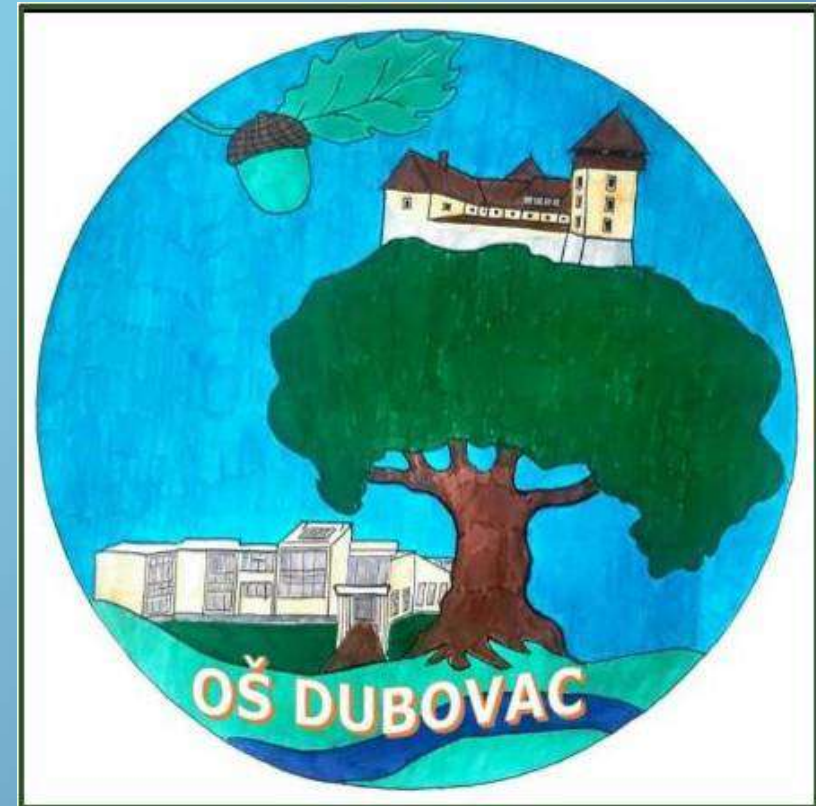
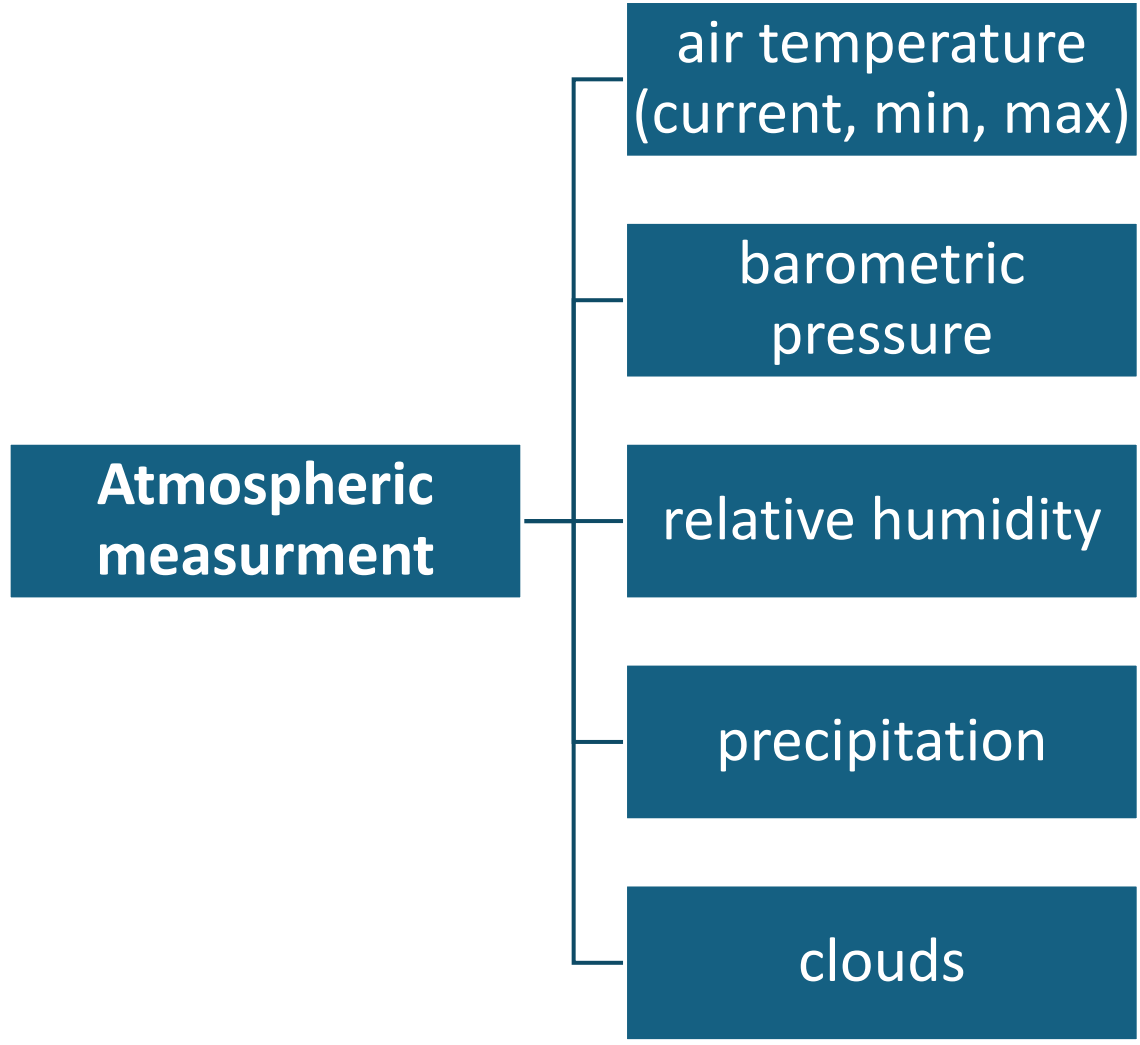




