
11	17.19	100.9
12	17.38	100.89
13	17.45	101.09
14	17.29	101

Marsaxlokk – $PM_{2.5}$ Sampler Report 16

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	14/03/20 00:05	14/03/20 23:55	Qa 38.3300	23:45:58	36.1	38.184	1.25	58.0626	51.4769	54.4482
2	14/03/21 00:05	14/03/21 23:55	Qa 38.3300	23:48:39	36.017	38.169	1.15	58.1406	51.4578	54.5325
3	14/03/22 00:05	14/03/22 23:55	Qa 38.3300	23:48:32	35.962	38.176	1.19	58.0457	51.3732	54.5361
4	14/03/23 00:05	14/03/23 23:55	Qa 38.3300	23:48:37	35.767	38.175	1.27	57.8584	51.098	54.538
5	14/03/24 00:05	14/03/24 23:55	Qa 38.3300	23:48:41	36.006	38.165	1.34	57.8642	51.4401	54.5251
6	14/03/25 00:05	14/03/25 23:55	Qa 38.3300	23:48:33	35.86	38.174	1.27	57.747	51.2291	54.5358
7	14/03/26 00:05	14/03/26 23:55	Qa 38.3300	23:48:31	35.737	38.185	1.29	57.7739	51.0505	54.5468
8	14/03/27 00:05	14/03/27 23:55	Qa 38.3300	23:48:30	35.742	38.182	1.33	57.7268	51.0582	54.544
9	14/03/28 00:05	14/03/28 23:55	Qa 38.3300	23:48:29	35.974	38.171	1.26	57.8445	51.3889	54.5269
10	14/03/29 00:05	14/03/29 23:55	Qa 38.3300	23:48:35	35.995	38.182	1.2	58.0001	51.4219	54.547
11	14/03/30 00:05	14/03/30 23:55	Qa 38.3300	23:48:38	35.8	38.177	1.23	57.8361	51.1473	54.543
12	14/03/31 00:05	14/03/31 23:55	Qa 38.3300	23:48:38	35.778	38.172	1.24	58.0698	51.114	54.5323
13	14/04/01 00:05	14/04/01 23:55	Qa 38.3300	23:48:38	35.813	38.169	1.23	57.9807	51.166	54.5289
14	14/04/02 00:05	14/04/02 23:55	Qa 38.3300	23:48:35	35.814	38.182	1.13	57.9288	51.1655	54.5482

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1	17.29	101.89
2	17.79	101.87
3	17.43	101.57
4	17.74	101.13
5	15.88	101.18
6	16.41	100.93
7	16.56	100.61
8	16.3	100.54
9	16.12	101.16
10	16.87	101.45
11	17.86	101.26
12	18.05	101.28
13	18.31	101.48
14	18.1	101.37

Birżebbuġa – PM_{10} Sampler Report 16

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	14/03/20 00:05	14/03/20 23:55	Qa 38.3300	23:42:18	36.353	38.254	0.45	56.6003	51.7072	54.41
2	14/03/21 00:05	14/03/21 23:55	Qa 38.3300	23:48:38	36.268	38.237	0.44	56.6071	51.814	54.6265
3	14/03/22 00:05	14/03/22 23:55	Qa 38.3300	23:48:41	36.187	38.243	0.47	56.648	51.6997	54.637
4	14/03/23 00:05	14/03/23 23:55	Qa 38.3300	23:48:33	35.963	38.244	0.45	56.6288	51.3742	54.6329
5	14/03/24 00:05	14/03/24 23:55	Qa 38.3300	23:48:40	36.147	38.249	0.48	57.0464	51.6409	54.644
6	14/03/25 00:05	14/03/25 23:55	Qa 38.3300	23:41:58	36.062	38.251	0.48	56.8464	51.2781	54.3911
7	14/03/26 00:05	14/03/26 23:55	Qa 38.3300	23:48:37	35.931	38.245	0.41	56.8491	51.3308	54.637
8	14/03/27 00:05	14/03/27 23:55	Qa 38.3300	23:48:37	35.899	38.251	0.44	57.1919	51.2882	54.648
9	14/03/28 00:05	14/03/28 23:55	Qa 38.3300	23:48:31	36.134	38.251	0.46	57.1846	51.6169	54.6425
10	14/03/29 00:05	14/03/29 23:55	Qa 38.3300	23:48:40	36.229	38.242	0.45	56.6719	51.7606	54.637
11	14/03/30 00:05	14/03/30 23:55	Qa 38.3300	23:48:33	36.02	38.243	0.43	56.4551	51.4576	54.6335
12	14/03/31 00:05	14/03/31 23:55	Qa 38.3300	23:48:32	35.931	38.248	0.43	56.805	51.3287	54.6366
13	14/04/01 00:05	14/04/01 23:55	Qa 38.3300	23:48:38	35.908	38.255	0.41	57.1934	51.2987	54.6516
14	14/04/02 00:05	14/04/02 23:55	Qa 38.3300	23:48:29	35.973	38.248	0.47	57.0514	51.3859	54.6359

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1	15.51	101.79
2	15.89	101.73
3	15.93	101.5
4	16.45	101.05
5	15.27	101.14
6	15.28	100.9
7	15.34	100.57
8	15.35	100.47
9	15.31	101.11
10	15.22	101.37
11	16.27	101.15
12	16.87	101.1
13	17.55	101.25
14	16.83	101.2

Birżebbuġa – $PM_{2.5}$ Sampler Report 16

Sample #	Effective start (yy/mm/dd hh.mm wd)	Effective stop (yy/mm/dd hh.mm wd)	Programmed flow rate (l/min)	Elapsed time (hh.mm.ss)	Average flow rate Qs (l/min)	Average flow rate Qa (l/min)	Deviation flow rate (%)	Gas meter volume (m^3)	Standard volume (m^3)	Actual volume (m^3)
1	14/03/20 00:05	14/03/20 23:55	Qa 38.3300	23:42:43	36.2	38.221	0.73	56.7171	51.5016	54.377
2	14/03/21 00:05	14/03/21 23:55	Qa 38.3300	23:48:36	36.124	38.233	0.71	57.1045	51.6068	54.6209
3	14/03/22 00:05	14/03/22 23:55	Qa 38.3300	23:48:33	36.043	38.241	0.71	57.2727	51.4883	54.628
4	14/03/23 00:05	14/03/23 23:55	Qa 38.3300	23:48:36	35.836	38.241	0.65	57.1877	51.1956	54.6314
5	14/03/24 00:05	14/03/24 23:55	Qa 38.3300	23:48:32	36.119	38.238	0.7	57.1899	51.5959	54.6232
6	14/03/25 00:05	14/03/25 23:55	Qa 38.3300	23:41:52	36.016	38.246	0.62	56.8671	51.2094	54.3786
7	14/03/26 00:05	14/03/26 23:55	Qa 38.3300	23:48:30	35.854	38.247	0.65	57.2273	51.2171	54.6356
8	14/03/27 00:05	14/03/27 23:55	Qa 38.3300	23:48:29	35.855	38.224	0.78	56.9547	51.2179	54.6024
9	14/03/28 00:05	14/03/28 23:55	Qa 38.3300	23:48:32	36.12	38.25	0.62	57.1309	51.5995	54.6416
10	14/03/29 00:05	14/03/29 23:55	Qa 38.3300	23:48:36	36.149	38.24	0.66	57.32	51.6432	54.6304
11	14/03/30 00:05	14/03/30 23:55	Qa 38.3300	23:48:39	35.932	38.237	0.67	56.8946	51.3344	54.6269
12	14/03/31 00:05	14/03/31 23:55	Qa 38.3300	23:48:37	35.838	38.24	0.66	57.0551	51.1986	54.6296
13	14/04/01 00:05	14/04/01 23:55	Qa 38.3300	23:48:35	35.95	38.246	0.64	57.2847	51.3574	54.6371
14	14/04/02 00:05	14/04/02 23:55	Qa 38.3300	23:48:31	35.899	38.241	0.68	57.3524	51.2816	54.6276

Sample #	Average ambient temperature (°C)	Average ambient pressure (kPa)
1	16.23	101.7
2	16.85	101.67
3	16.84	101.42
4	17.28	100.99
5	15.24	101.08
6	15.4	100.83
7	15.8	100.51
8	15.39	100.43
9	15.26	101.06
10	15.67	101.31
11	16.7	101.07
12	17.57	101.1
13	17.37	101.33
14	17.49	101.24

