



GLOBE Investigation

Gozo College Sir Arturo Mercieca Rabat Primary School 2024-2025

“Analysing Air Quality in Two Different Location in the Same Village”



Summary

During our scholastic years of 2022-2023, we performed an Air Quality Campaign (GLOBE, GLOBE Teacher Guide, 2024) while occupying **Vajringa Street** in Victoria, Gozo. Our school has recently moved into a new location – **Fortunto Mizzi Street** – staying within the same village of Victoria, Gozo. We decided to check the air quality in the new premises, which included taking atmospheric readings.

Research Questions

We have researched and learned that Malta's air pollutants have been doubling in recent years. From ranking Malta, in the year of 2022 – 76th out of 118 countries (IQAir, 2022), we are now in the 49th place out of 134 countries for the worst air quality (Cummings, 2024).

Remembering what are air pollutants such as sulphates, black carbon, nitrates and ammonium is the main reason why it is important to find out our air quality in the new area. These microscopic particles can be damaging to our human health which can lead to asthma, cancer, strokes and lung disease linking everything around us such as car usage and construction.

The number of cars on the road has increased to 420,000 for this small island. It comes to around 30 cars added to the road each day (Cummings, 2024). This is not the only reason why Malta has increased in pollutants.

Malta has had an upswing in construction – building everywhere – which is increasing pollution in the air. There has a boom on building permits from 224,00 in 2011 to as much as 297,000 in 2021 (Cummings, 2024).

Climate change (weather) has also been a major factor in air pollution. Dust Storms/Sandstorms and wildfires have worsened due to the global temperature upsurges. It is also very important to collect the data and pass onto the GLOBE team for analysis.

Research Methods

Again, we were interested to find out what is the nitrogen dioxide level around our new school in Victoria, Gozo and participated in the GLOBE Air Quality Campaign 2024-2025. The best way to do this is we would take on the task of carrying out a daily traffic survey comprising of counting each motor vehicle that pass in front of our school within a certain time frame (10-15 minutes) beginning November 11, 2024, till December 5, 2024. This experiment would happen during our second break – 12:00pm-12:30pm instead of early mornings like we did in 2022 (Fig 1). We also incorporated the daily atmospheric conditions to see if this potentially had an impact on our air quality.

Also, with the help of Ms. Ramona, our GLOBE Deputy Coordinator, she acquired a nitrogen dioxide diffusion tube which we hung up for 4 weeks at the beginning of our school street. We placed the NO₂ diffusion tube in front of our school on Fortunato Mizzi Street in Victoria, Gozo (Fig. 2). This street is a major artery in the capital city of Gozo where cars and heavy/construction vehicles pass – HIGH TRAFFIC. After the monitoring period, the diffusion tube was sent to Passam Laboratory in Switzerland for analysis.

This year we participated in the STEAM Learning Ecologies with other schools in Malta. We took VOC (Volatile Organic Compounds), CO₂ (Carbon Dioxide) & PM (Particulate Matter) readings daily for one month. We came together in a meeting in Pembroke, Malta (Fig. 3).

The atmospheric conditions we have collected from 2022 & 2024 have been passed on to the GLOBE website. It is essential for our students to input all our data collected into the GLOBE database (Fig. 4).

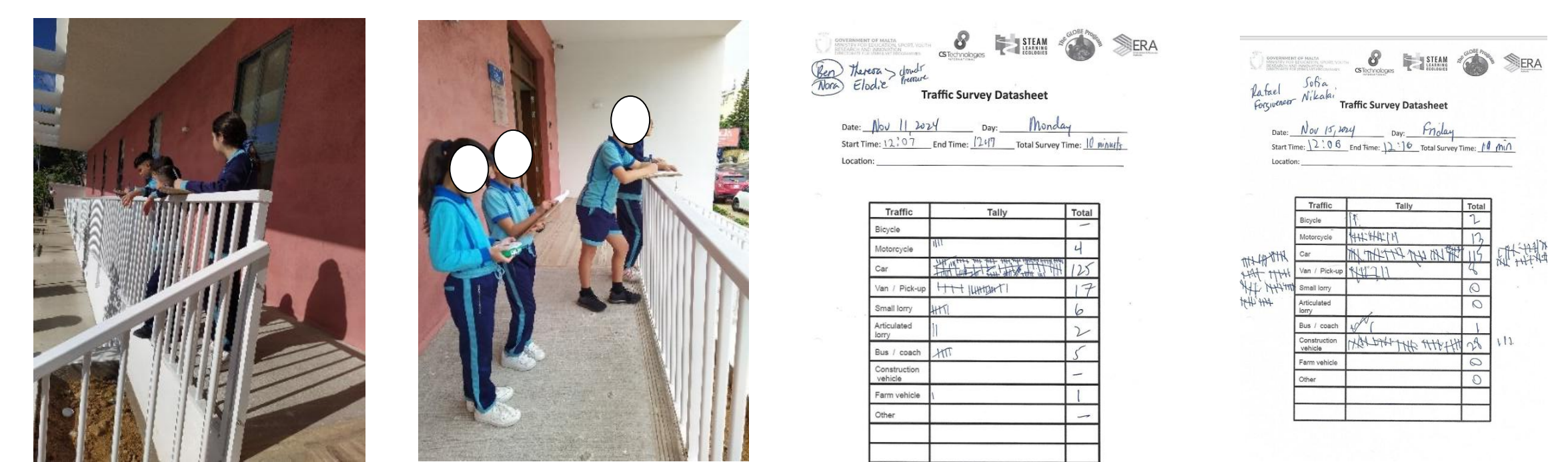


Figure 1: Samples data sheets of traffic and weather survey done by the GLOBE students



Figure 2: Where the diffusion tube was placed and views of the street which we are taking readings.

