



Air pollution on a small island – A Study on Air Quality

GLOBE/Eco-Schools Team

Sir M. A. Refalo Sixth Form, Victoria, Gozo



Abstract

An Air Quality Campaign was carried out between the 17th of October and 14th of November 2022. The main aim was to investigate air quality in different locations around Gozo. Air pollution is an environmental concern which varies from one location to another due to several factors such as transportation, energy production and population density. Poor air quality can lead to health issues especially those related to respiratory and cardiovascular. According to statistics published during 2022, eight of Malta's main roads exceeded the limit set by the EU on air pollution. The Environment Minister Miriam Dalli pointed out that the least polluted streets are in Gozo with the exception being Republic Street in Victoria. Sir M.A. Refalo Sixth Form is located in this area.

Research Questions

- What are the levels of nitrogen dioxide in front of the school?
- Is the level of nitrogen dioxide high in front of our school compared to other schools in Gozo?
- What are the causes of such level of nitrogen?
- What can be done to reduce the level of nitrogen dioxide and improve air quality especially in urban areas?

Introduction

During this campaign, different data was collected from the same location in front of the Three Hills fountain. A diffusion tube which was donated by Europe Direct Gozo, was attached to a pole in front of the institute to measure nitrogen dioxide levels in the surrounding air. Date and time when it was set up and removed were recorded. The tube together with other tubes of other Gozitan schools were analysed in a laboratory.



Research Methods

A diffusion tube was put up to measure NO₂. During the observation period, weather parameters (air temperature, pressure, humidity, rainfall, wind and visibility) were observed and measured on a daily basis following the GLOBE protocols. The data was, in most cases, collected around the same time, that is between 10 a.m. and noon.



Putting up the diffusion tube in front of the institute

Atmospheric Conditions & Cloud Type Datasheet												
Date	Time	Cloud type			Air Temperature (°C)	Pressure (mb)	Humidity (%)	Rainfall		Wind		
		High	Mid	Low				Yes	No	Light	Calm	Good
✓ 17/10/2022	11.00				23.5°	30.21	53%	✓				
✓ 18/10/2022	10.55				22.2°	30.33	62%	✓				
✓ 19/10/2022	11.00				22.8°	30.15	62%	✓				
✓ 20/10/2022	11.30				22.9°	30.13	57%	✓				
✓ 21/10/2022	11.45				23.7°	30.22	70%	✓				
✓ 24/10/2022	11.15				23.7°	30.21	69%	✓				
✓ 25/10/2022	10.52				25°	30.19	73%	✓				
✓ 26/10/2022	10.53				24.4°	30.18	71%	✓				
✓ 27/10/2022	11.00				25°	30.28	65%	✓				
✓ 28/10/2022	10.45				23.3°	30.37	81%	✓				
✓ 31/10/2022												
✓ 1/11/2022												
✓ 3/11/2022	10.50				22.3°	30.20	67%	✓				
✓ 4/11/2022	11.55				24.4°	30.19	68%	✓				
✓ 7/11/2022	11.20				21.1°	30.15	64%	✓				
✓ 8/11/2022	10.45				24.1°	30.19	62%	✓				
✓ 9/11/2022	11.11				22.2°	30.17	69%	✓				
✓ 10/11/2022	11.15				21.1°	30.19	72%	✓				
✓ 11/11/2022	11.30				22.3°	30.22	71%	✓				
✓ 14/11/2022	11.25				17.6°	30.19	95%	✓				