ANNEX C – METEOROLOGICAL DATA

Report 1

	Air Temperature	Humidity	Precipitation	Wind Speed	Wind Direction
	°C	%	mm	kt	°
	[Average]	[Average]	[Sum]	[Average]	[Average]
Wed. 4 Sept 2013	25.8	71.2	0	7.3	82.5
Thu. 5 Sept 2013	24.3	78.6	18.4	7.4	104.2
Fri. 6 Sept 2013	25.2	80.8	0	3.5	182.3
Sat. 7 Sept 2013	25	71.7	0	3.1	189.7
Sun. 8 Sept 2013	25.4	75.5	0	3.2	201.1
Mon. 9 Sept 2013	25.8	73.1	0	3.9	244.8
Tue. 10 Sept 2013	25.7	74.8	0	4.4	242
Wed. 11 Sept 2013	26.2	73.5	0	4.2	206.9

Report 2

	Air Temperature	Humidity	Precipitation	Wind Speed	Wind Direction
	°C	%	mm	kt	°
	[Average]	[Average]	[Sum]	[Average]	[Average]
Thu. 12 Sept 2013	25.9	72.6	0	4.4	238.5
Fri. 13 Sept 2013	25	59.6	0	8.2	300.6
Sat. 14 Sept 2013	24.1	62	0	5.3	273.3
Sun. 15 Sept 2013	25.3	74.1	0	4.7	222.6
Mon. 16 Sept 2013	25.5	70.6	1.6	8.6	234.8
Tue. 17 Sept 2013	25.2	66.7	0	8.1	295.8
Wed. 18 Sept 2013	24.2	63.5	0	9.1	301.9
Thu. 19 Sept 2013	24.2	65.8	0	5.7	286
Fri. 20 Sept 2013	24.2	65.5	0	6.2	299
Sat. 21 Sept 2013	23.5	66.1	0	4.9	247.4
Sun. 22 Sept 2013	23.2	69.6	2.6	5.6	126.5
Mon. 23 Sept 2013	22.2	67.7	0	3.6	172.4
Tue. 24 Sept 2013	23.4	60.6	0	3	200
Wed. 25 Sept 2013	24.2	60.6	0	4.2	225

Report 3

	Air Temperature	Humidity	Precipitation	Wind Speed	Wind Direction
	°C	%	mm	kt	°
	[Average]	[Average]	[Sum]	[Average]	[Average]
Thu. 26 Sept 2013	25	77.4	0	4	180.5
Fri. 27 Sept 2013	24.9	76.5	0	4.1	253.7
Sat. 28 Sept 2013	23.9	78.9	0	4.3	181.7
Sun. 29 Sept 2013	25.8	82.5	0	7	159.4
Mon. 30 Sept 2013	25.4	70.6	0	7.7	295.7
Tue. 01 Oct 2013	24.9	64.8	0	10	297.3
Wed. 02 Oct 2013	24.2	71.1	0	5.3	273.3

Report 4

	Air Temperature	Humidity	Precipitation	Wind Speed	Wind Direction
	°C	%	mm	kt	°
	[Average]	[Average]	[Sum]	[Average]	[Average]
Thu. 3 Oct 2013	23.7	75.1	0	7.2	138.9
Fri. 4 Oct 2013	23.6	71	0	8.4	110.7
Sat. 5 Oct 2013	23.7	68.1	0	7.6	144.8
Sun. 6 Oct 2013	24.1	75.5	2.8	5.3	197.7
Mon. 7 Oct 2013	24.1	70.6	0	3.8	241.7
Tue. 8 Oct 2013	21.5	78.5	9.4	3.3	220.4
Wed. 9 Oct 2013	22.8	77.3	0	3.7	174.5
Thu. 10 Oct 2013	24	80.6	0	4	179
Fri. 11 Oct 2013	24.9	84.7	0.2	3.7	200.6
Sat. 12 Oct 2013	25.8	79.5	0	5	171.9
Sun. 13 Oct 2013	25.3	80.9	0	4.3	202.6
Mon. 14 Oct 2013	24.6	81.5	0.2	3.4	200.8
Tue. 15 Oct 2013	24.4	82.9	0.2	3.9	227.2
Wed. 16 Oct 2013	24.6	69.4	0	12.3	286.9

Report 5

	Air Temperature	Humidity	Precipitation	Wind Speed	Wind Direction
	°C	%	mm	kt	°
	[Average]	[Average]	[Sum]	[Average]	[Average]
Thu, 17 Oct 2013	23.6	65.4	0	9	308.6
Fri. 18 Oct 2013	22.3	70.2	0	2.7	182.2
Sat. 19 Oct 2013	23.3	69.1	0	5.2	127.8
Sun. 20 Oct 2013	23.5	65.5	0	7.5	116.4
Mon. 21Oct 2013	23	70	0.6	6.5	120.9
Tue. 22 Oct 2013	21.9	68.3	0	3.4	157.5
Wed. 23 Oct 2013	22	66.7	0	4.1	153.7
Thu. 24 Oct 2013	21.7	72.5	0	3.3	176.2
Fri. 25 Oct 2013	23.2	63.3	0	4.4	193.1
Sat. 26 Oct 2013	21.8	70.4	0	3	163.4
Sun. 27 Oct 2013	21.1	67.8	0	3.1	199.8
Mon.28 Oct 2013	21.9	69.7	0	4.9	265.8
Tue. 29 Oct 2013	21.8	64.9	0	3.7	217.8
Wed. 30 Oct 2013	23	67.4	0	6.3	147.3

Report 6

	Air Temperature	Humidity	Precipitation	Wind Speed	Wind Direction
	°C	%	mm	kt	°
	[Average]	[Average]	[Sum]	[Average]	[Average]
Thu, 31 Oct 2013	22.4	71.2	0.8	7.6	146.9
Fri. 01 Nov 2013	21.1	69.8	7.4	5.8	179.0
Sat. 02 Nov 2013	20.1	71.8	3.2	3.3	217.9
Sun. 03 Nov Oct 2013	20.1	75.8	3.8	3.0	242.5
Mon. 04 Nov 2013	22.5	63.2	0.0	7.5	221.3
Tue. 05 Nov 2013	19.4	69.1	21.2	11.1	264.1
Wed. 06 Nov 2013	20.7	62.3	0.2	10.5	308.5
Thu. 07 Nov 2013	20.5	66.1	0.0	3.9	225.1
Fri. 08 Nov 2013	20.9	73.7	0.0	3.1	225.0
Sat. 09 Nov 2013	21.9	75.4	0.0	3.8	229.0
Sun. 10 Nov 2013	20.5	72.7	1.4	6.2	290.2
Mon. 11 Nov 2013	17.5	66.2	15.4	10.0	275.8
Tue. 12 Nov 2013	16.7	69.5	5.0	5.8	206.8
Wed. 13 Nov 2013	16.4	72.2	1.0	3.7	221.4

Report 7

	Air Temperature	Humidity	Precipitation	Wind Speed	Wind Direction
	°C	%	mm	kt	°
	[Average]	[Average]	[Sum]	[Average]	[Average]
Thu. 14 Nov 2013	17.4	70.2	0.0	2.9	238.9
Fri. 15 Nov 2013	18.4	71.8	1.0	3.6	236.1
Sat. 16 Nov 2013	18.4	68.5	0.0	4.4	281.7
Sun. 17 Nov 2013	18.4	67.1	0.0	3.5	158.4
Mon. 18 Nov 2013	20.7	71.1	0.0	13.2	136.1
Tue. 19 Nov 2013	19.9	51.5	0.0	12.5	235.3
Wed. 20 Nov 2013	19.4	51.7	0.0	10.0	240.0
Thu. 21 Nov 2013	17.7	58.3	0.0	7.5	274.3
Fri. 22 Nov 2013	17.7	51.3	0.0	10.1	236.9
Sat. 23 Nov 2013	16.0	58.5	1.0	7.6	265.0
Sun. 24 Nov 2013	15.2	56.4	8.4	9.7	266.7
Mon. 25 Nov 2013	14.0	72.1	14.0	5.7	279.7
Tue. 26 Nov 2013	12.6	56.7	1.2	9.5	303.1
Wed. 27 Nov 2013	12.1	59.7	0.0	4.8	297.4

Report 8

	Air Temperature	Humidity	Precipitation	Wind Speed	Wind Direction
	°C	%	mm	kt	°
	[Average]	[Average]	[Sum]	[Average]	[Average]
Thu. 28 Nov 2013	14.3	72.1	27.2	4.7	144.0
Fri. 29 Nov 2013					
Sat. 30 Nov 2013					
Sun. 01 Dec 2013	15.7	78.1	19.8	10.2	236.6
Mon. 02 Dec 2013	14.8	66.2	15.4	6.4	236.8
Tue. 03 Dec 2013	12.5	78	6	3.7	268.6
Wed. 04 Dec 2013	15.2	65.7	0	6.8	78.8
Thu. 05 Dec 2013	14	66.8	0	3.5	257.8
Fri. 06 Dec 2013	14.7	66.7	0	6.7	289.1
Sat. 07 Dec 2013	15.5	67.1	0	5.2	236.5
Sun. 08 Dec 2013	15.9	63	0	7.7	95.5
Mon. 09 Dec 2013	16.1	63.8	0	5	132.2
Tue. 10 Dec 2013	16	73.7	0	2.5	218.7
Wed. 11 Dec 2013	15.5	62.8	0	6.8	94.4