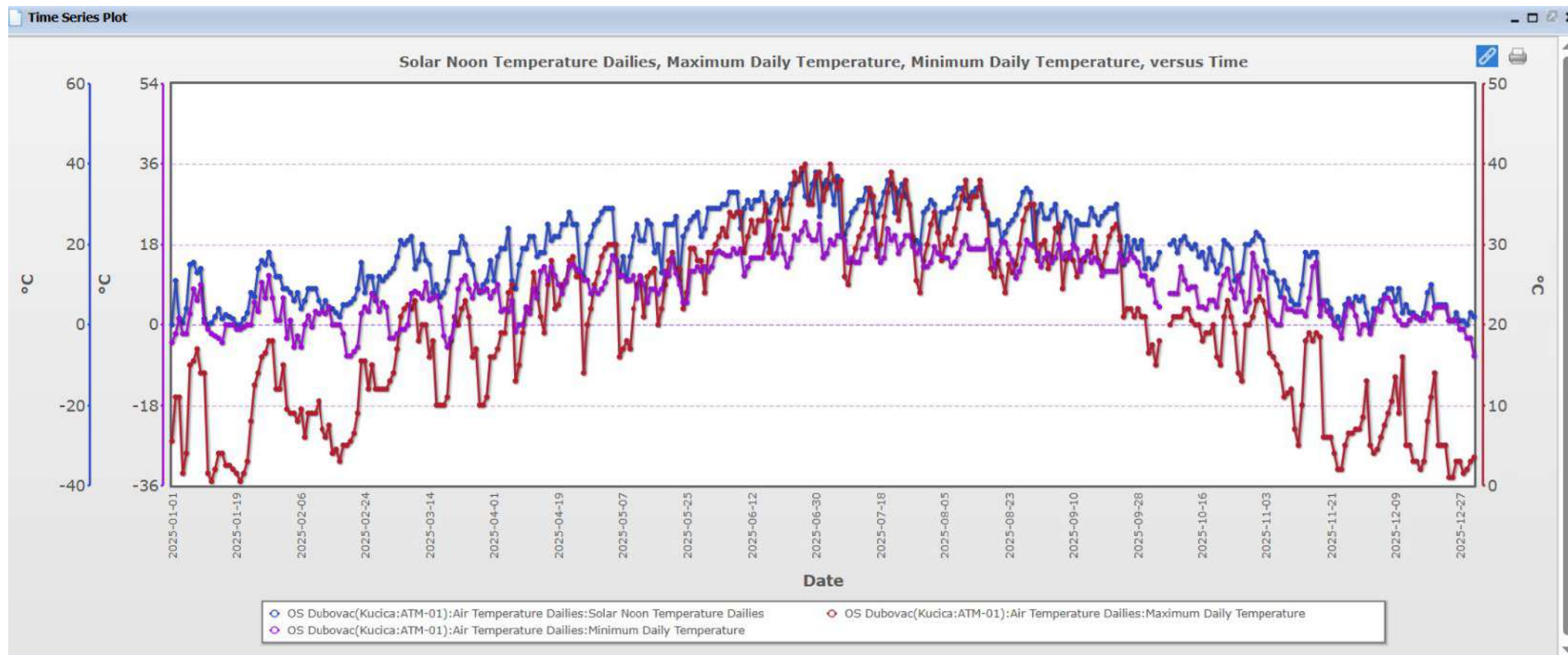
GLOBEPROGRAM[®]

Dubovac primary school



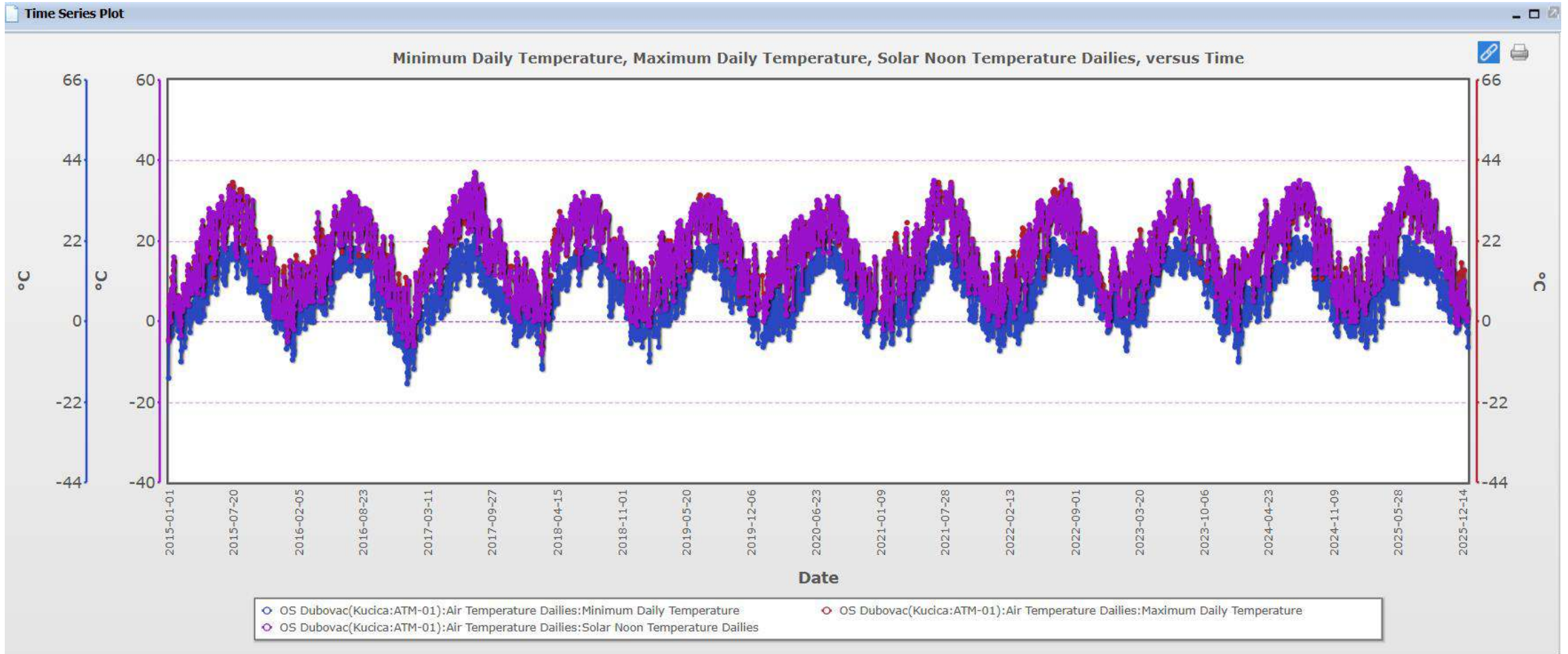


air temperature measurements in 2025



- the lowest air temperature (minimum) was measured in February 2025 and was -7 degrees Celsius
- the highest air temperature (maximum) was measured in June 2025 and was 37 degrees Celsius

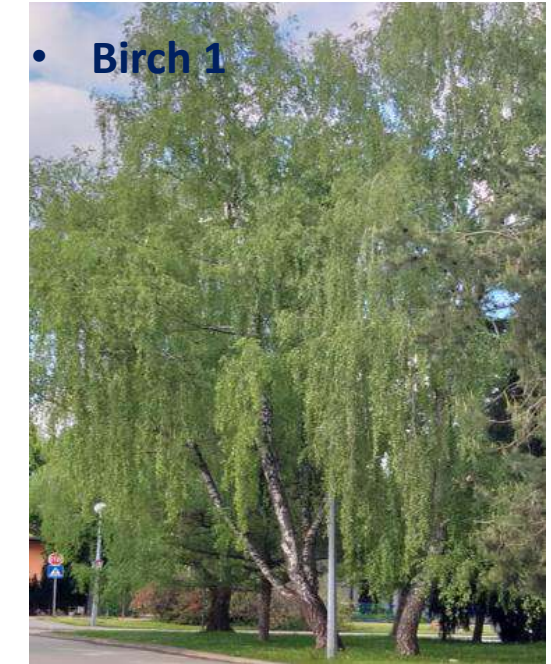
display of air temperature from 2015 to 2025



- we observe hot summers in all years
- the period of temperatures below 0 degrees Celsius is very short and mostly in January
- in recent years current temperatures have very rarely been below 0 degrees Celsius

Phenology

- **Birch 1**
school park
north position
sandy loam soil
- **Birches 2**
school playground
south position
sandy loam soil
- **Hazel bush**
interior of the school building,
west position
sandy loam soil