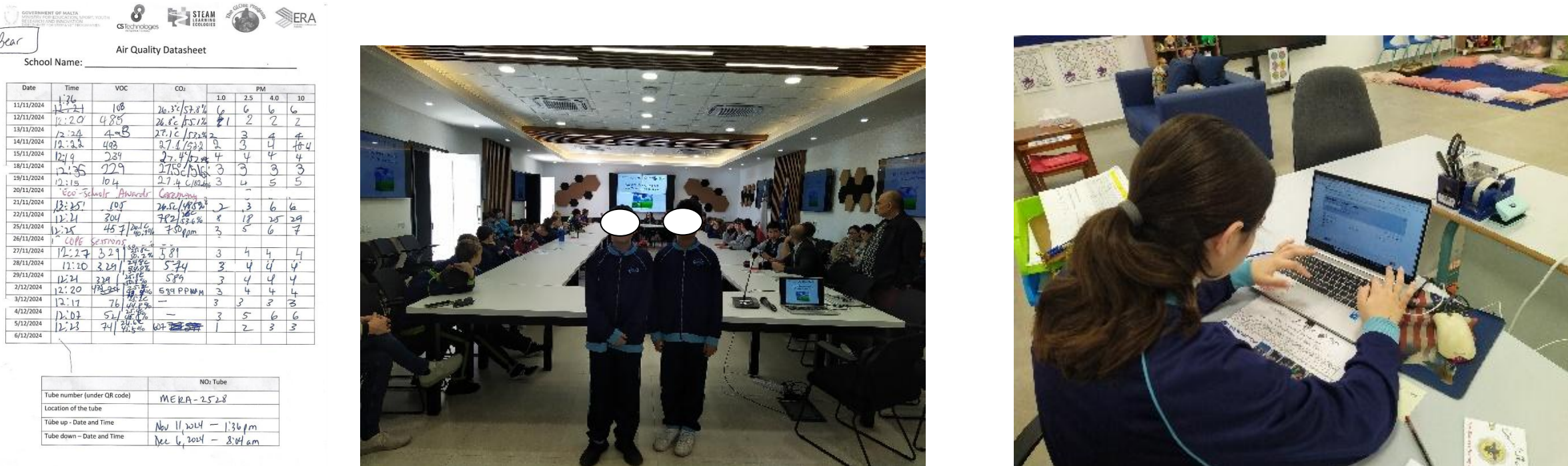


Figure 3: The GLOBE – Air Quality Campaign as a STEAM Learning Ecologies

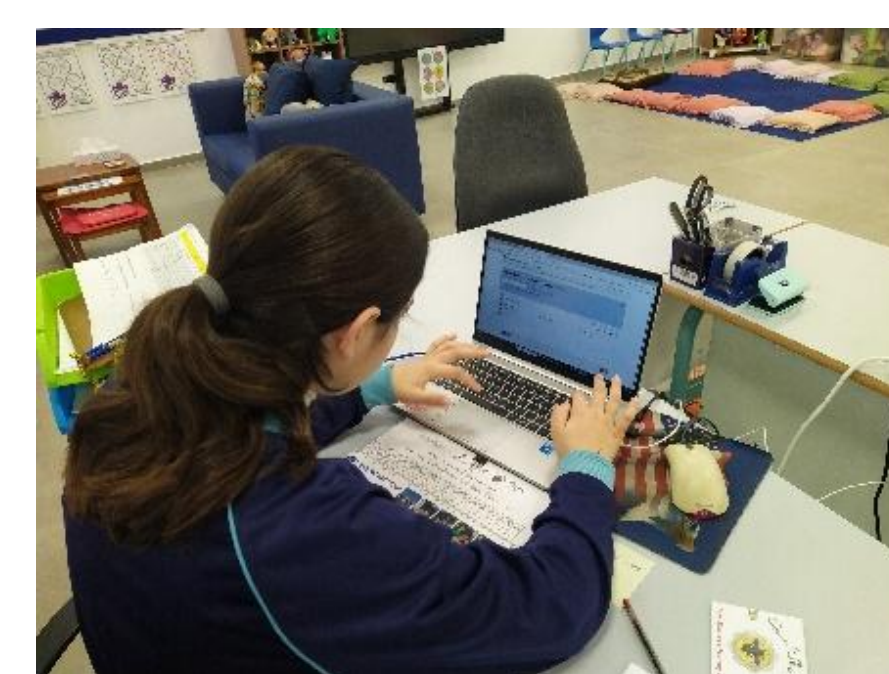


Figure 4: Uploading data to GLOBE database

Results

First, looking at our traffic survey, we observed that our school's new location has much more traffic than our old location to the point of 1,260 more vehicles on the road even though the surveys were taken at different times of the day – 2022 early mornings and 2024 in the afternoons. The biggest number of vehicles was regular cars at a trend of 765 more cars in a one-month period. Where we were surprised is that Bus/Coaches and Farm vehicles were less on this street, which is the main artery in Victoria, Gozo (Fig. 5).

Secondly, examining our results from both laboratories Year 2022 – Gradko Labs in the U.K. and Year 2024 – Passam Labs in Switzerland, we discovered that our old school area had a higher NO₂ than our new school area by a difference of +1.5% NO₂ (Fig. 6). Noteworthy, compared with the seven other schools on the Island of Malta and one school on the Island of Gozo, we are still the **HIGHEST!!!**

Thirdly, we analysed/averaged our VOC and PM we were at a good levels – VOC of 270.0 and PM at 5. Our CO₂ readings (Fig. 7) were inconclusive because we were having problems with the mechanics of the machine reading correctly. Nonetheless, the information collect was digitally sent to Malta for their analysis.

Finally, we then evaluated the atmospheric conditions from years 2022 (Fig. 8) to 2024 (Fig. 9), we noticed that average temperature during 2022 was 25.5 and in 2024 was 23.5. It was 2° less this year from previous years – meaning that our temperature is decreasing. The humidity in 2022 was an average of 55% and in 2024 was 44%. Telling us that it was 11% less in 2024 from 2022. Even though studies show that temperatures are getting warmer (Jenkins, 2009), Malta has shown the opposite effect. But we need to say everything, in 2022 temperature & humidity readings were taken in the morning 8:00am-8:15am and in 2024 readings were taken in the afternoon (12:00pm-12:15pm). This would make a significant difference since the earth warms up in the afternoon compared to the mornings. We uploaded all data into the GLOBE Website which were plotted in graph format (Figs. 10-15).