Report 9

	Air Temperature	Humidity	Precipitation	Wind Speed	Wind Direction
	°C	*%*	*mm*	*kt*	*°*
	[Average]	[Average]	[Sum]	[Average]	[Average]
Thu. 12 Dec 2013	13.7	74	0	3.5	266.5
Fri. 13 Dec 2013	13.8	74.6	0	3.9	285.6
Sat. 14 Dec 2013	14.2	73.2	0	4	283.5
Sun. 15 Dec 2013	14.3	71.6	0	4.2	287.6
Mon. 16 Dec 2013	13.9	69.1	0	5	181.8
Tue. 17 Dec 2013	14.4	63	0	5.9	86.8
Wed. 18 Dec 2013	13.8	60.8	0	4.8	139.1
Thu. 19 Dec 2013	13.1	64.3	0	3.3	174.4
Fri. 20 Dec 2013	15.3	60.2	0	7.7	93.1
Sat. 21 Dec 2013	16.2	76.1	0	8.1	81.7
Sun. 22 Dec 2013	15.8	72.7	0	10.6	79.5

Report 10

	Air Temperature	Humidity	Precipitation	Wind Speed	Wind Direction
	°C	%	mm	kt	°
	[Average]	[Average]	[Sum]	[Average]	[Average]
Mon. 23 Dec 2013	15.5	71.3	5.4	10.7	60.8
Tue. 24 Dec 2013	14.9	78.6	1.4	9.8	78.9
Wed. 25 Dec 2013	15.2	72.4	0.2	5.6	241.1
Thu. 26 Dec 2013	14.2	72.5	11.2	10.5	238.9
Fri. 27 Dec 2013	11.1	73.6	13.8	8	295.5
Sat. 28 Dec 2013	12.9	69.3	0	4.9	290.3
Sun. 29 Dec 2013	14.2	75.1	0	3.7	268.4
Mon. 30 Dec 2013	14.6	79.9	0	4.6	280.1
Tue. 31 Dec 2013	12	77.6	15.8	8.2	290.6
Wed. 01 Jan 2013	13.6	76.6	0.0	8.1	293.4
Thur. 02 Jan 2014	13.4	74.2	0.0	3.4	271.9
Fri. 03 Jan 2014	14.3	75.6	0.0	3.1	256.0
Sat. 04 Jan 2014	15.0	79.6	0.0	4.4	223.8
Sun. 05 Jan 2014	14.8	73.0	0.2	8.5	243.8
Mon. 06 Jan 2014	12.5	74.4	8.0	8.6	203.0

Report 11

	Air Temperature	Humidity	Precipitation	Wind Speed	Wind Direction
	°C	%	mm	kt	°
	[Average]	[Average]	[Sum]	[Average]	[Average]
Tue, 7 Jan 2014	14.0	67.8	0.0	6.1	189.8
Wed, 8 Jan 2014	13.1	77.1	0.0	3.2	264.3
Thu, 9 Jan 2014	13.6	77.4	0.0	3.9	260.1
Fri, 10 Jan 2014	15.9	73.8	0.0	5.8	231.9
Sat, 11 Jan 2014	16.0	85.0	0.0	3.8	176.0
Sun, 12 Jan 2014	15.9	89.3	0.8	2.7	190.6
Mon, 13 Jan 2014	13.9	84.5	0.0	4.1	232.8
Tue, 14 Jan 2014	14.3	79.8	1.0	3.2	223.2
Wed, 15 Jan 2014	12.7	82.0	20.4	3.6	258.2
Thu, 16 Jan 2014	13.0	70.6	0.0	4.1	274.6
Fri, 17 Jan 2014	15.3	68.1	0.0	8.8	184.6
Sat, 18 Jan 2014	17.0	77.6	0.0	10.6	162.6
Sun, 19 Jan 2014	17.3	75.2	0.0	6.3	199.6
Mon, 20 Jan 2014	15.9	66.1	0.0	9.9	232.1
Tue, 21 Jan 2014	13.5	58.6	0.0	10.0	273.7

Report 12

	Air Temperature	Humidity	Precipitation	Wind Speed	Wind Direction
	°C	%	mm	kt	°
	[Average]	[Average]	[Sum]	[Average]	[Average]
Wed, 22 Jan 2014	14.2	61.0	0.0	6.7	246.1
Thu, 23 Jan 2014	15.7	74.5	0.0	7.0	160.2
Fri, 24 Jan 2014	14.2	74.4	6.2	10.8	260.0
Sat, 25 Jan 2014	12.2	69.0	11.8	14.3	287.6
Sun, 26 Jan 2014	13.0	62.0	0.0	12.8	302.3
Mon, 27 Jan 2014	13.6	67.0	0.4	8.5	274.2
Tue, 28 Jan 2014	12.1	71.2	2.2	8.7	292.1
Wed, 29 Jan 2014	14.2	59.8	0.0	8.0	222.2
Thu, 30 Jan 2014	15.7	79.6	0.0	12.1	133.2
Fri, 31 Jan 2014	16.3	83.5	0.0	7.8	146
Sat, 01 Feb 2014	13.8	87.6	40.2	6.7	173.1
Sun, 02 Feb 2014	13.5	78.6	1.8	6.2	187.4
Mon, 03 Feb 2014	12.5	64.6	0	8.8	286.7
Tue, 04 Feb 2014	13.9	60.7	0	5.1	229
Wed, 05 Feb 2014	12.9	75.4	5.8	4.4	242.2

Report 13

	Air Temperature	Humidity	Precipitation	Wind Speed	Wind Direction
	°C	%	mm	kt	°
	[Average]	[Average]	[Sum]	[Average]	[Average]
Thursday, 06 Feb 2014	14.5	71.1	0	8.7	278.9
Friday, 07 Feb 2014	13.8	73.7	0	4.1	194.4
Saturday, 08 Feb 2014	13.8	77.5	0	6.3	274.6
Sunday, 09 Feb 2014	14.4	76.1	0	6.2	245.2
Monday, 10 Feb 2014	15.3	84	0	5.9	173.9
Tuesday, 11 Feb 2014	14.1	82	2.6	9.2	231.7
Wednesday, 12 Feb 2014	12.8	68	2.6	8.7	271.3
Thursday, 13 February 2014	12.9	71	0.4	8.7	297.8
Friday, 14 February 2014	15.3	78.5	0	10.5	279
Saturday, 15 February 2014	14.6	83.7	0.2	3.3	202.3
Sunday, 16 February 2014	15.7	90.1	0.2	5	188.7
Monday, 17 February 2014	15.8	90.8	0.4	5.3	159.3

Report 14

	Air Temperature	Humidity	Precipitation	Wind Speed	Wind Direction
	°C	*%*	*mm*	*kt*	*°*
	[Average]	[Average]	[Sum]	[Average]	[Average]
Tuesday, 18 February 2014	16	85.4	0.2	7	128
Wednesday, 19 February 2014	16.3	82.4	0	6.4	151
Thursday, 20 Feb 2014	15.8	85.9	0	6.6	50.3
Friday, 21 Feb 2014	14.2	73.6	1	13.1	292
Saturday, 22 February 2014	14.1	80.2	0	5.9	278
Sunday, 23 February 2014	13	70.7	0	6.7	297.5
Monday, 24 February 2014	12.6	68.4	0	5	285.1
Tuesday, 25 Feb 2014	13.2	65.7	0	4.3	162
Wednesday, 26 February 2014	14.2	70.6	0	4.3	113.2
Thursday, 27 February 2014	12.3	83.2	7.4	4	141.2
Friday, 28 February 2014	12	72.9	0	4.8	291.4
Saturday, 01 March 2014	12.1	64.8	0.2	7.4	260.5
Sunday, 02 March 2014	11	82.1	6.4	4.7	229.3
Monday, 03 March 2014	12.8	69.4	9	9.1	274.8
Tuesday, 04 March 2014	11.7	69.4	1.8	9.6	280.4