Birch 1

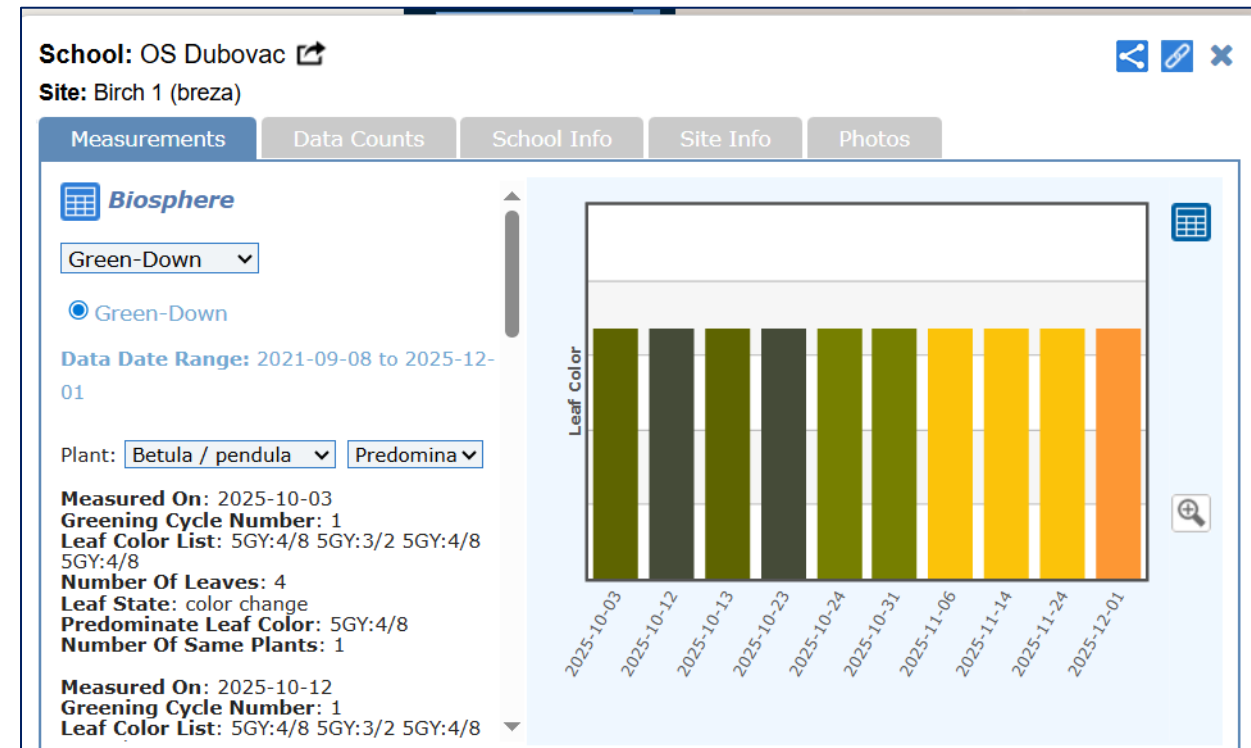
budburst : March 3rd

the leaves have stopped growing: May 10th



Birch 1

all leaves fallen: December 10th



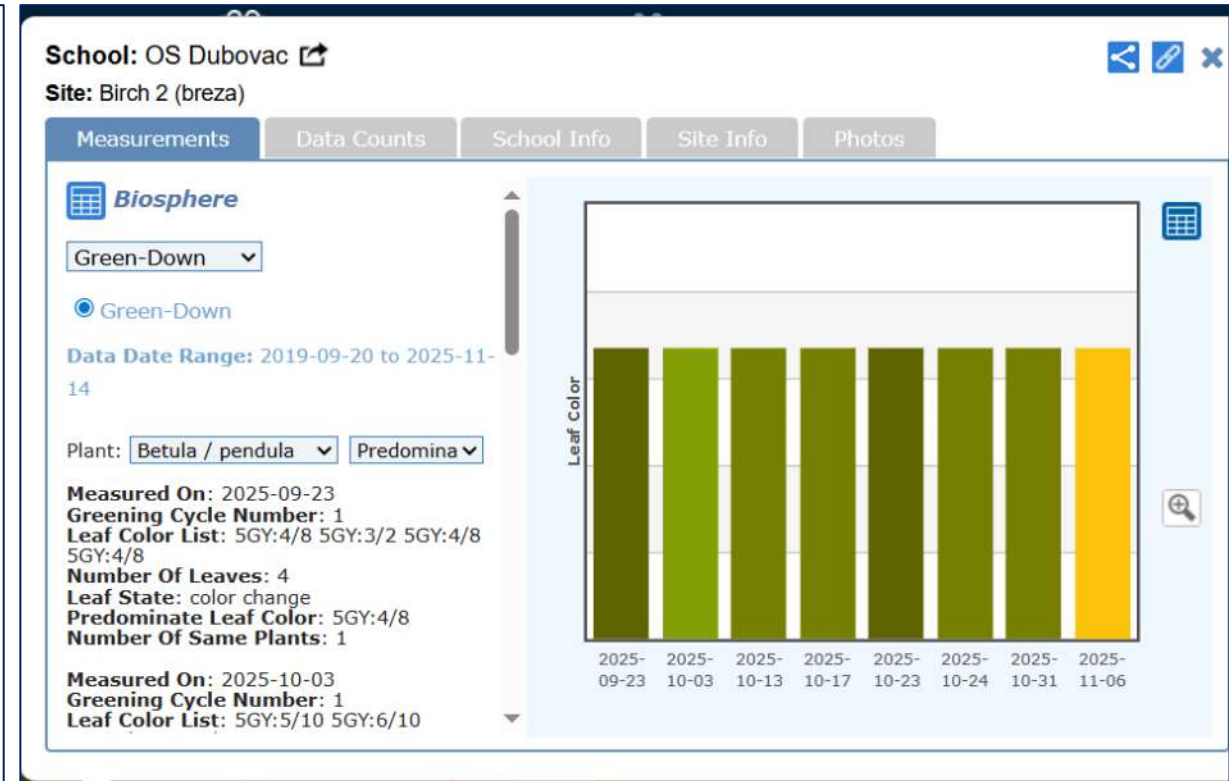
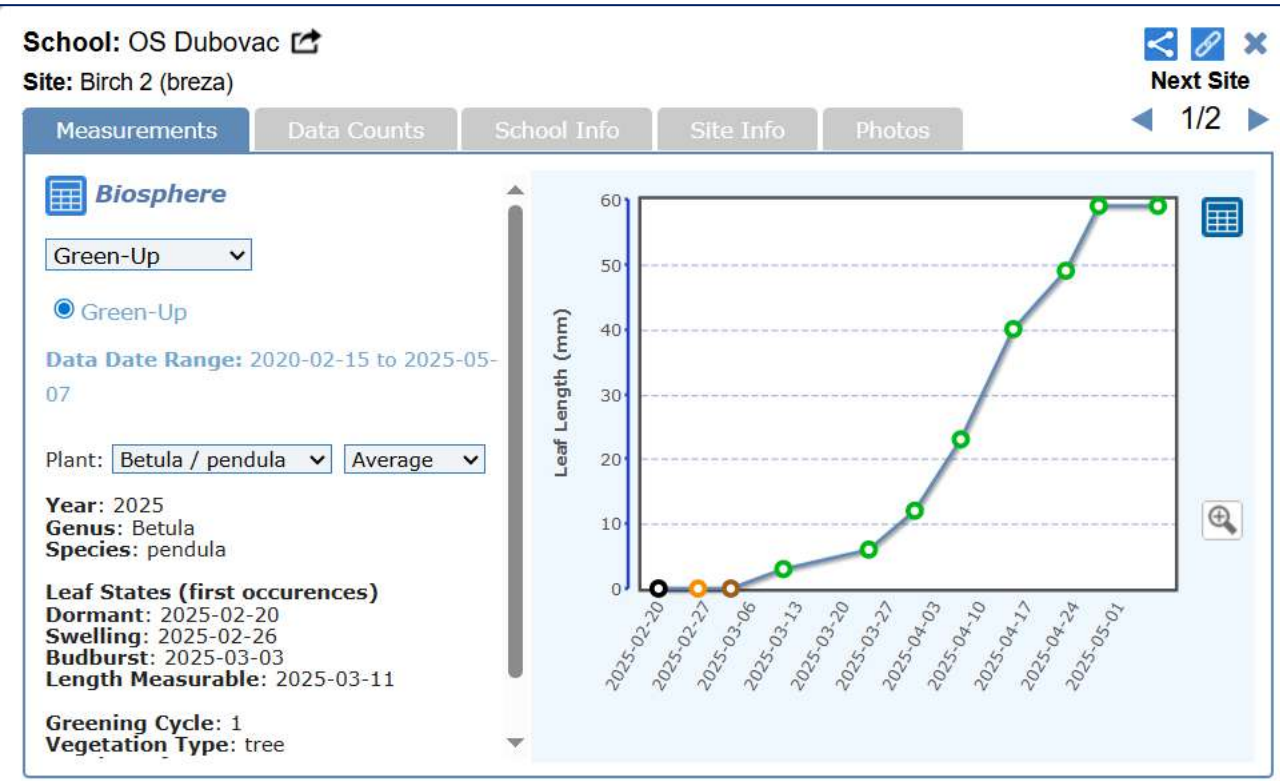
Birch 2