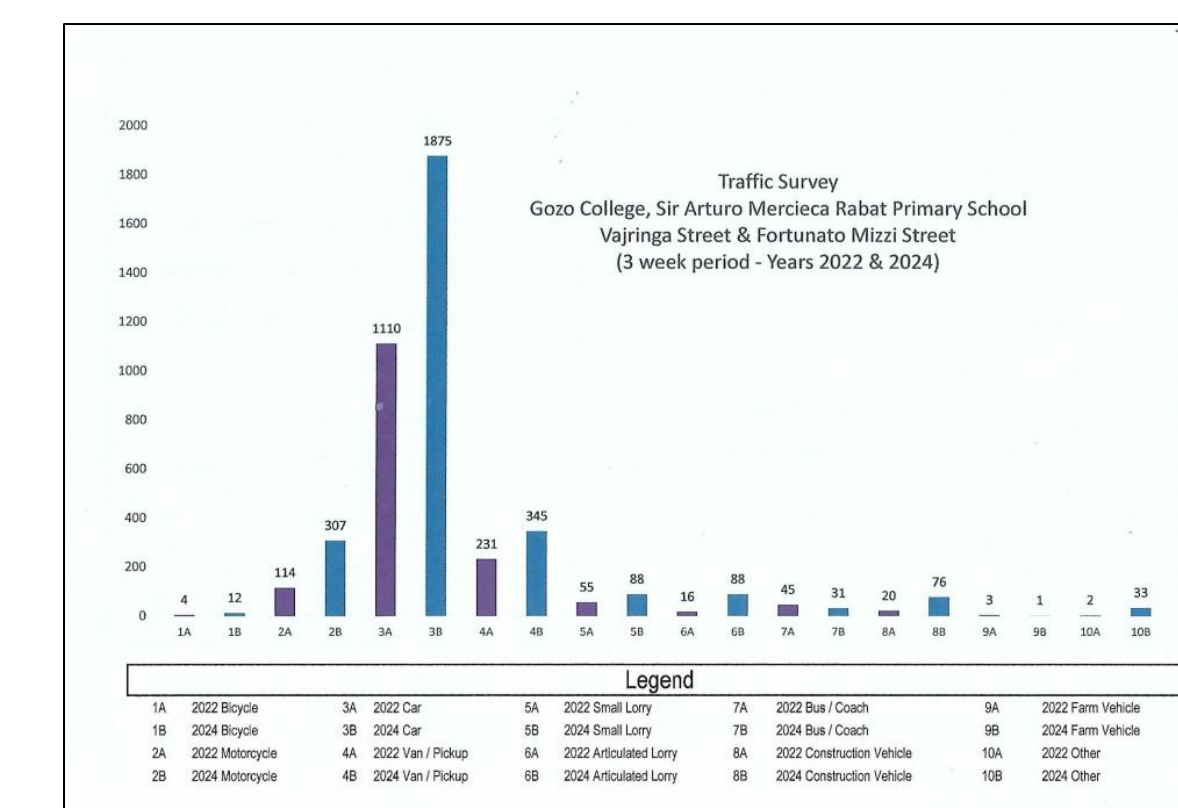


Figure 5: Bar graph showing traffic count results 2022 & 2024

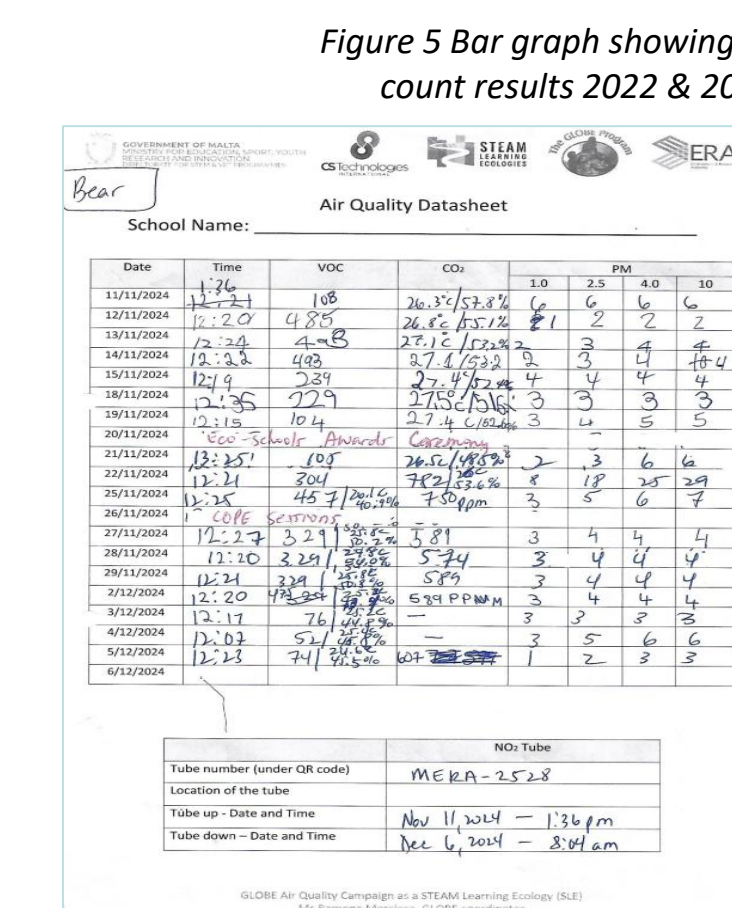
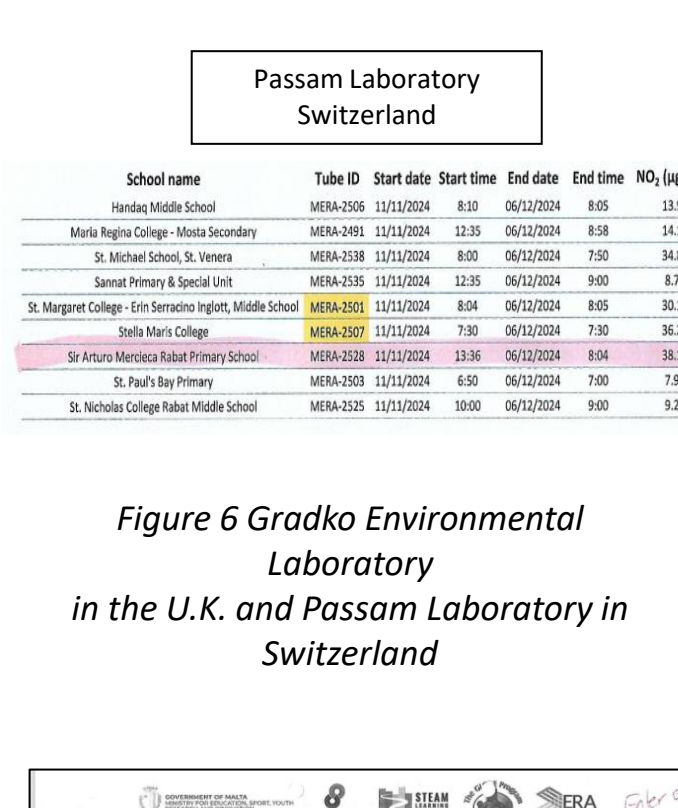
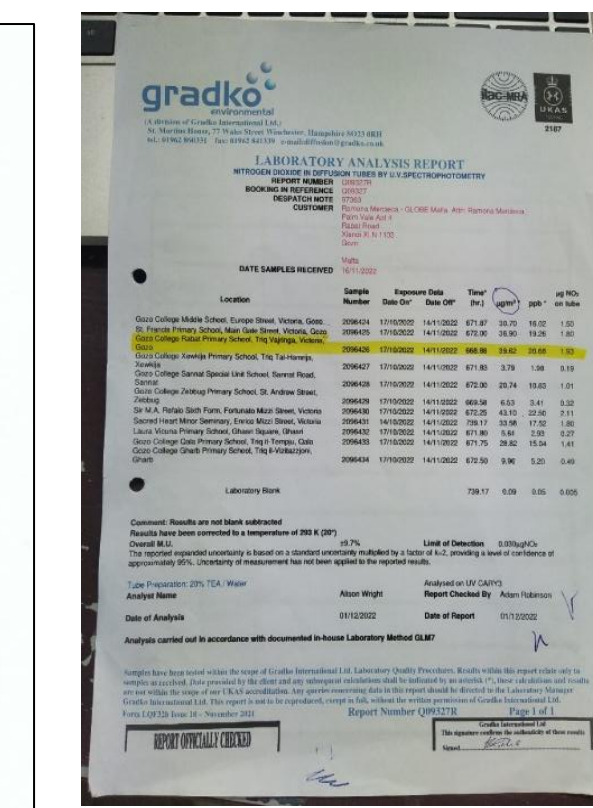