Report 15

	Air Temperature	Humidity	Precipitation	Wind Speed	Wind Direction
	°C	%	mm	kt	°
	[Average]	[Average]	[Sum]	[Average]	[Average]
Wednesday, 05 March 2014	11.7	74.1	3.4	11.5	272.2
Thursday, 06 March 2014	12	72.3	0	5.1	284.9
Friday, 07 March 2014	12.5	74.2	0	4.3	252.2
Saturday, 08 March 2014	12.9	73.5	0.4	9.1	129.3
Sunday, 09 March 2014	12.7	76.5	12.4	6.7	99.5
Monday, 10 March 2014	12	75.3	0	4.3	159.3
Tuesday, 11 March 2014	11.5	74.2	3.4	3	238.2
Wednesday, 12 March 2014	13	72.7	0	5.2	143.3
Thursday, 13 March 2014	14.1	71.2	0	10.9	86.7
Friday, 14 March 2014	15.2	75.4	0	12.7	94.4
Saturday, 15 March 2014	15	80.3	0	8.2	67.8
Sunday, 16 March 2014	14.2	77.8	0	6.4	301.2
Monday, 17 March 2014	14.6	80.1	0	4.6	283.8
Tuesday, 18 March 2014	15.8	75.3	0	3.8	240.3
Wednesday, 19 March 2014	14.7	82.1	0.2	4.3	233.3

Report 16

	Air Temperature	Humidity	Precipitation	Wind Speed	Wind Direction
	°C	%	mm	kt	°
	[Average]	[Average]	[Sum]	[Average]	[Average]
Thursday, 20 March 2014	14.9	83.4	0.2	4.6	110.6
Friday, 21 March 2014	15	79.9	0	5.9	78.7
Saturday, 22 March 2014	14.8	82.4	0	4.3	137.7
Sunday, 23 March 2014	15.3	85.2	0	5.7	172.1
Monday, 24 March 2014	13.7	62.1	0	9.8	294.7
Tuesday, 25 March 2014	14.4	70.9	0	8	252.3
Wednesday, 26 March 2014	14.6	75.2	0	8.2	196.5
Thursday, 27 March 2014	14.2	64.4	0	10.5	257.5
Friday, 28 March 2014	13.9	70.2	0	8.5	281.6
Saturday, 29 March 2014	14.4	74.6	0	6.9	135
Sunday, 30 March 2014	15.7	74.1	0	10.1	89.6
Monday, 31 March 2014	15.6	70.1	0	6.8	157.2
Tuesday, 01 April 2014					
Wednesday, 02 April 2014					

ANNEX D – MONTHLY REPORTS SCHEDULE S4.5 OF THE IPPC PERMIT **IP0002/07/D**

S4.5 Ambient Air Quality Monitoring

Sampling location:		**Marsaxlokk**	
Day	**Date**	**PM_{10} (µg/m^3)**	**$PM_{2.5}$ (µg/m^3)**
Wednesday	13/09/04	NA[26]	NA
Thursday	13/09/05	18.87	6.24
Friday	13/09/06	37.91	NA
Saturday	13/09/07	34.62	NA
Sunday	13/09/08	37.18	NA
Monday	13/09/09	NA	NA
Tuesday	13/09/10	20.88	13.57
Wednesday	13/09/11	19.60	11.55
Average during reporting period		28.18	10.45
Average during calendar year (to date)		28.18	10.45
Number of exceedances of daily limit value registered during calendar year (to date)		0	0

Note: in the table above underline measurements which exceed the daily limit value of 50 µg/m^3 for PM10. in accordance with LN 478/2010. PM2.5 values were not adjusted for Saharan dust contribution because of no data available from Għarb station.

Name of laboratory carrying out sampling and measurement	AMBIENTE

Additional documentation to be submitted (if not identical to the submission in the previous month):

Accreditation certificate(s) of laboratory: ACCREDIA 510

[26] Not available due to power interruption. Same reason applicable to the rest of the NA data

S4.5 Ambient Air Quality Monitoring

Sampling location:		**Birżebbuġa**	
Day	**Date**	**PM_{10} (µg/m^3)**	**$PM_{2.5}$ (µg/m^3)**
Wednesday	13/09/04	38.09	12.08
Thursday	13/09/05	28.76	9.34
Friday	13/09/06	44.33	13.00
Saturday	13/09/07	34.07	13.18
Sunday	13/09/08	34.25	17.94
Monday	13/09/09	33.88	1.83
Tuesday	13/09/10	23.07	13.18
Wednesday	13/09/11	21.24	10.98
Average during reporting period		32.21	11.44
Average during calendar year (to date)		32.21	11.44
Number of exceedances of daily limit value registered during calendar year (to date)		**0**	**0**

Note: in the table above underline measurements which exceed the daily limit value of 50 µg/m^3 for PM10. in accordance with LN 478/2010. PM2.5 values were not adjusted for Saharan dust contribution because of no data available from Għarb station.

Name of laboratory carrying out sampling and measurement	AMBIENTE

Additional documentation to be submitted (if not identical to the submission in the previous month):

Accreditation certificate(s) of laboratory: ACCREDIA 510

Ambient Air Quality Monitoring

Sampling location:		**Marsaxlokk**	
Day	**Date**	**PM_{10} (µg/m^3)**	**$PM_{2.5}$ (µg/m^3)**
Thursday	13/09/12		
Friday	13/09/13	33.70	14.49
Saturday	13/09/14	32.78	12.10
Sunday	13/09/15	34.44	17.24
Monday	13/09/16	32.79	15.96
Tuesday	13/09/17	37.00	
Wednesday	13/09/18	35.53	
Thursday	13/09/19	35.17	
Friday	13/09/20	33.52	
Saturday	13/09/21	36.81	
Sunday	13/09/22	45.23	
Monday	13/09/23	28.94	
Tuesday	13/09/24	35.90	
Wednesday	13/09/25	37.34	
Average during reporting period		35.32	14.95
Average during calendar year (to date)		33.06	13.02
Number of exceedances of daily limit value registered during calendar year (to date)		0	0

Note: in the table above underline measurements which exceed the daily limit value of 50 µg/m^3 for PM10. in accordance with LN 478/2010. PM2.5 values were not adjusted for Saharan dust contribution because of no data available from Għarb station.

Name of laboratory carrying out sampling and measurement	AMBIENTE

Additional documentation to be submitted (if not identical to the submission in the previous month):

Accreditation certificate(s) of laboratory: ACCREDIA 510

S4.5 Ambient Air Quality Monitoring

Sampling location:		**Birżebbuġa**	
Day	**Date**	**PM_{10} (µg/m^3)**	**$PM_{2.5}$ (µg/m^3)**
Thursday	13/09/12		
Friday	13/09/13	30.03	12.99
Saturday	13/09/14		16.47
Sunday	13/09/15		13.91
Monday	13/09/16		14.28
Tuesday	13/09/17		17.02
Wednesday	13/09/18		15.01
Thursday	13/09/19		15.74
Friday	13/09/20		13.36
Saturday	13/09/21		15.93
Sunday	13/09/22		16.29
Monday	13/09/23		15.74
Tuesday	13/09/24		19.95
Wednesday	13/09/25		19.03
Average during reporting period		30.03	15.83
Average during calendar year (to date)		31.97	14.16
Number of exceedances of daily limit value registered during calendar year (to date)		**0**	**0**

Note: in the table above underline measurements which exceed the daily limit value of 50 µg/m^3 for PM10. in accordance with LN 478/2010. PM2.5 values were not adjusted for Saharan dust contribution because of no data available from Għarb station.

Name of laboratory carrying out sampling and measurement	AMBIENTE

Additional documentation to be submitted (if not identical to the submission in the previous month):

Accreditation certificate(s) of laboratory: ACCREDIA 510

S4.5 Ambient Air Quality Monitoring

Sampling location:		**Marsaxlokk**	
Day	**Date**	**PM_{10} (µg/m^3)**	**$PM_{2.5}$ (µg/m^3)**
Thursday	13/09/26	NV	*NV*
Friday	13/09/27	47.44	*N.V*
Saturday	13/09/28	40.49	17.60
Sunday	13/09/29	53.50	16.69
Monday	13/09/30	61.36	17.61
Tuesday	13/10/01	44.51	16.33
Wednesday	13/10/02	42.67	14.86
Average during reporting period		48.3	16.62
Average during calendar year (to date)		36.73	14.52
Number of exceedances of daily limit value registered during calendar year (to date)		2	0

Note: in the table above underline measurements which exceed the daily limit value of 50 µg/m^3 for PM10. in accordance with LN 478/2010. PM2.5 values were not adjusted for Saharan dust contribution because of no data available from Għarb station.

Name of laboratory carrying out sampling and measurement	AMBIENTE

Additional documentation to be submitted (if not identical to the submission in the previous month):

Accreditation certificate(s) of laboratory: ACCREDIA 510

S4.5 Ambient Air Quality Monitoring

Sampling location:		**Birżebbuġa**	
Day	**Date**	**PM_{10} (µg/m^3)**	**$PM_{2.5}$ (µg/m^3)**
Thursday	13/09/26	*N.V*	*N.V*
Friday	13/09/27	*N.V*	*N.V*
Saturday	13/09/28	*N.V*	17.77
Sunday	13/09/29	*N.V*	20.88
Monday	13/09/30	*N.V*	15.57
Tuesday	13/10/01	*N.V*	10.26
Wednesday	13/10/02	*N.V*	15.20
Average during reporting period			15.94
Average during calendar year (to date)		31.97	14.50
Number of exceedances of daily limit value registered during calendar year (to date)		**0**	**0**

Note: in the table above underline measurements which exceed the daily limit value of 50 µg/m^3 for PM10. in accordance with LN 478/2010. PM2.5 values were not adjusted for Saharan dust contribution because of no data available from Gharb station.