budburst : March 3rd

the leaves have stopped growing: May 10th

Birch 2

all leaves fallen: November 18th



Hazel

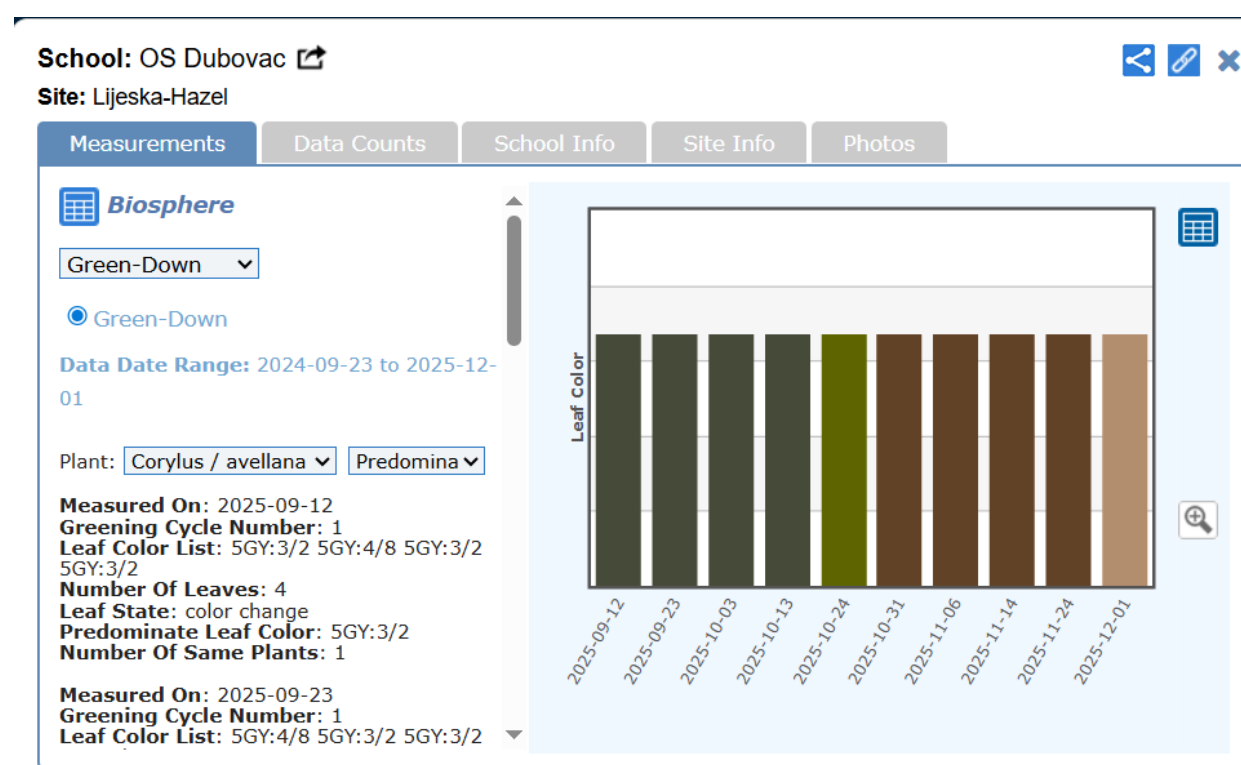
budburst : March 1st

the leaves have stopped growing: May 10th



Hazel

all leaves fallen: December 12th



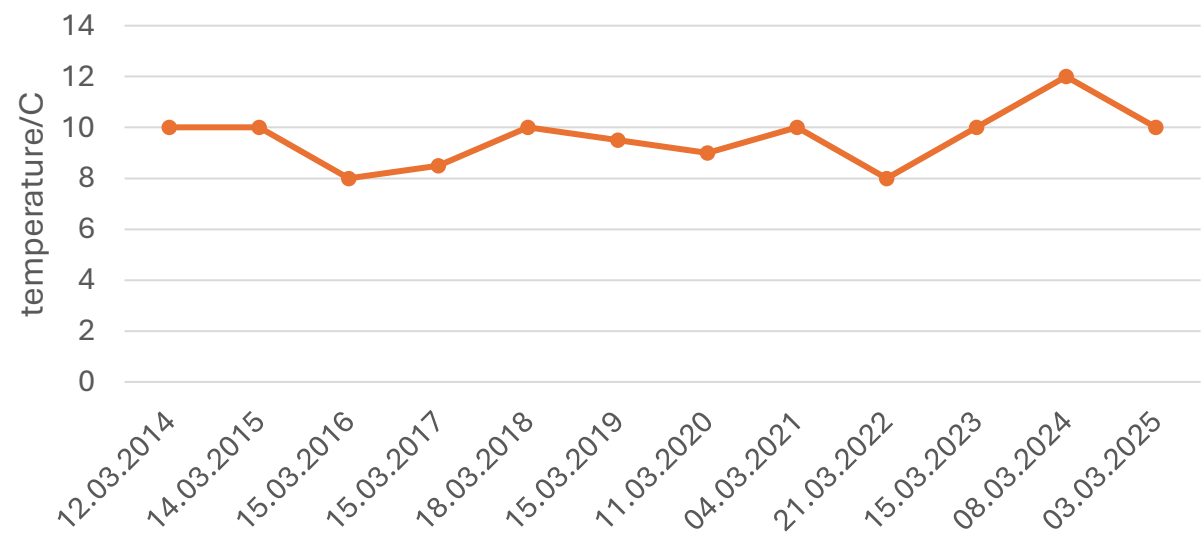
10 years of Green up- Birches (average)

- budburst starts in the first half of March
- the last two years budding was the earliest