Figure 8: Atmospheric Conditions Year of 2022 – Student's Readings

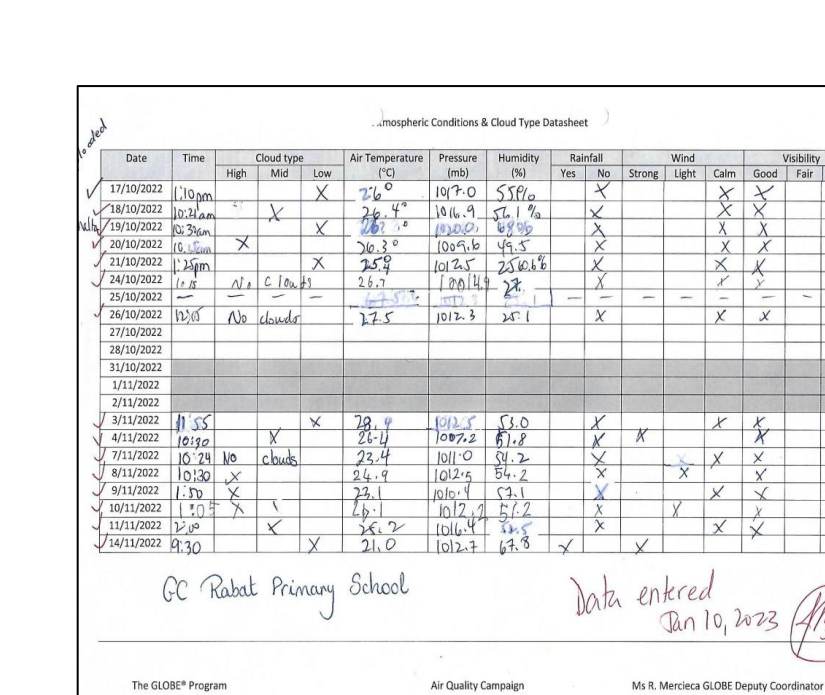