Name of laboratory carrying out sampling and measurement	AMBIENTE

Additional documentation to be submitted (if not identical to the submission in the previous month):

Accreditation certificate(s) of laboratory: ACCREDIA 510

S4.5 Ambient Air Quality Monitoring

Sampling location:		**Marsaxlokk**	
Day	**Date**	**PM_{10} ($\mu g/m^3$)**	**$PM_{2.5}$ ($\mu g/m^3$)**
Thursday	13/10/03	33.15	12.28
Friday	13/10/04	25.63	13.75
Saturday	13//05	18.13	8.98
Sunday	13/10/06	21.43	9.72
Monday	13/10/07	34.61	13.39
Tuesday	13/10/08	25.63	11.92
Wednesday	13/10/09	27.29	11.56
Thursday	13/10/10	56.58	12.93
Friday	13/10/11	*N.V*	*N.V*
Saturday	13/10/12	*N.V*	*N.V*
Sunday	13/10/13	42.84	*N.V*
Monday	13/10/14	38.09	*N.V*
Tuesday	13/10/15	*N.V*	*N.V*
Wednesday	13/10/16	52.38	*N.V*
Average during reporting period		34.16	11.82
Average during calendar year (to date)		35.94	13.44
Number of exceedances of daily limit value registered during calendar year (to date)		4	0

Note: in the table above underline measurements which exceed the daily limit value of 50 $\mu g/m^3$ for PM10. in accordance with LN 478/2010. PM2.5 values were not adjusted for Saharan dust contribution because of no data available from Gharb station.

Name of laboratory carrying out sampling and measurement	AMBIENTE

Additional documentation to be submitted (if not identical to the submission in the previous month):

Accreditation certificate(s) of laboratory: ACCREDIA 510

S4.5 Ambient Air Quality Monitoring

Sampling location:		**Birżebbuġa**	
Day	**Date**	**PM_{10} (μg/m^3)**	**$PM_{2.5}$ (μg/m^3)**
Thursday	13/10/03	*N.V.*	*N.V*
Friday	13/10/04	*N.V.*	11.35
Saturday	13/10/05	*N.V.*	11.72
Sunday	13/10/06	*N.V.*	7.87
Monday	13/10/07	*N.V.*	2.01
Tuesday	13/10/08	*N.V.*	8.07
Wednesday	13/10/09	*N.V.*	8.61
Thursday	13/10/10	*N.V.*	9.89
Friday	13/10/11	*N.V.*	16.73
Saturday	13/10/12	*N.V.*	12.45
Sunday	13/10/13	*N.V.*	8.87
Monday	13/10/14	*N.V.*	1.83
Tuesday	13/10/15	*N.V.*	13.76
Wednesday	13/10/16	*N.V.*	14.46
Average during reporting period			9.82
Average during calendar year (to date)		31.97	12.94
Number of exceedances of daily limit value registered during calendar year (to date)		0	0

Note: in the table above underline measurements which exceed the daily limit value of 50 μg/m^3 for PM10. in accordance with LN 478/2010. PM2.5 values were not adjusted for Saharan dust contribution because of no data available from Għarb station.

Name of laboratory carrying out sampling and measurement	AMBIENTE

Additional documentation to be submitted (if not identical to the submission in the previous month):

Accreditation certificate(s) of laboratory: ACCREDIA 510

S4.5 Ambient Air Quality Monitoring

Sampling location:		**Marsaxlokk**	
Day	**Date**	**PM_{10} (µg/m^3)**	**$PM_{2.5}$ (µg/m^3)**
Thursday	13/10/17	30.29	N.V.
Friday	13/10/18	31.68	N.V.
Saturday	13/10/19	5.31	N.V.
Sunday	13/10/20	12.63	N.V.
Monday	13/10/21	12.94	N.V.
Tuesday	13/10/22	15.38	N.V.
Wednesday	13/10/23	13.55	N.V.
Thursday	13/10/24	17.03	8.61
Friday	13/10/25	18.13	9.16
Saturday	13/10/26	15.56	10.45
Sunday	13/10/27	21.42	11.73
Monday	13/10/28	23.62	12.47
Tuesday	13/10/29	16.11	9.53
Wednesday	13/10/30	8.24	6.78
Average during reporting period		17.28	9.82
Average during calendar year (to date)		30.72	12.50
Number of exceedances of daily limit value registered during calendar year (to date)		4	0

Note: in the table above underline measurements which exceed the daily limit value of 50 µg/m^3 for PM10, in accordance with LN 478/2010. PM2.5 values were not adjusted for Saharan dust contribution because of no data available from Għarb station.

Name of laboratory carrying out sampling and measurement	AMBIENTE

Additional documentation to be submitted (if not identical to the submission in the previous month):

Accreditation certificate(s) of laboratory: ACCREDIA 510

S4.5 Ambient Air Quality Monitoring

Sampling location:		**Birżebbuġa**	
Day	**Date**	**PM_{10} (µg/m^3)**	**$PM_{2.5}$ (µg/m^3)**
Thursday	13/10/17	N.V.	N.V.
Friday	13/10/18	26.40	6.79
Saturday	13/10/19	18.30	5.13
Sunday	13/10/20	19.96	5.68
Monday	13/10/21	N.V.	N.V.
Tuesday	13/10/22	20.78	4.71
Wednesday	13/10/23	17.94	1.83
Thursday	13/10/24	20.05	7.91
Friday	13/10/25	17.95	8.43
Saturday	13/10/26	20.22	10.30
Sunday	13/10/27	17.96	9.90
Monday	13/10/28	20.72	12.47
Tuesday	13/10/29	15.38	7.51
Wednesday	13/10/30	15.56	5.86
Average during reporting period		19.27	7.21
Average during calendar year (to date)		24.71	11.59
Number of exceedances of daily limit value registered during calendar year (to date)		0	0

Note: in the table above underline measurements which exceed the daily limit value of 50 µg/m^3 for PM10, in accordance with LN 478/2010. PM2.5 values were not adjusted for Saharan dust contribution because of no data available from Għarb station.

Name of laboratory carrying out sampling and measurement	AMBIENTE

Additional documentation to be submitted (if not identical to the submission in the previous month):

Accreditation certificate(s) of laboratory: ACCREDIA 510

5 Ambient Air Quality Monitoring

Sampling location:		Marsaxlokk	
Day	**Date**	**PM_{10} ($\mu g/m^3$)**	**$PM_{2.5}$ ($\mu g/m^3$)**
Thursday	13/10/31	13.59	2.95
Friday	13/11/01	15.75	4.40
Saturday	13/11/02	20.14	11.36
Sunday	13/11/03	18.31	2.20
Monday	13/11/04	18.49	2.75
Tuesday	13/11/05	32.59	<1.83
Wednesday	13/11/06	32.65	<1.83
Thursday	13/11/07	31.30	4.22
Friday	13/11/08	30.39	<1.83
Saturday	13/11/09	23.62	2.93
Sunday	13/11/10	26.91	2.75
Monday	13/11/11	29.65	<1.83
Tuesday	13/11/12	13.18	<1.83
Wednesday	13/11/13	9.89	2.38
Average during reporting period		22.60	3.22
Average during calendar year (to date)		28.94	9.57
Number of exceedances of daily limit value registered during calendar year (to date)		4	0

Note: in the table above underline measurements which exceed the daily limit value of 50 $\mu g/m^3$ for PM10, in accordance with LN 478/2010. PM2.5 values were not adjusted for Saharan dust contribution because of no data available from Għarb station.

Name of laboratory carrying out sampling and measurement	AMBIENTE

Additional documentation to be submitted (if not identical to the submission in the previous month):

Accreditation certificate(s) of laboratory: ACCREDIA 510

S4.5 Ambient Air Quality Monitoring

Sampling location:		**Birżebbuġa**	
Day	**Date**	**PM_{10} (µg/m^3)**	**$PM_{2.5}$ (µg/m^3)**
Thursday	13/10/31	N.V.	N.V.
Friday	13/11/01	N.V.	N.V.
Saturday	13/11/02	38.08	15.55
Sunday	13/11/03	10.07	<1.83
Monday	13/11/04	22.00	<1.83
Tuesday	13/11/05	14.64	<1.83
Wednesday	13/11/06	17.24	<1.83
Thursday	13/11/07	3.11	<1.83
Friday	13/11/08	13.08	<1.83
Saturday	13/11/09	8.97	<1.83
Sunday	13/11/10	12.09	<1.83
Monday	13/11/11	6.77	<1.83
Tuesday	13/11/12	7.69	<1.83
Wednesday	13/11/13	6.41	<1.83
	Average during reporting period	13.35	2.98
	Average during calendar year (to date)	20.58	9.95
	Number of exceedances of daily limit value registered during calendar year (to date)	0	0

Note: in the table above underline measurements which exceed the daily limit value of 50 µg/m^3 for PM10, in accordance with LN 478/2010. PM2.5 values were not adjusted for Saharan dust contribution because of no data available from Għarb station.