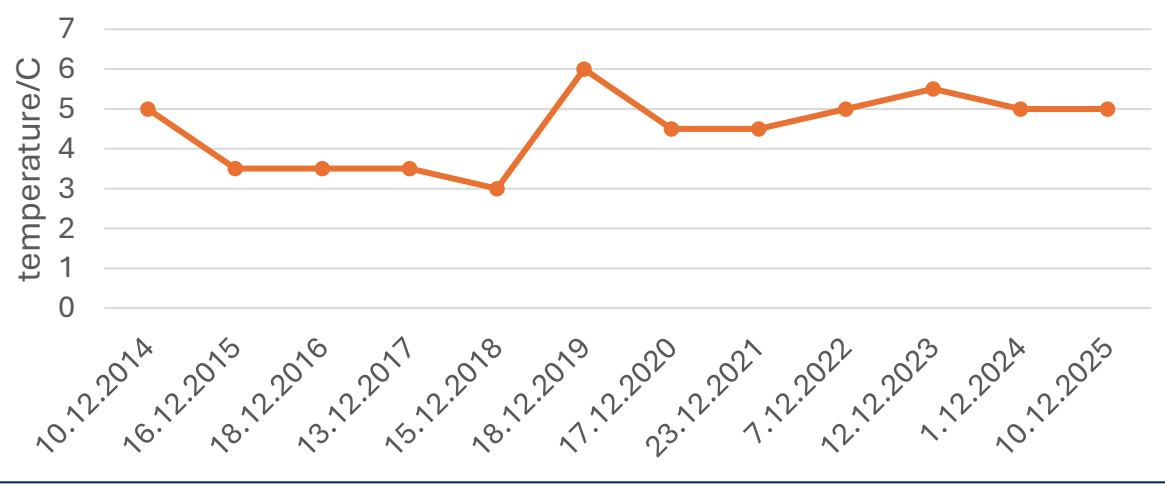
10 years of Green down – Birches (average)

- Green starts in October
- the last leaves always fall in December

Green up and average temperature of March



Green down and average temperature of December



For the VSS (virtual symposium) we submitted the paper "Black Promenade" which we presented at the 2025 state competition GLOBE

The research project describes biometric measurements on the promenade and calculates the amount of carbon stored in all the trees on the promenade

Use GLOBE Data for Research

[Student Research Reports](#)

[GLOBE Science Process](#)

[GLOBE Publications](#)

Black promenade

Organization(s): [OS Dubovac](#)

Country: [Croatia](#)

Student(s): [Esma Šabanović](#), [Zoea Benković](#), [Korina Brozović](#), [Jana Zaborski](#)

Grade Level: Middle School (grades 6-8, ages 11-14)

GLOBE Member(s): [Snježana Marković-Zoraja](#)

Contributors: [Kristina Fratrović](#), GLOBE teacher, [Dubovac Primary school Math and IT teacher](#)

Report Type(s): [Virtual Science Symposium Report](#)

Protocols: [Biometry \(including Tree Height\)](#), [Carbon Cycle](#)

Presentation Poster: [View Document](#)

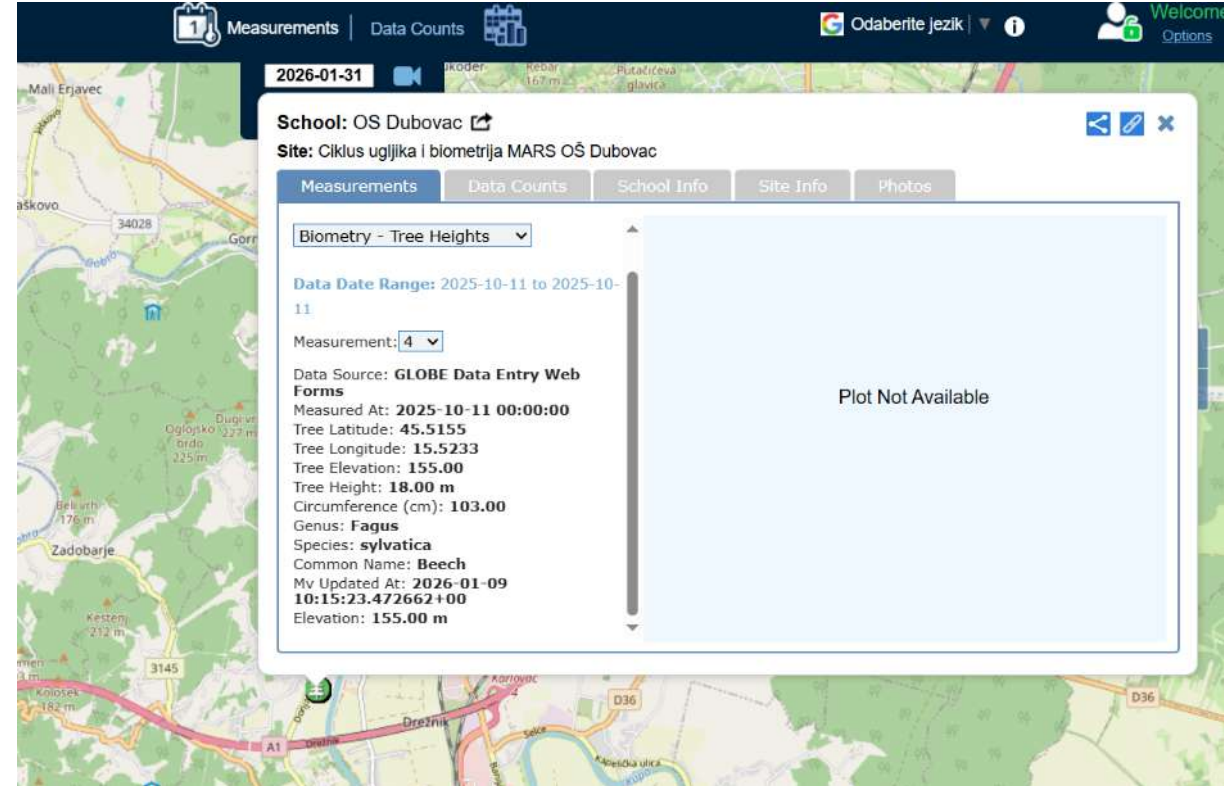
Language(s): [English](#)

Date Submitted: [2025-12-21](#)