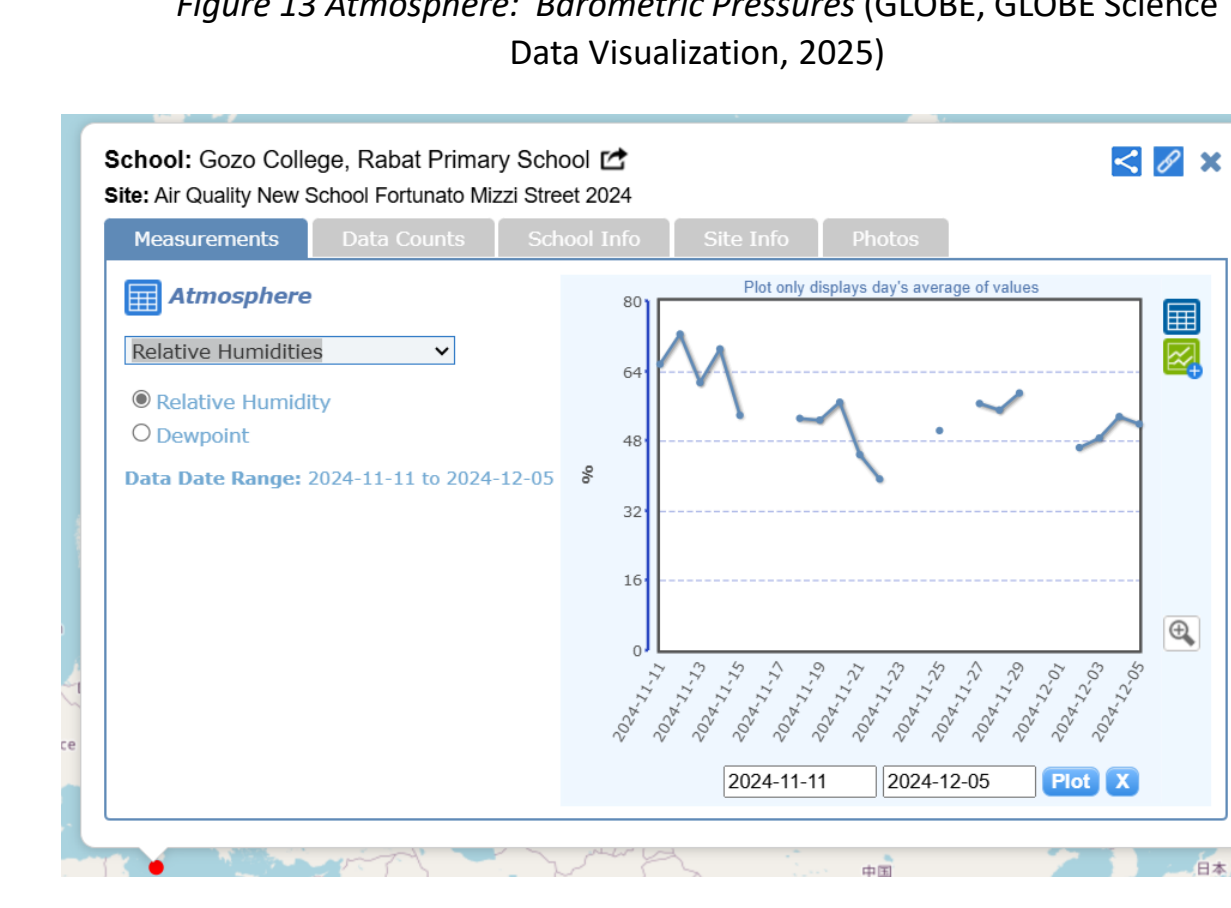
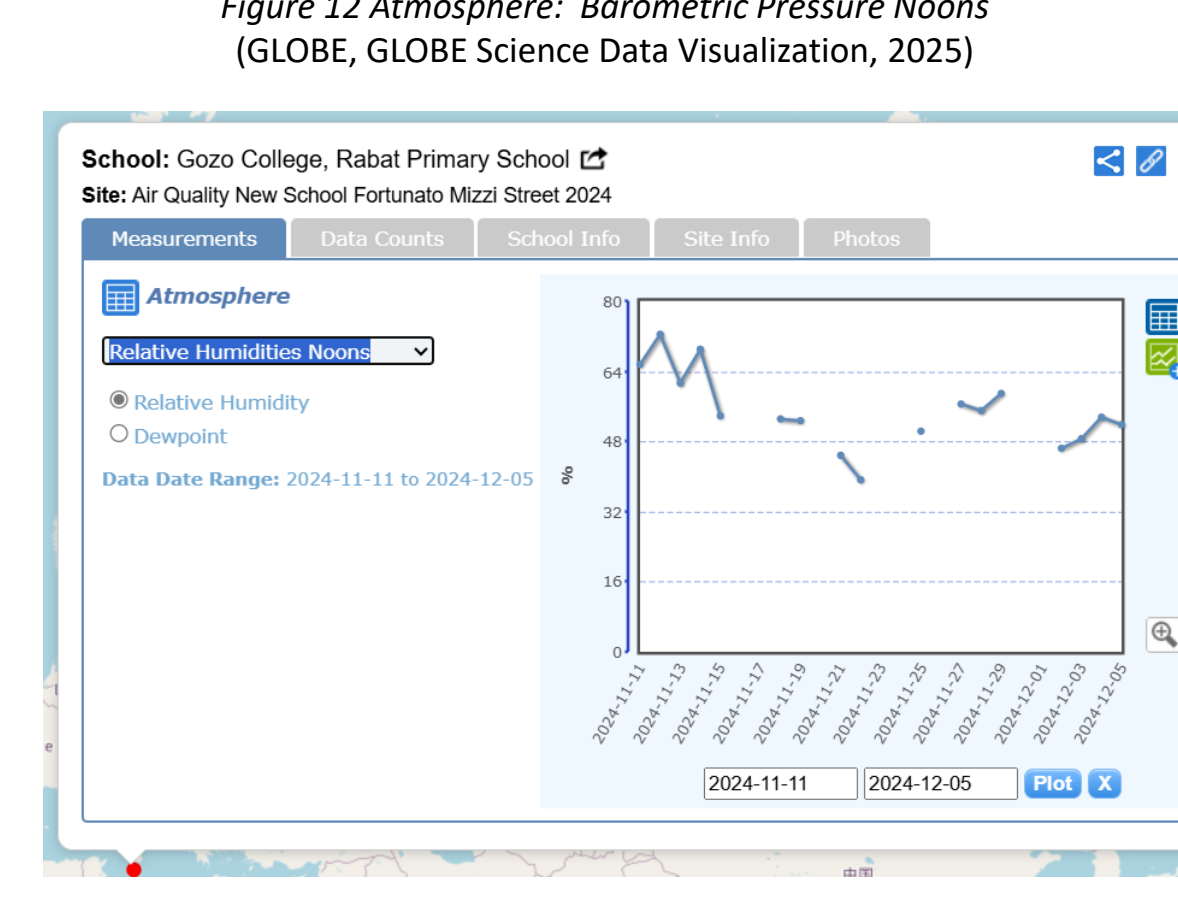