Name of laboratory carrying out sampling and measurement	AMBIENTE

Additional documentation to be submitted (if not identical to the submission in the previous month):

Accreditation certificate(s) of laboratory: ACCREDIA 510

S4.5 Ambient Air Quality Monitoring

Sampling location:		**Marsaxlokk**	
Day	**Date**	**PM_{10} (µg/m^3)**	**$PM_{2.5}$ (µg/m^3)**
Thursday	13/11/14	26.17	13.59
Friday	13/11/15	16.29	13.75
Saturday	13/11/16	13.91	10.64
Sunday	13/11/17	12.09	6.97
Monday	13/11/18	10.25	7.34
Tuesday	13/11/19	59.9	28.98
Wednesday	13/11/20	24.90	15.03
Thursday	13/11/21	15.19	3.30
Friday	13/11/22	21.42	14.48
Saturday	13/11/23	40.09	25.10
Sunday	13/11/24	4.95	4.58
Monday	13/11/25	10.99	2.20
Tuesday	13/11/26	10.80	8.98
Wednesday	13/11/27	17.58	14.65
Average during reporting period		20.85	12.12
Average during calendar year (to date)		27.49	10.04
Number of exceedances of daily limit value registered during calendar year (to date)		5	0

Note: in the table above underline measurements which exceed the daily limit value of 50 µg/m^3 for PM10, in accordance with LN 478/2010. PM2.5 values were not adjusted for Saharan dust contribution because of no data available from Għarb station.

Name of laboratory carrying out sampling and measurement	AMBIENTE

Additional documentation to be submitted (if not identical to the submission in the previous month):

Accreditation certificate(s) of laboratory: ACCREDIA 510

S4.5 Ambient Air Quality Monitoring

Sampling location:		**Birżebbuġa**	
Day	**Date**	**PM_{10} (µg/m^3)**	**$PM_{2.5}$ (µg/m^3)**
Thursday	13/11/14	10.12	4.22
Friday	13/11/15	<1.83	<1.83
Saturday	13/11/16	7.87	<1.83
Sunday	13/11/17	6.95	<1.83
Monday	13/11/18	15.01	<1.83
Tuesday	13/11/19	66.82	12.08
Wednesday	13/11/20	28.55	2.01
Thursday	13/11/21	11.35	<1.83
Friday	13/11/22	25.07	<1.83
Saturday	13/11/23	10.98	<1.83
Sunday	13/11/24	4.76	<1.83
Monday	13/11/25	5.49	<1.83
Tuesday	13/11/26	7.87	2.56
Wednesday	13/11/27	2.75	2.20
Average during reporting period		15.20	2.83
Average during calendar year (to date)		18.97	8.65
Number of exceedances of daily limit value registered during calendar year (to date)		1	0

Note: in the table above underline measurements which exceed the daily limit value of 50 µg/m^3 for PM10. in accordance with LN 478/2010. PM2.5 values were not adjusted for Saharan dust contribution because of no data available from Għarb station.

Name of laboratory carrying out sampling and measurement	AMBIENTE

Additional documentation to be submitted (if not identical to the submission in the previous month):

Accreditation certificate(s) of laboratory: ACCREDIA 510

Ambient Air Quality Monitoring

Sampling location:		**Marsaxlokk**	
Day	**Date**	**PM_{10} (µg/m^3)**	**$PM_{2.5}$ (µg/m^3)**
Thursday	13/12/12	N.V.	N.V.
Friday	13/12/13	32.78	20.70
Saturday	13/12/14	34.06	6.04
Sunday	13/12/15	40.10	27.11
Monday	13/12/16	26.97	15.99
Tuesday	13/12/17	22.15	13.37
Wednesday	13/12/18	25.09	15.21
Thursday	13/12/19	28.56	11.17
Friday	13/12/20	8.60	2.75
Saturday	13/12/21	19.04	10.44
Sunday	13/12/22	21.42	17.04
Average during reporting period		25.88	13.98
Average during calendar year (to date)		27.22	10.65
Number of exceedances of daily limit value registered during calendar year (to date)		5	0

Note: in the table above underline measurements which exceed the daily limit value of 50 µg/m^3 for PM10, in accordance with LN 478/2010. PM2.5 values were not adjusted for Saharan dust contribution because of no data available from Għarb station.

Name of laboratory carrying out sampling and measurement	AMBIENTE

Additional documentation to be submitted (if not identical to the submission in the previous month):

Accreditation certificate(s) of laboratory: ACCREDIA 510

S4.5 Ambient Air Quality Monitoring

Sampling location:		**Birżebbuġa**	
Day	**Date**	**PM_{10} (µg/m^3)**	**$PM_{2.5}$ (µg/m^3)**
Thursday	13/12/12	N.V.	N.V.
Friday	13/12/13	27.82	16.11
Saturday	13/12/14	24.71	15.56
Sunday	13/12/15	23.24	14.47
Monday	13/12/16	26.55	18.95
Tuesday	13/12/17	38.62	13.00
Wednesday	13/12/18	27.64	13.73
Thursday	13/12/19	23.79	14.64
Friday	13/12/20	12.81	9.34
Saturday	13/12/21	20.13	9.70
Sunday	13/12/22	39.91	10.07
Average during reporting period		26.52	13.56
Average during calendar year (to date)		20.17	9.22
Number of exceedances of daily limit value registered during calendar year (to date)		1	0

Note: in the table above underline measurements which exceed the daily limit value of 50 µg/m^3 for PM10. in accordance with LN 478/2010. PM2.5 values were not adjusted for Saharan dust contribution because of no data available from Għarb station.

Name of laboratory carrying out sampling and measurement	AMBIENTE

Additional documentation to be submitted (if not identical to the submission in the previous month):

Accreditation certificate(s) of laboratory: ACCREDIA 510

Ambient Air Quality Monitoring

Sampling location:		**Marsaxlokk**	
Day	**Date**	**PM_{10} (μg/m^3)**	**$PM_{2.5}$ (μg/m^3)**
Monday	13/12/23	13.64	12.29
Tuesday	13/12/24	25.81	11.91
Wednesday	13/12/25	23.98	13.56
Thursday	13/12/26	31.86	11.91
Friday	13/12/27	21.97	12.64
Saturday	13/12/28	38.28	17.59
Sunday	13/12/29	35.52	16.49
Monday	13/12/30	29.11	13.92
Tuesday	13/12/31	23.67	10.18
Wednesday	14/01/01	26.18	11.91
Thursday	14/01/02	28.75	14.84
Friday	14/01/03	33.88	15.94
Saturday	14/01/04	14.28	13.92
Sunday	14/01/05	26.18	11.36
Monday	14/01/06	18.31	10.26
Average during reporting period		26.09	13.25
Average during calendar year (to date)		27.06	11.13
Number of exceedances of daily limit value registered during calendar year (to date)		5	0

Note: in the table above underline measurements which exceed the daily limit value of 50 µg/m^3 for PM10, in accordance with LN 478/2010. PM2.5 values were not adjusted for Saharan dust contribution because of no data available from Għarb station.

Name of laboratory carrying out sampling and measurement	AMBIENTE

Additional documentation to be submitted (if not identical to the submission in the previous month):

Accreditation certificate(s) of laboratory: ACCREDIA 510

S4.5 Ambient Air Quality Monitoring

Sampling location:		**Birżebbuġa**	
Day	**Date**	**PM_{10} (μg/m^3)**	**$PM_{2.5}$ (μg/m^3)**
Monday	13/12/23	18.52	8.83
Tuesday	13/12/24	31.11	10.62
Wednesday	13/12/25	18.12	10.25
Thursday	13/12/26	27.09	8.79
Friday	13/12/27	17.75	6.77
Saturday	13/12/28	22.14	10.80
Sunday	13/12/29	19.22	9.15
Monday	13/12/30	19.22	10.43
Tuesday	13/12/31	14.28	7.32
Wednesday	14/01/01	18.48	8.24
Thursday	14/01/02	23.80	12.44
Friday	14/01/03	29.28	17.75
Saturday	14/01/04	N.V.	N.V.
Sunday	14/01/05	N.V.	N.V.
Monday	14/01/06	N.V.	N.V.
Average during reporting period		21.58	10.12
Average during calendar year (to date)		20.42	9.33
Number of exceedances of daily limit value registered during calendar year (to date)		1	0

Note: in the table above underline measurements which exceed the daily limit value of 50 μg/m^3 for PM10. in accordance with LN 478/2010. PM2.5 values were not adjusted for Saharan dust contribution because of no data available from Għarb station.