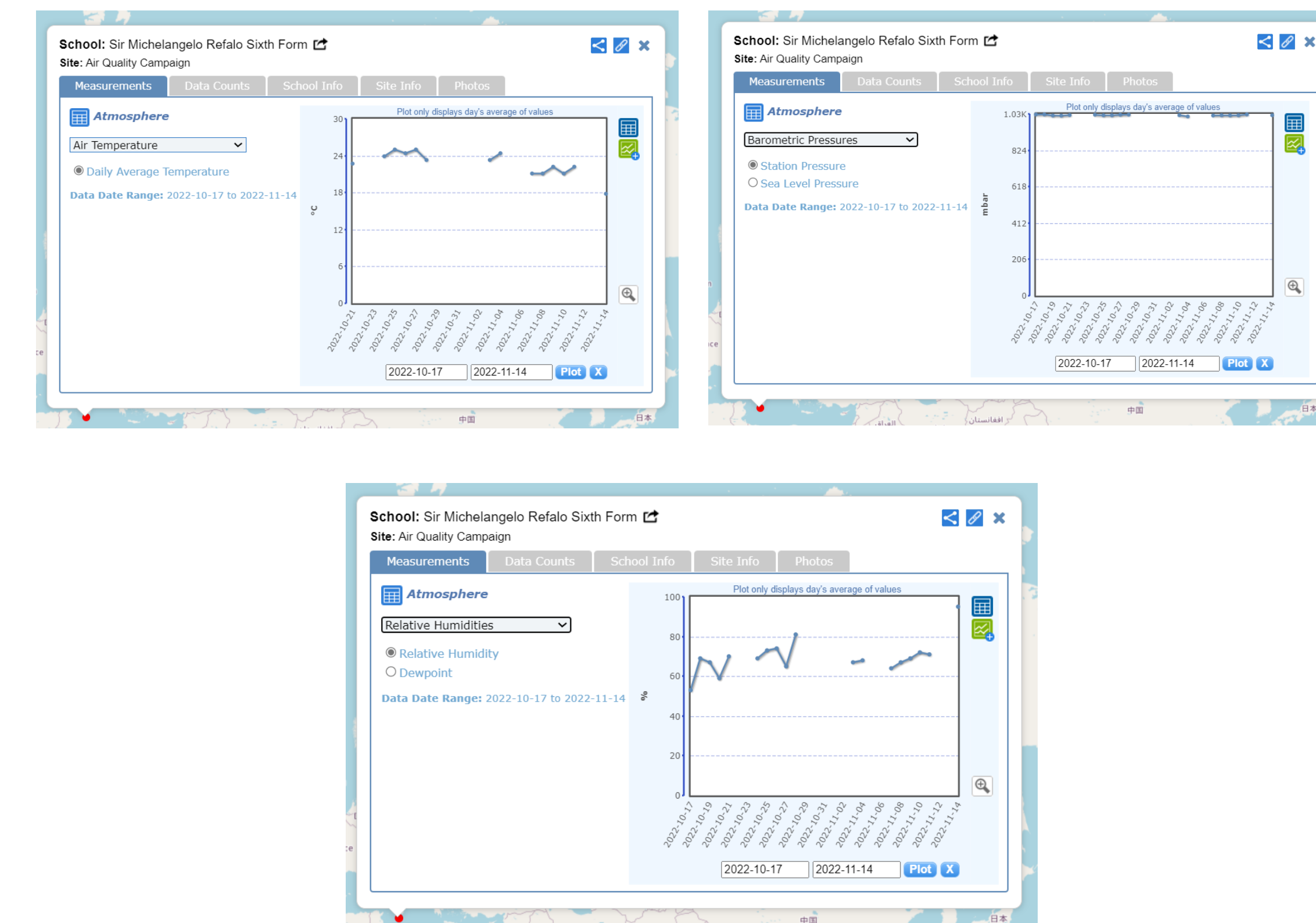
Sir M.A. Refalo Sixth Form Victoria
Coordinates: Latitude 36.0405° Longitude 14.2406°
The GLOBE® Program Air Quality Campaign Ms R. Mercieca GLOBE Deputy Coordinator

Weather parameters datasheet

Results

The screenshots below show data uploaded on GLOBE website during observation period between October and November 2022. The students collected daily readings of air temperature, barometric pressure, and humidity following GLOBE protocols.