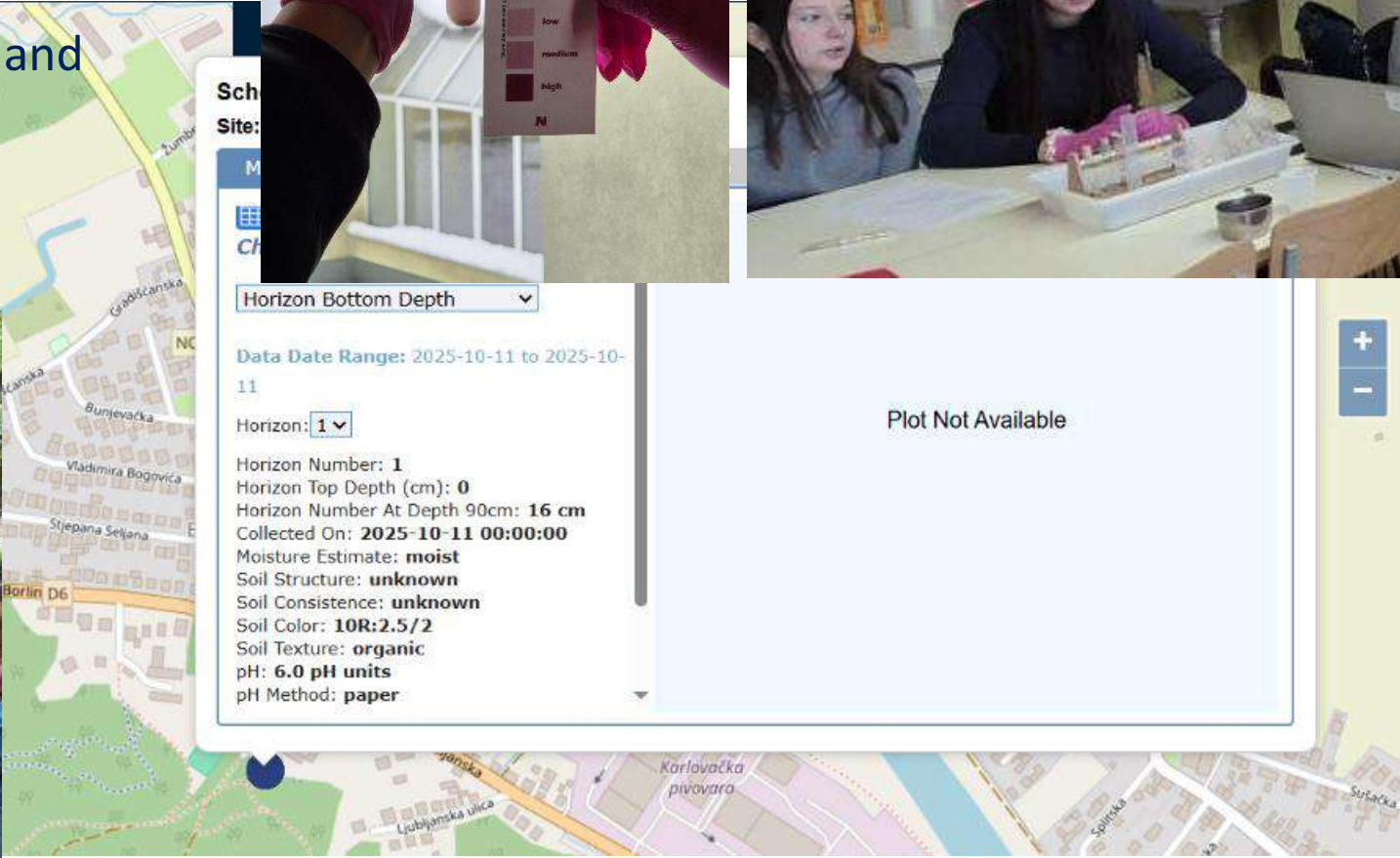


This student research assesses the ecological value of urban tree lines in Karlovac (Croatia), focusing on the "Black Promenade" alley located along the eastern edge of the historic "Karlovac Star" fortification. In spring 2025, detailed biometric measurements were conducted for all 178 trees following GLOBE protocols, including species identification, circumference at breast height, total height, and geolocation, while tree age was estimated using species-specific age factors. Based on these field data, diameter at breast height (DBH) was derived and used to estimate dry biomass, stored carbon, and lifetime CO₂ uptake. The results indicate a

- On October 11th we were in the forest near our school and we did biometric measurements
- the dominant trees in forest are beech and sweet chestnut trees
- the average height of the trees is 20 meters



We also did a soil analysis in the forest, determining the horizons, texture, soil color, carbonates and pH
We tested the soil samples at school and determined the amount of nitrogen, potassium and phosphorus in each horizons



Sch Site: M C/

Horizon Bottom Depth

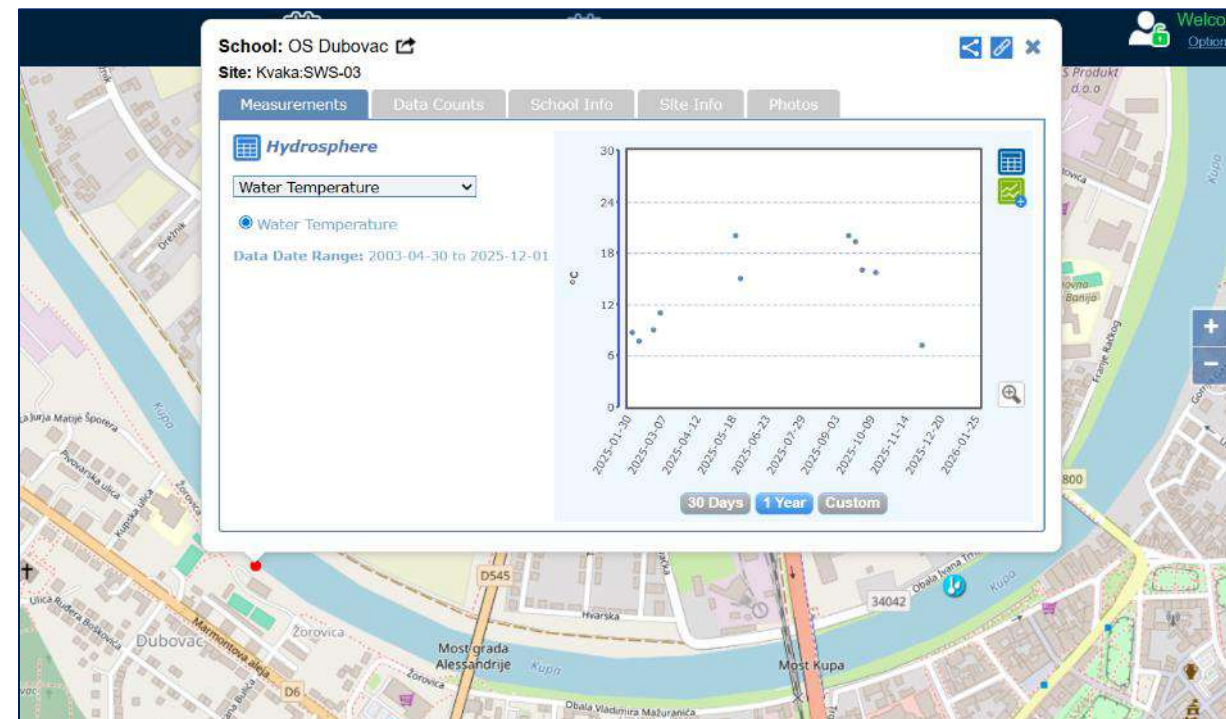
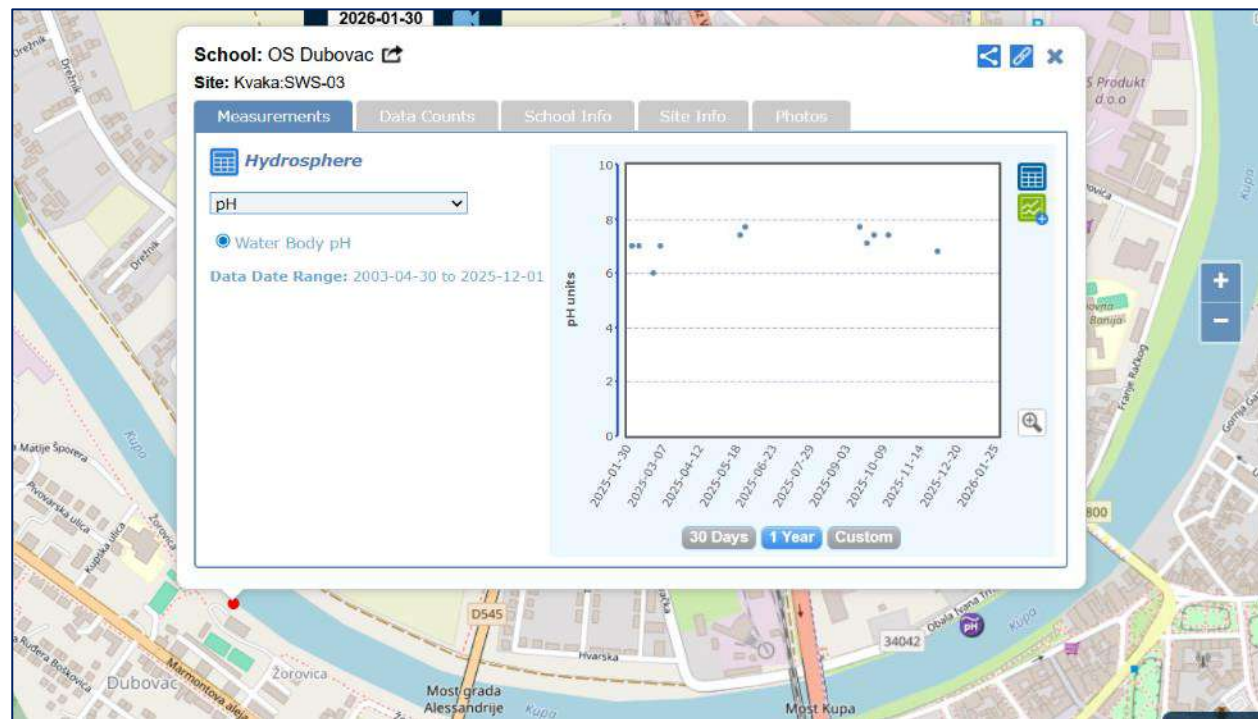
Data Date Range: 2025-10-11 to 2025-10-11