Name of laboratory carrying out sampling and measurement	AMBIENTE

Additional documentation to be submitted (if not identical to the submission in the previous month):

Accreditation certificate(s) of laboratory: ACCREDIA 510

Sampling location:		Marsaxlokk	
Day	**Date**	**PM10 (µg/m3)**	**PM2.5 (µg/m3)**
Tuesday	14/01/07	20.5	12.53
Wednesday	14/01/08	8.1	3.11
Thursday	14/01/09	27.1	13.65
Friday	14/01/10	22.2	3.48
Saturday	14/01/11	28.9	11.73
Sunday	14/01/12	31.9	11.92
Monday	14/01/13	28.4	11.00
Tuesday	14/01/14	30.9	13.38
Wednesday	14/01/15	24.9	11.92
Thursday	14/01/16	37.2	16.87
Friday	14/01/17	20.70	5.68
Saturday	14/01/18	13.82	17.24
Sunday	14/01/19	41.07	26.85
Monday	14/01/20	21.61	33.37
Tuesday	14/01/21	21.61	2.57
Average during reporting period		42.29	13.43
Average during calendar year (to date)		29.06	11.43
Number of exceedances of daily limit value registered during calendar year (to date)		5	0

Note: in the table above underline measurements which exceed the daily limit value of 50 µg/m³ for PM10, in accordance with LN 478/2010. PM2.5 values were not adjusted for Saharan dust contribution because of no data available from Għarb station.

Name of laboratory carrying out sampling and measurement	AMBIENTE

Additional documentation to be submitted (if not identical to the submission in the previous month):

Accreditation certificate(s) of laboratory: ACCREDIA 510

S4.5 Ambient Air Quality Monitoring

Sampling location:		**Birżebbuġa**	
Day	**Date**	**PM_{10} (µg/m^3)**	**$PM_{2.5}$ (µg/m^3)**
Tuesday	14/01/07	N.V.	N.V.
Wednesday	14/01/08	23.79	9.89
Thursday	14/01/09	18.33	8.87
Friday	14/01/10	19.40	7.69
Saturday	14/01/11	24.71	7.69
Sunday	14/01/12	22.70	6.41
Monday	14/01/13	22.70	9.52
Tuesday	14/01/14	12.45	11.90
Wednesday	14/01/15	21.41	9.34
Thursday	14/01/16	23.43	10.25
Friday	14/01/17	18.85	<1.83
Saturday	14/01/18	23.75	20.88
Sunday	14/01/19	11.13	27.64
Monday	14/01/20	41.7	32.96
Tuesday	14/01/21	10.25	9.88
Average during reporting period		40.28	13.30
Average during calendar year (to date)		23.86	9.79
Number of exceedances of daily limit value registered during calendar year (to date)		1	0

Note: in the table above underline measurements which exceed the daily limit value of 50 µg/m^3 for PM10. in accordance with LN 478/2010. PM2.5 values were not adjusted for Saharan dust contribution because of no data available from Għarb station.

Name of laboratory carrying out sampling and measurement	AMBIENTE

Additional documentation to be submitted (if not identical to the submission in the previous month):

Accreditation certificate(s) of laboratory: ACCREDIA 510

Ambient Air Quality Monitoring

Sampling location:		**Marsaxlokk**	
Day	**Date**	**PM10 (µg/m3)**	**PM2.5 (µg/m3)**
Wednesday	14/01/22	23.10	7.55
Thursday	14/01/23	29.30	5.50
Friday	14/01/24	23.26	6.97
Saturday	14/01/25	17.02	7.52
Sunday	14/01/26	14.65	6.97
Monday	14/01/27	18.86	17.60
Tuesday	14/01/28	12.73	4.25
Wednesday	14/01/29	24.72	4.03
Thursday	14/01/30	23.64	15.41
Friday	14/01/31	45.66	44.20
Saturday	14/02/01	11.52	39.96
Sunday	14/02/02	26.37	1.83
Monday	14/02/03	21.43	6.41
Tuesday	14/02/04	28.57	17.05
Wednesday	14/02/05	21.24	5.68
Average during reporting period		22.80	12.73
Average during calendar year (to date)		26.38	11.61
Number of exceedances of daily limit value registered during calendar year (to date)		5	0

Note: in the table above underline measurements which exceed the daily limit value of 50 µg/m^3 for PM10, in accordance with LN 478/2010. PM2.5 values were not adjusted for Saharan dust contribution because of no data available from Għarb station.

Name of laboratory carrying out sampling and measurement	AMBIENTE

Additional documentation to be submitted (if not identical to the submission in the previous month):

Accreditation certificate(s) of laboratory: ACCREDIA 510

S4.5 Ambient Air Quality Monitoring

Sampling location:		**Birżebbuġa**	
Day	**Date**	**PM_{10} (µg/m^3)**	**$PM_{2.5}$ (µg/m^3)**
Wednesday	14/01/22	6.96	6.64
Thursday	14/01/23	19.24	8.60
Friday	14/01/24	36.25	3.11
Saturday	14/01/25	23.61	1.83
Sunday	14/01/26	17.39	4.76
Monday	14/01/27	20.68	5.49
Tuesday	14/01/28	20.68	3.11
Wednesday	14/01/29	13.18	1.83
Thursday	14/01/30	23.61	14.65
Friday	14/01/31	34.07	32.77
Saturday	14/02/01	62.24	36.79
Sunday	14/02/02	50.10	7.38
Monday	14/02/03	40.94	5.31
Tuesday	14/02/04	5.31	6.04
Wednesday	14/02/05	24.71	6.64
Average during reporting period		27.21	9.66
Average during calendar year (to date)		21.55	9.71
Number of exceedances of daily limit value registered during calendar year (to date)		2	0

Note: in the table above underline measurements which exceed the daily limit value of 50 µg/m^3 for PM10. in accordance with LN 478/2010. PM2.5 values were not adjusted for Saharan dust contribution because of no data available from Għarb station.

Name of laboratory carrying out sampling and measurement	AMBIENTE

Additional documentation to be submitted (if not identical to the submission in the previous month):

Accreditation certificate(s) of laboratory: ACCREDIA 510

Ambient Air Quality Monitoring

Sampling location:		Marsaxlokk	
Day	Date	PM10 (µg/m3)	PM2.5 (µg/m3)
Friday	14/02/07	26.54	9.89
Saturday	14/02/08	31.50	9.71
Sunday	14/02/09	35.72	N.V.
Monday	14/02/10	56.87	N.V.
Tuesday	14/02/11	27.65	N.V.
Wednesday	14/02/12	21.79	N.V.
Thursday	14/02/13	29.48	N.V.
Friday	14/02/14	28.02	N.V.
Saturday	14/02/15	24.18	N.V.
Sunday	14/02/16	23.07	N.V.
Monday	14/02/17	16.12	N.V.
Average during reporting period		29.18	9.80
Average during calendar year (to date)		26.59	11.58
Number of exceedances of daily limit value registered during calendar year (to date)		6	0

Note: in the table above underline measurements which exceed the daily limit value of 50 µg/m^3 for PM10, in accordance with LN 478/2010. PM2.5 values were not adjusted for Saharan dust contribution because of no data available from Għarb station.

Name of laboratory carrying out sampling and measurement	AMBIENTE

Additional documentation to be submitted (if not identical to the submission in the previous month):

Accreditation certificate(s) of laboratory: ACCREDIA 510

S4.5 Ambient Air Quality Monitoring

Sampling location:		**Birżebbuġa**	
Day	**Date**	**PM_{10} (μg/m^3)**	**$PM_{2.5}$ (μg/m^3)**
Friday	14/02/07	21.78	5.49
Saturday	14/02/08	25.99	9.15
Sunday	14/02/09	35.87	11.90
Monday	14/02/10	52.42	14.64
Tuesday	14/02/11	27.09	10.98
Wednesday	14/02/12	25.80	7.50
Thursday	14/02/13	25.07	2.93
Friday	14/02/14	24.52	10.06
Saturday	14/02/15	24.52	9.70
Sunday	14/02/16	26.54	9.70
Monday	14/02/17	26.17	8.60
Average during reporting period		28.71	9.15
Average during calendar year (to date)		22.27	9.67
Number of exceedances of daily limit value registered during calendar year (to date)		3	0

Note: in the table above underline measurements which exceed the daily limit value of 50 μg/m^3 for PM10. in accordance with LN 478/2010. PM2.5 values were not adjusted for Saharan dust contribution because of no data available from Għarb station.