Air Temperature, Barometric Pressure and Relative Humidities Plots of VIZ GLOBE



Laboratory report

LABORATORY ANALYSIS REPORT									
NITROGEN DIOXIDE IN DIFFUSION TUBES BY UV SPECTROPHOTOMETRY									
REPORT NUMBER: CR02278									
BOOKING IN REFERENCE: CR02278									
DESPATCH NOTE: 07/383									
CUSTOMER: Ramona Mercieca - GLOBE Malta Attn: Ramona Mercieca									
PAIN VIAL: Apt 4									
RURAL ROAD: Xero's XLN 1103									
Gozo									
Malta 19/11/2022									
DATE SAMPLES RECEIVED: 19/11/2022									
Location	Sample Number	Exposure Data		Time*	ppb	µg m ⁻³	ppm	µg NO ₂ m ⁻³	ppm
		Date On*	Date Off*						
Gozo College Middle School, Europe Street, Victoria, Gozo	2086424	17/10/2022	14/11/2022	671.87	30.70	16.02	1.50		
St. Francis Primary School, Main Gate Street, Victoria, Gozo	2086425	17/10/2022	14/11/2022	672.00	36.90	19.26	1.80		
Gozo College Rialto Primary School, Triq Valletta, Victoria, Gozo	2086426	17/10/2022	14/11/2022	668.88	39.62	20.68	1.93		
Gozo College Kewkija Primary School, Triq Tal-Hamra, Kewkija	2086427	17/10/2022	14/11/2022	671.83	3.79	1.98	0.19		
Gozo College Sannat Special Unit School, Sannat Road, Sannat	2086428	17/10/2022	14/11/2022	672.00	20.74	10.83	1.01		
Gozo College Zebbug Primary School, St. Andrew Street, Zebbug	2086429	17/10/2022	14/11/2022	669.58	6.53	3.41	0.32		
Sir M.A. Refalo Sixth Form, Fortunato Miczi Street, Victoria	2086430	17/10/2022	14/11/2022	672.05	43.10	22.50	2.11		
Sacred Heart Minor Seminary, Enrico Miczi Street, Victoria	2086431	14/10/2022	14/11/2022	739.17	33.58	17.52	1.80		
Laura Viora Primary School, Ghazzi Square, Ghazzi	2086432	17/10/2022	14/11/2022	671.80	5.61	2.80	0.27		
Gozo College Gata Primary School, Triq il-Tempja, Gata	2086433	17/10/2022	14/11/2022	671.75	28.82	15.04	1.41		
Gozo College Ghazzi Primary School, Triq il-Kollonji, Ghazzi	2086434	17/10/2022	14/11/2022	672.50	9.96	5.20	0.49		
Laboratory Blank									
739.17 0.09 0.05 0.005									

Traffic data collected during the study.

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9
Bicycle	0	0	1	4	2	1	0	1	0
Motorcycle	23	10	22	17	28	24	15	18	16
Car	113	112	114	126	124	105	122	93	108
Van/pick-up	38	27	37	35	48	29	21	16	33
small lorry	5	9	13	8	6	8	14	14	9
Articulated lorry	0	0	0	0	0	0	0	2	0
Bus/Coach	1	2	2	3	1	4	5	2	4
Construction Vehicle	6	5	2	5	4	5	4	6	6
Farm vehicle	0	0	0	0	0	0	0	0	0
	Day 10	Day 11	Day 12	Day 13	Day 14	Day 15	Day 16	Day 17	Day 18
Bicycle	0	0	0	3	3	1	1	0	0
Motorcycle	20	13	22	22	23	14	46	11	2
Car	86	110	121	114	97	102	161	83	68
Van/pick-up	14	36	25	60	26	20	63	19	26
small lorry	11	12	7	14	11	15	13	12	5
Articulated lorry	0	1	0	3	3	5	1	0	0
Bus/Coach	4	2	2	2	3	4	3	2	2
Construction Vehicle	5	3	1	7	4	5	5	4	0
Farm vehicle	0	1	0	0	0	0	0	1	0

References

EPA US Environmental Protection Agency - Basic Information about NO₂
<https://www.epa.gov/no2-pollution/basic-information-about-no2> (Accessed January 2023).
GLOBE Observer <https://observer.globe.gov/> (Accessed October 2023).
GLOBE teacher guide <https://www.globe.gov/> (Accessed October 2023).