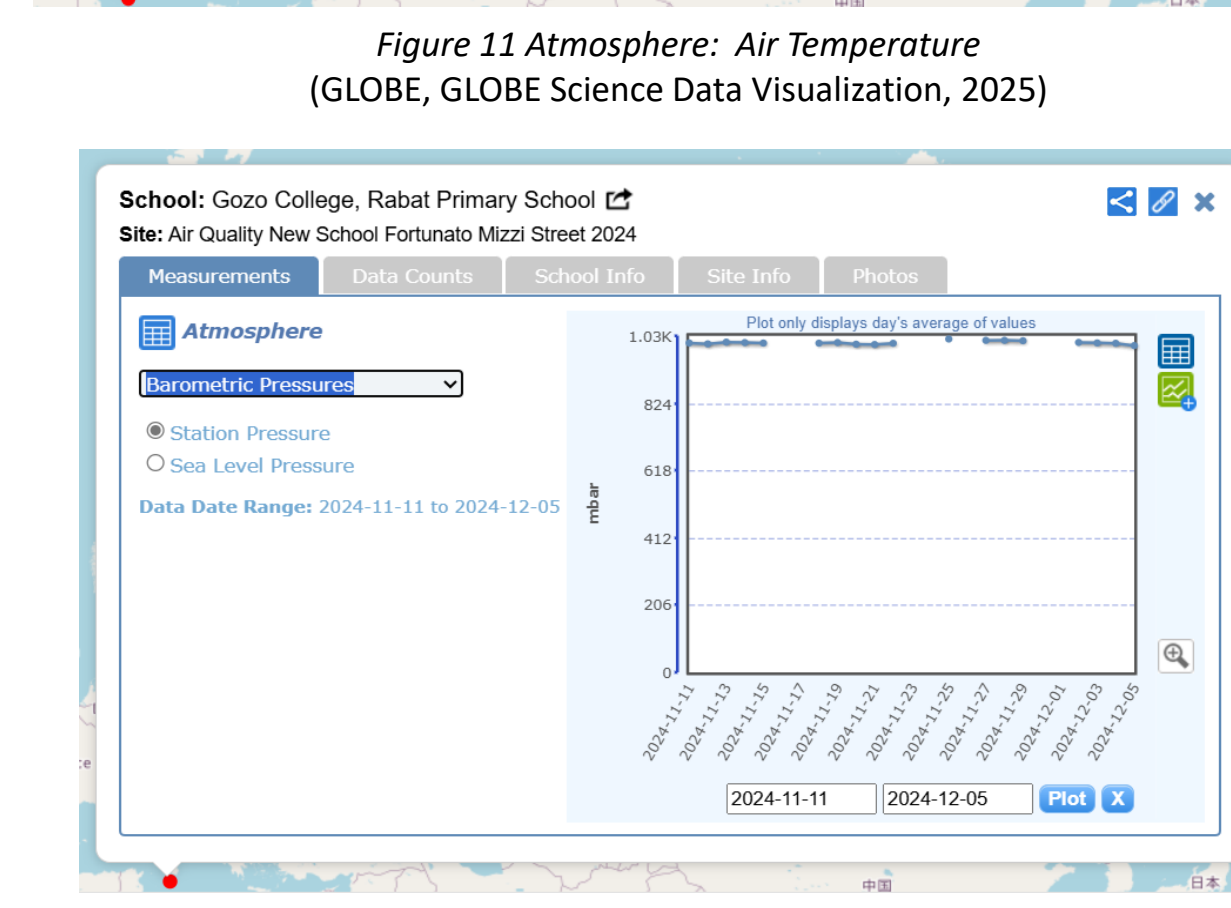
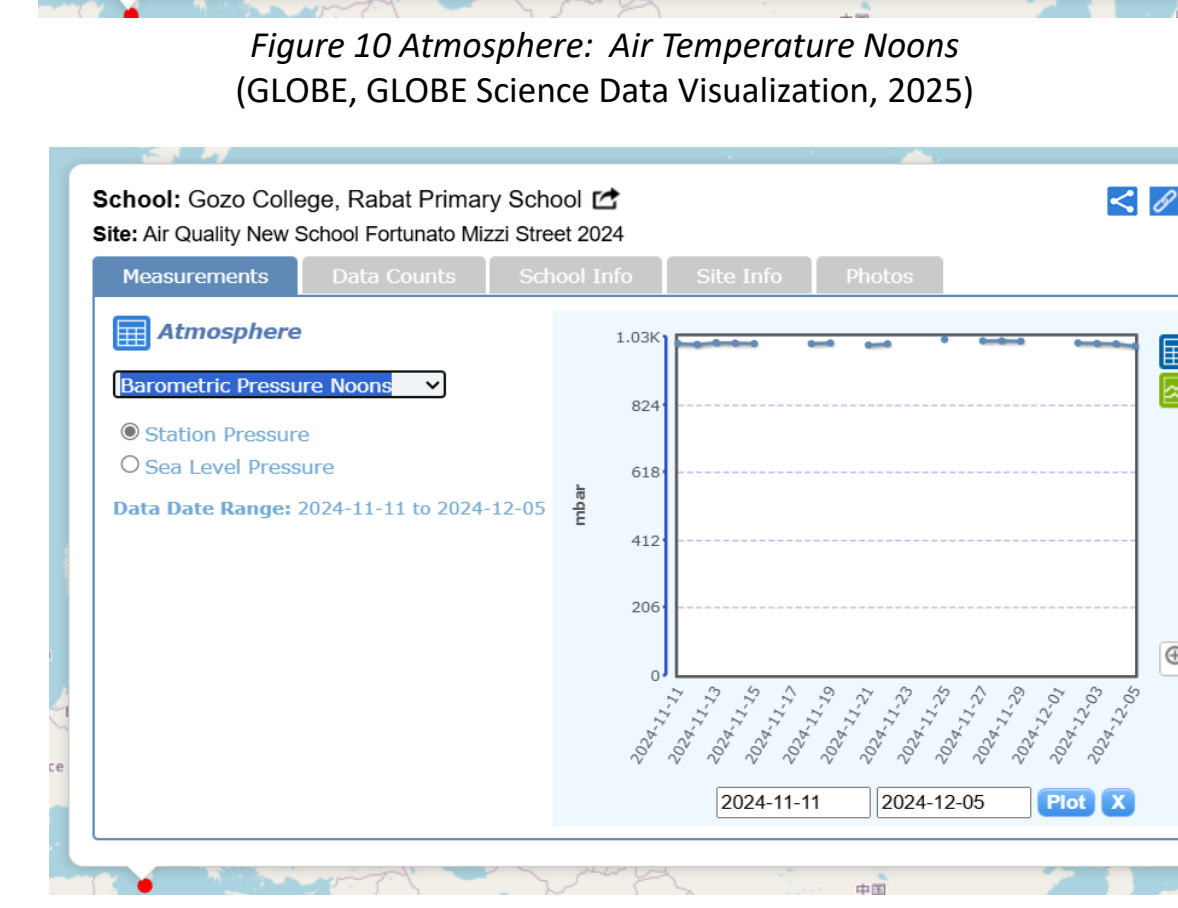
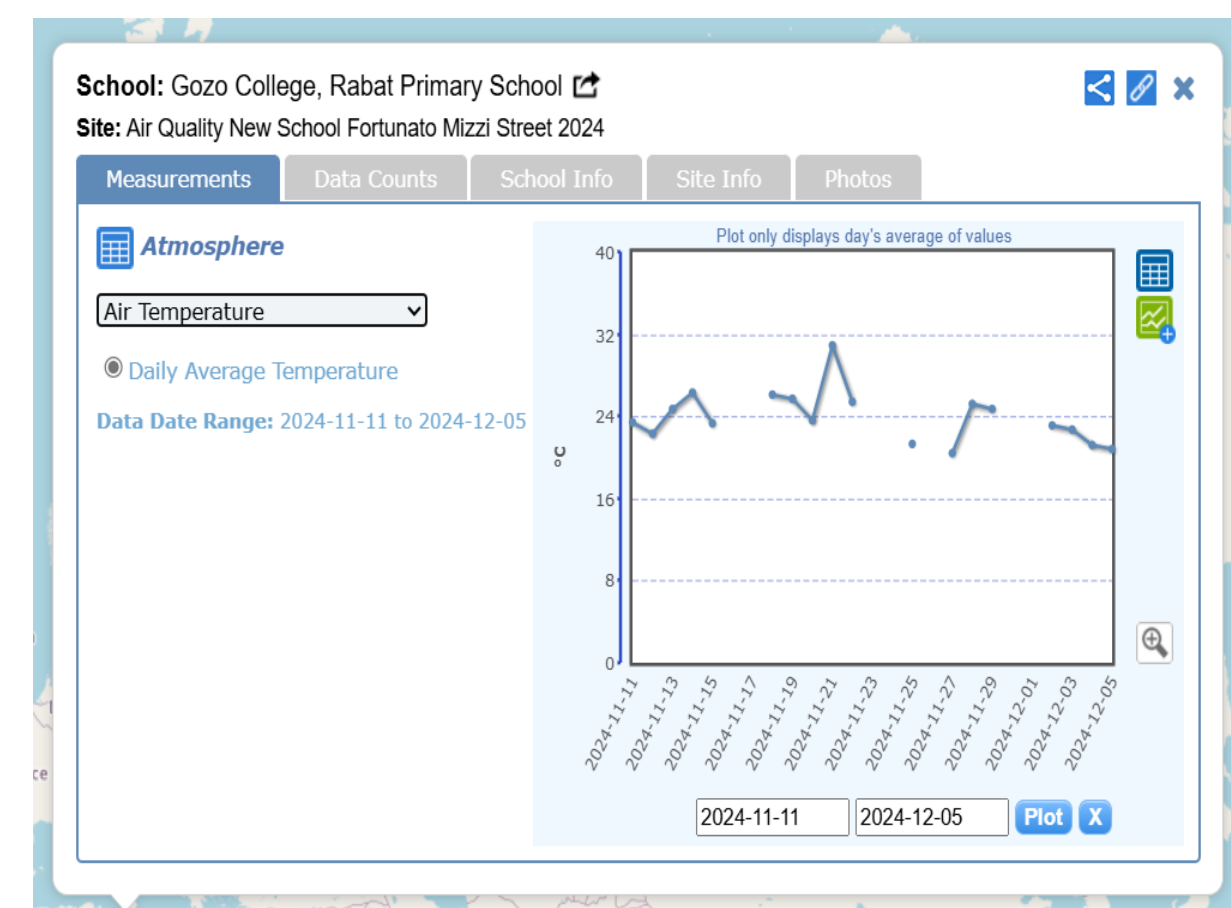