Horizon: 1

Horizon Number: 1
Horizon Top Depth (cm): 0
Horizon Number At Depth 90cm: 16 cm
Collected On: 2025-10-11 00:00:00
Moisture Estimate: moist
Soil Structure: unknown
Soil Consistence: unknown
Soil Color: 10R:2.5/2
Soil Texture: organic
pH: 6.0 pH units
pH Method: paper

Plot Not Available

- we carry out hydrological measurements on the Kupa River in 2025
- we measured: temperature, pH, transparency, alkalinity, dissolved oxygen, nitrates and conductivity
- at the meeting on April 21st, we will go to the Kupa River where our group will show you how we do hydrological measurements.



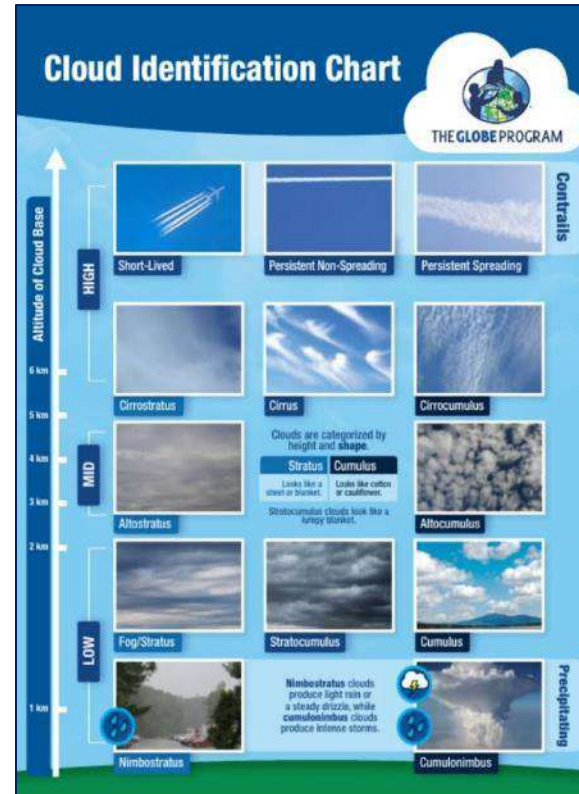
2026. January 29th

Our GLOBE students are involved in the ICSE project and they presented the research project "Measurement of air quality" at the Faculty of Science and Mathematics and received an award in the category Digitalization



Our project started in spring 2025.

During the warmer months of the year, while taking atmospheric measurements at the school meteorological station and observing the sky, students recorded different colors of the sky and varying visibility.

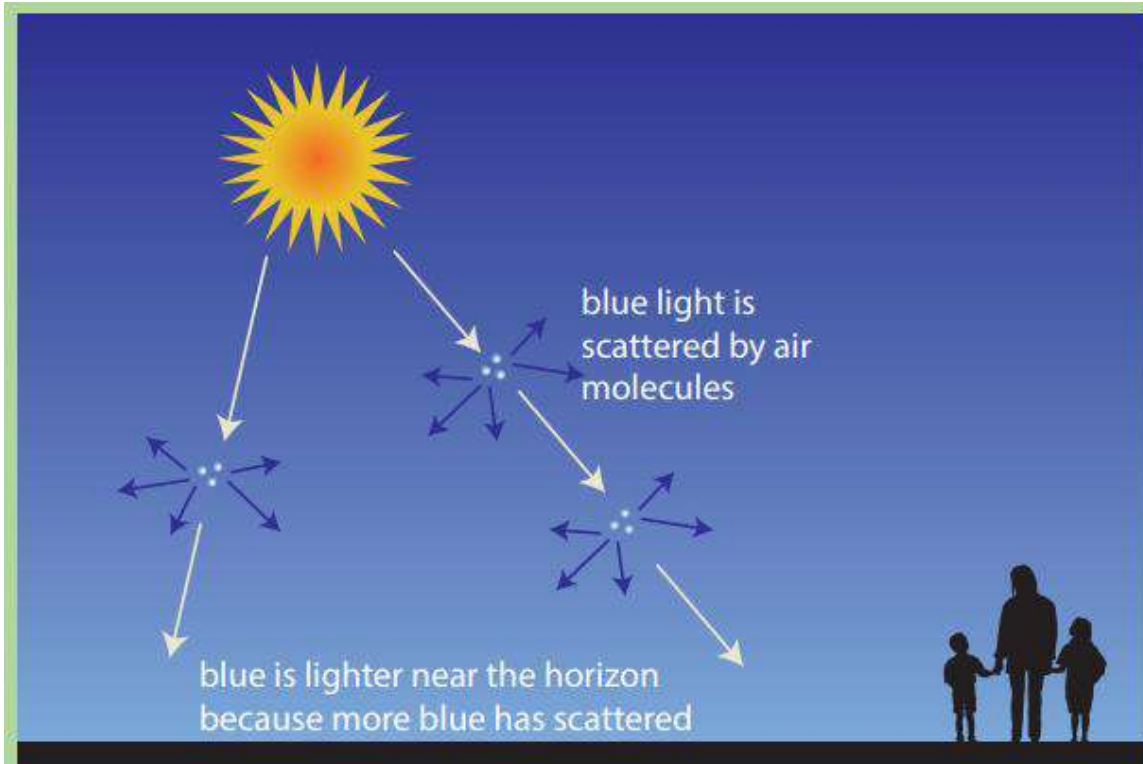


clouds (globe.gov)

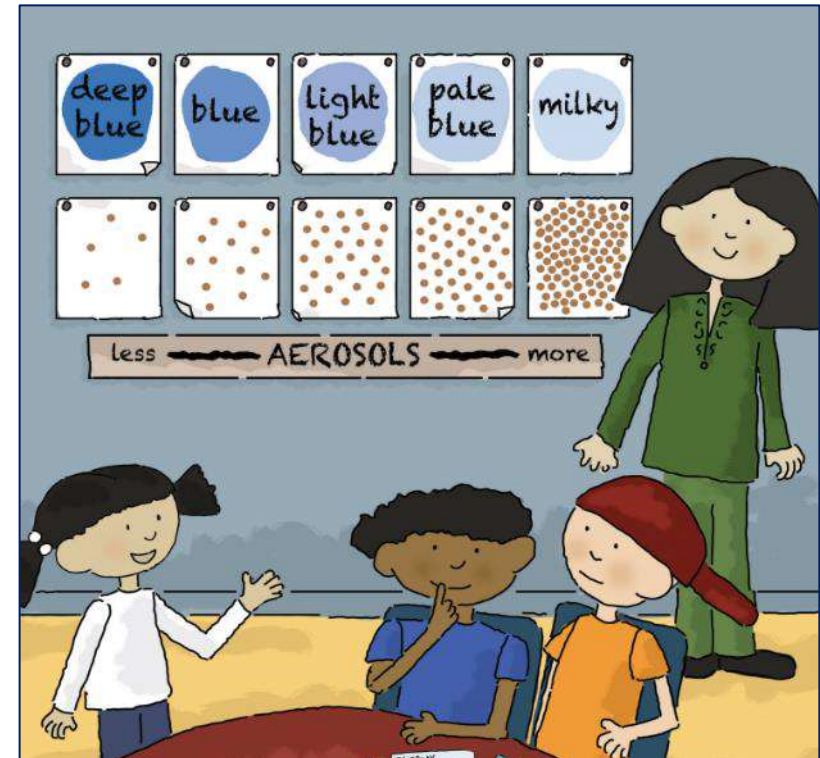
Cloud Cover	Sky Color	Sky Visibility
How much of the sky is covered by clouds?	Which is the deepest blue in the sky?	What does the horizon look like?
Few (<10%)	Deep Blue	Unusually Clear
Isolated (10-25%)	Blue	Clear
Scattered (25-50%)	Light Blue	Somewhat Hazy
Broken (50-90%)	Pale Blue	Very Hazy
Overcast (>90%)	Milky	Extremely Hazy

According to the instructions in the GLOBE protocols, the color of the sky depends on the amount and types of particles in the air.