Name of laboratory carrying out sampling and measurement	AMBIENTE

Additional documentation to be submitted (if not identical to the submission in the previous month):

Accreditation certificate(s) of laboratory: ACCREDIA 510

Ambient Air Quality Monitoring

Sampling location:		Marsaxlokk	
Day	**Date**	**PM10 (µg/m3)**	**PM2.5 (µg/m3)**
Tuesday	14/02/18		
Wednesday	14/02/19		
Thursday	14/02/20	48.93	16.86
Friday	14/02/21	46.71	15.94
Saturday	14/02/22	35.04	13.74
Sunday	14/02/23	49.64	12.64
Monday	14/02/24	27.19	10.45
Tuesday	14/02/25	29.93	12.46
Wednesday	14/02/26	29.20	11.00
Thursday	14/02/27	16.24	8.25
Friday	14/02/28	17.71	9.16
Saturday	14/03/01	15.69	15.39
Sunday	14/03/02	18.43	9.89
Monday	14/03/03	15.33	7.51
Tuesday	14/03/04	22.26	8.06
Average during reporting period		28.64	11.64
Average during calendar year (to date)		26.76	11.58
Number of exceedances of daily limit value registered during calendar year (to date)		6	0

Note: in the table above underline measurements which exceed the daily limit value of 50 µg/m^3 for PM10, in accordance with LN 478/2010. PM2.5 values were not adjusted for Saharan dust contribution because of no data available from Għarb station.

Name of laboratory carrying out sampling and measurement	AMBIENTE

Additional documentation to be submitted (if not identical to the submission in the previous month):

Accreditation certificate(s) of laboratory: ACCREDIA 510

S4.5 Ambient Air Quality Monitoring

Sampling location:		**Birżebbuġa**	
Day	**Date**	**PM_{10} (µg/m^3)**	**$PM_{2.5}$ (µg/m^3)**
Tuesday	14/02/18		
Wednesday	14/02/19		
Thursday	14/02/20		
Friday	14/02/21		
Saturday	14/02/22		
Sunday	14/02/23		
Monday	14/02/24		
Tuesday	14/02/25		
Wednesday	14/02/26		
Thursday	14/02/27		
Friday	14/02/28		
Saturday	14/03/01		
Sunday	14/03/02		
Monday	14/03/03		
Tuesday	14/03/04		
Average during reporting period		26.89	11.75
Average during calendar year (to date)		22.51	9.73
Number of exceedances of daily limit value registered during calendar year (to date)		4	0

Note: in the table above underline measurements which exceed the daily limit value of 50 µg/m^3 for PM10. in accordance with LN 478/2010. PM2.5 values were not adjusted for Saharan dust contribution because of no data available from Għarb station.

Name of laboratory carrying out sampling and measurement	AMBIENTE

Additional documentation to be submitted (if not identical to the submission in the previous month):

Accreditation certificate(s) of laboratory: ACCREDIA 510

Ambient Air Quality Monitoring

Sampling location:		**Marsaxlokk**	
Day	**Date**	**PM10 (µg/m3)**	**PM2.5 (µg/m3)**
Wednesday	14/03/05		
Thursday	14/03/06		
Friday	14/03/07	24.18	9.90
Saturday	14/03/08	17.22	3.12
Sunday	14/03/09	15.39	7.15
Monday	14/03/10	22.17	1.83
Tuesday	14/03/11	32.06	12.64
Wednesday	14/03/12	20.70	12.09
Thursday	14/03/13	20.88	4.03
Friday	14/03/14	39.56	15.58
Saturday	14/03/15	28.39	9.16
Sunday	14/03/16	38.64	19.80
Monday	14/03/17	42.87	5.32
Tuesday	14/03/18	45.61	22.92
Wednesday	14/03/19	34.80	17.60
Average during reporting period		29.42	10.86
Average during calendar year (to date)		26.99	11.51
Number of exceedances of daily limit value registered during calendar year (to date)		6	0

Note: in the table above underline measurements which exceed the daily limit value of 50 µg/m^3 for PM10, in accordance with LN 478/2010. PM2.5 values were not adjusted for Saharan dust contribution because of no data available from Għarb station.

Name of laboratory carrying out sampling and measurement	AMBIENTE

Additional documentation to be submitted (if not identical to the submission in the previous month):

Accreditation certificate(s) of laboratory: ACCREDIA 510

S4.5 Ambient Air Quality Monitoring

Sampling location:		**Birżebbuġa**	
Day	**Date**	**PM_{10} (µg/m^3)**	**$PM_{2.5}$ (µg/m^3)**
Wednesday	14/03/05		
Thursday	14/03/06		
Friday	14/03/07	23.97	11.17
Saturday	14/03/08	18.48	<1.83
Sunday	14/03/09	15.01	10.25
Monday	14/03/10	25.25	9.15
Tuesday	14/03/11	25.26	11.35
Wednesday	14/03/12	18.66	9.52
Thursday	14/03/13	25.08	5.31
Friday	14/03/14	55.47	17.21
Saturday	14/03/15	38.07	11.90
Sunday	14/03/16	37.52	20.69
Monday	14/03/17	41.73	19.59
Tuesday	14/03/18	41.00	9.88
Wednesday	14/03/19	17.14	16.77
Average during reporting period		28.57	12.73
Average during calendar year (to date)		23.16	9.95
Number of exceedances of daily limit value registered during calendar year (to date)		5	0

Note: in the table above underline measurements which exceed the daily limit value of 50 µg/m^3 for PM10. in accordance with LN 478/2010. PM2.5 values were not adjusted for Saharan dust contribution because of no data available from Għarb station.

Name of laboratory carrying out sampling and measurement	AMBIENTE

Additional documentation to be submitted (if not identical to the submission in the previous month):

Accreditation certificate(s) of laboratory: ACCREDIA 510

Ambient Air Quality Monitoring

Sampling location:		**Marsaxlokk**	
Day	**Date**	**PM10 (µg/m3)**	**PM2.5 (µg/m3)**
Thursday	14/03/20	33.68	16.90
Friday	14/03/21	24.18	15.77
Saturday	14/03/22	25.83	8.98
Sunday	14/03/23	23.99	<1.83
Monday	14/03/24	24.92	8.99
Tuesday	14/03/25	25.09	8.25
Wednesday	14/03/26	24.73	7.33
Thursday	14/03/27	27.46	5.68
Friday	14/03/28	25.46	8.44
Saturday	14/03/29	17.77	6.78
Sunday	14/03/30	25.09	11.00
Monday	14/03/31	26.75	13.94
Tuesday	14/03/01	26.74	16.51
Wednesday	14/03/02	33.69	16.13
Average during reporting period		26.10	11.13
Average during calendar year (to date)		26.92	11.48
Number of exceedances of daily limit value registered during calendar year (to date)		6	0

Note: in the table above underline measurements which exceed the daily limit value of 50 µg/m^3 for PM10, in accordance with LN 478/2010. PM2.5 values were not adjusted for Saharan dust contribution because of no data available from Għarb station.

Name of laboratory carrying out sampling and measurement	AMBIENTE

Additional documentation to be submitted (if not identical to the submission in the previous month):

Accreditation certificate(s) of laboratory: ACCREDIA 510

S4.5 Ambient Air Quality Monitoring

Sampling location:		**Birżebbuġa**	
Day	**Date**	**PM_{10} (µg/m^3)**	**$PM_{2.5}$ (µg/m^3)**
Thursday	14/03/20	29.77	25.01
Friday	14/03/21	23.07	14.65
Saturday	14/03/22	25.26	12.81
Sunday	14/03/23	27.82	10.80
Monday	14/03/24	27.08	7.32
Tuesday	14/03/25	25.92	7.91
Wednesday	14/03/26	23.98	6.77
Thursday	14/03/27	40.44	10.81
Friday	14/03/28	21.78	<1.83
Saturday	14/03/29	6.59	5.86
Sunday	14/03/30	34.59	11.17
Monday	14/03/31	32.40	13.36
Tuesday	14/03/01	26.90	14.09
Wednesday	14/03/02	34.23	20.50
Average during reporting period		27.13	12.39
Average during calendar year (to date)		23.61	10.13
Number of exceedances of daily limit value registered during calendar year (to date)		5	0

Note: in the table above underline measurements which exceed the daily limit value of 50 µg/m^3 for PM10. in accordance with LN 478/2010. PM2.5 values were not adjusted for Saharan dust contribution because of no data available from Għarb station.

Name of laboratory carrying out sampling and measurement	AMBIENTE

Additional documentation to be submitted (if not identical to the submission in the previous month):

Accreditation certificate(s) of laboratory: ACCREDIA 510