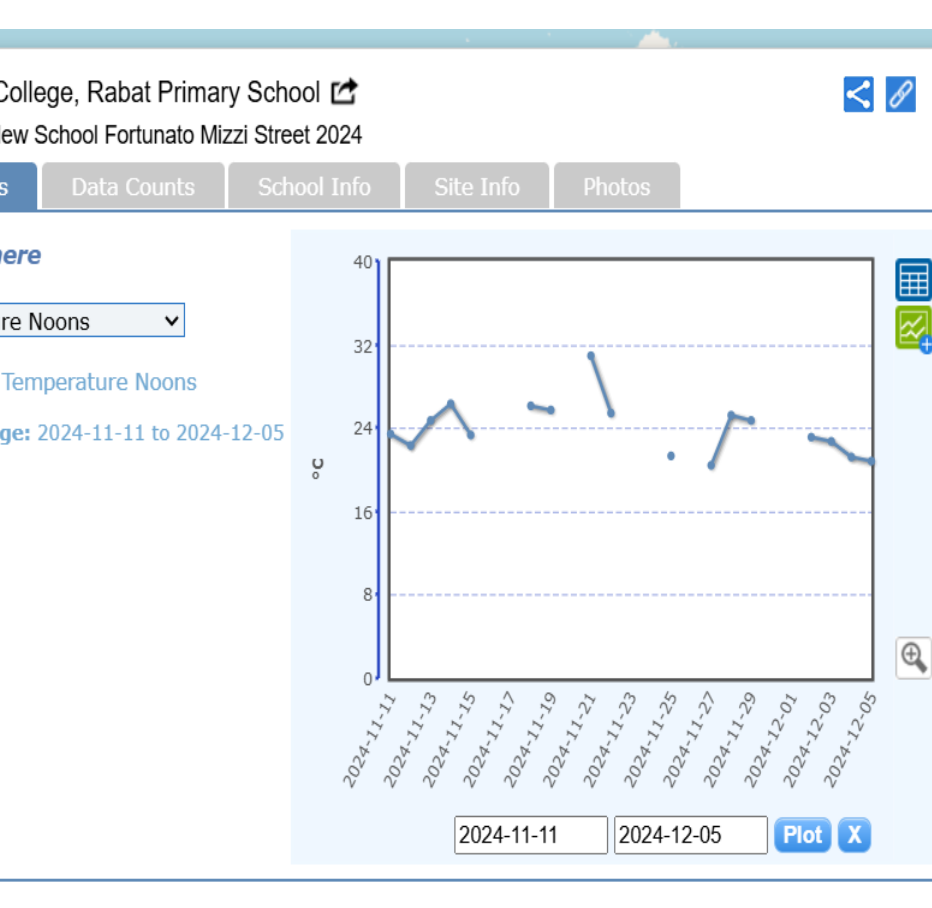
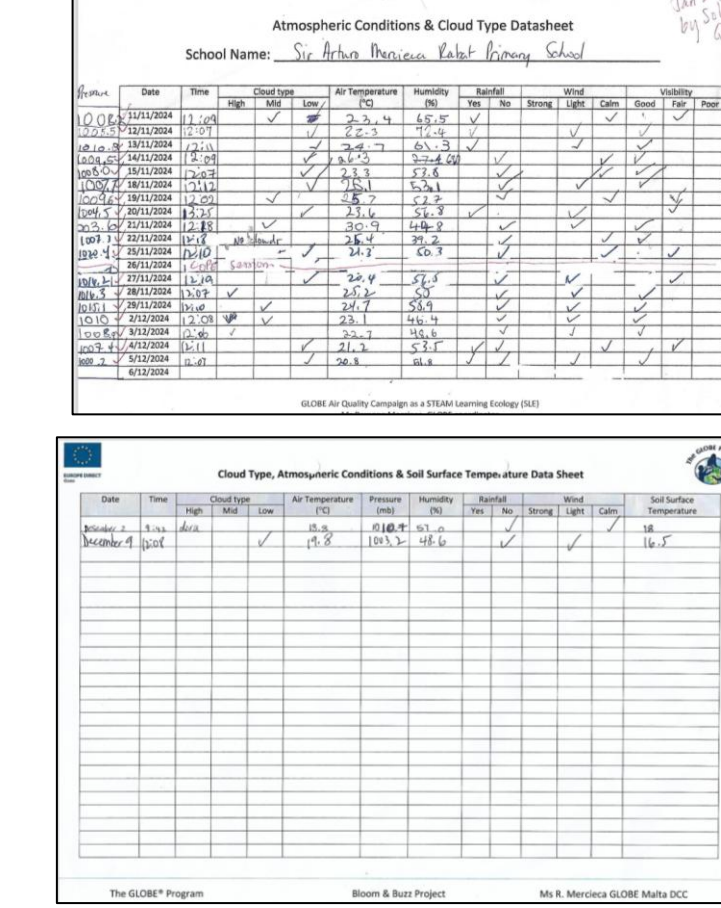


Figure 9: Atmospheric Conditions Year of 2024 – Student's Readings



Conclusions

Taking all of this into account, atmospheric conditions 2% colder; traffic increased by 126% and our NO₂ levels are still the worst on the islands, we needed to come up with some kind of solution.

Our new school has been built with the intent of producing more oxygen for our community. With that said, our school has more trees and plant life than our old school. We have decided to put planters on each of the school levels (3 levels) to reduce carbon dioxide and increase room oxygenation (Picard, 2023).

Also implementing sustainable mobility by using our bicycles, on foot, school transport and car-pooling by parents. Our Head of School, Mr. Lelio Spiteri encourages students to ride their bicycles and walk to school. Our school transport now has 5 minivans and 2 coaches with a total of 127 students riding compared to 2 years ago when we only had 4 minivans with a total of 45 students.

We will be contacting our local council to put up signs in front of our school and on the side road for cars not to idle in our school area which should reduce car emissions.



Bibliography

Cummings, J. (2024, March 19). *Pollution in Malta more than double recommended threshold, report says*. Retrieved from Times Malta 90 Years: <https://timesofmalta.com/article/pollution-malta-double-recommended-threshold-report-says-1089480>

GLOBE. (2024, October). *GLOBE Teacher Guide*. Retrieved from GLO: <https://www.globe.gov/>

GLOBE. (2025, February). *GLOBE Science Data Visualization*. Retrieved from GLOBE.gov: <https://vis.globe.gov/GLOBE/>

IQAir. (2022, 02 16). *IQAir*: <https://www.iqair.com/malta>. Retrieved from IQAir: <https://www.iqair.com/malta>

Jenkins, D. A. (2009, september 9). *The ups and downs of global warming*. Retrieved from GLOBE Climate Change: <https://climate.nasa.gov/news/175/the-ups-and-downs-of-global-warming/>

Picard, R. (2023, March 1). *35 Ways to Reduce Air Pollution and Boost Air Quality for All*. Retrieved from GreenCoast: <https://greencoast.org/ways-to-reduce-air-pollution/>