When there are few particles in the atmosphere, the sky appears dark blue because sunlight is scattered by molecules in the air – nitrogen, oxygen (blue light is scattered more than other colors)

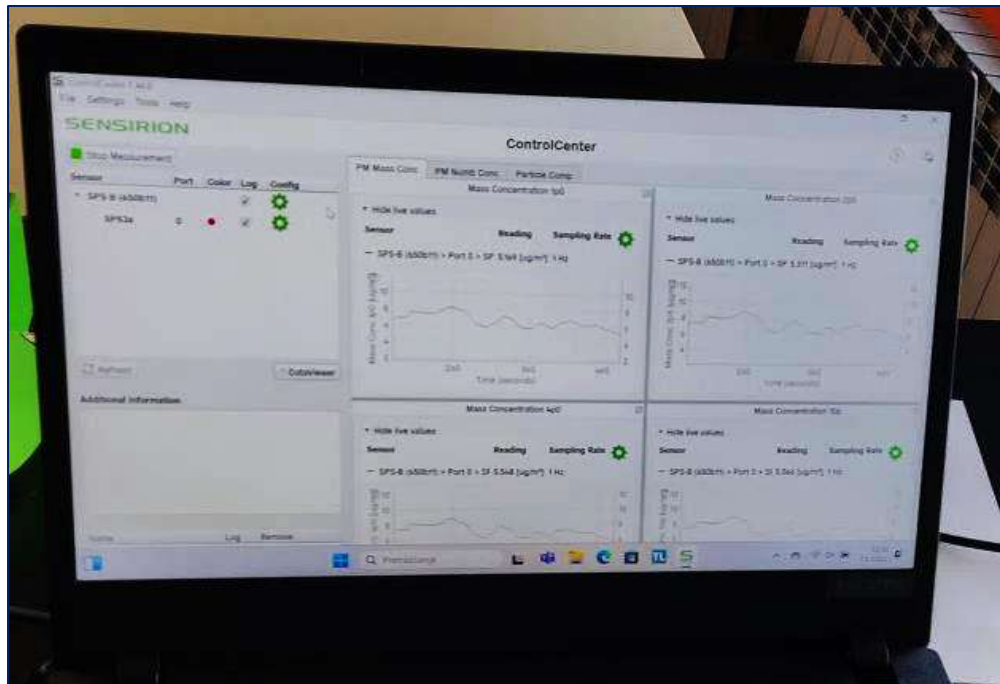


When there are more particles floating in the atmosphere, light is scattered in more directions and in more colors at once, making the sky appear brighter, hazy, or pale blue.



Our methods

- 1) atmospheric measurements and observations from 1:00 PM to 2:00 PM, from March 1 to October 1, 202atmospheric factors
- 2) measurments of particles matter, PM (computer with sensor Sensirion SP 30)
- 3) experiment (milk is added to blue solutions) - milk in a blue solution behaves like floating particles in the air, so we compare the changes in blue color

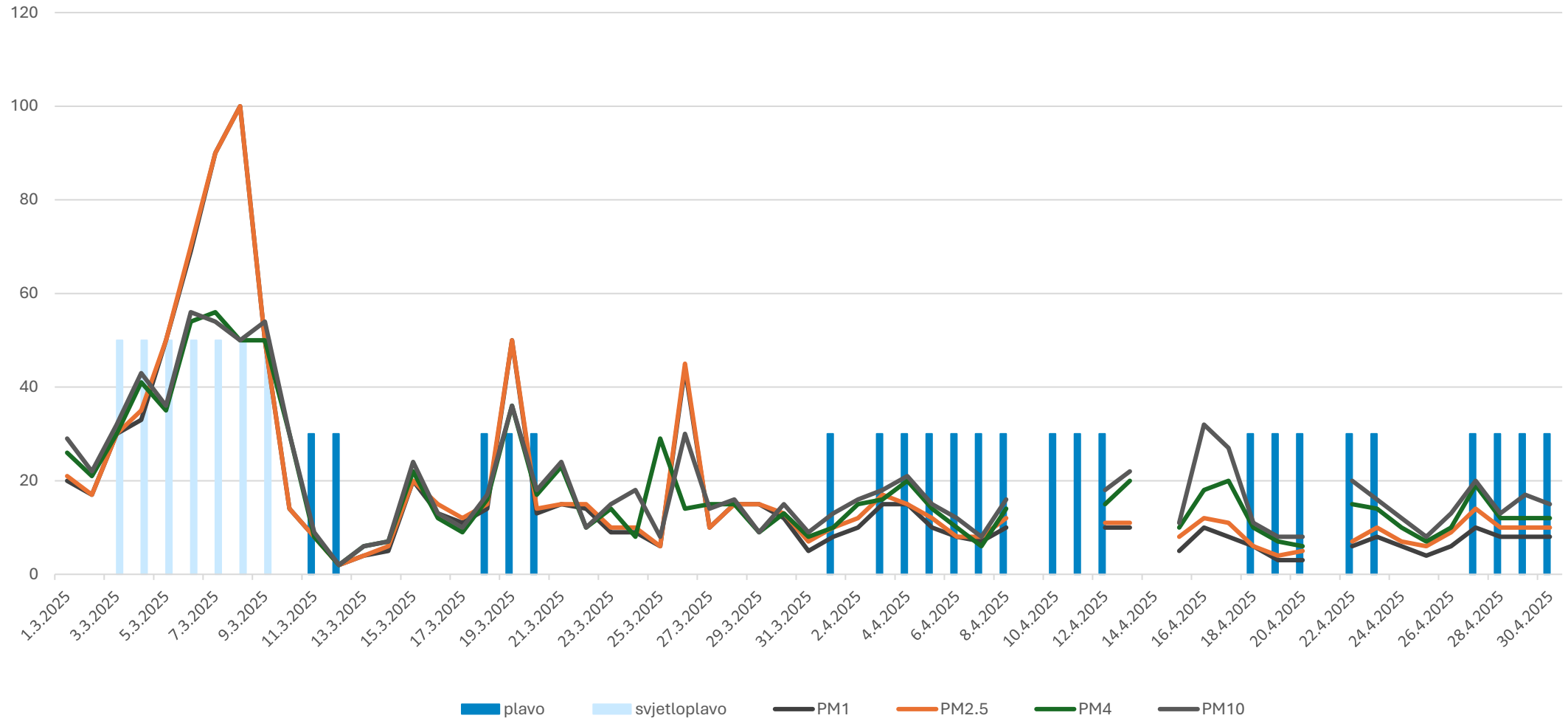


Results

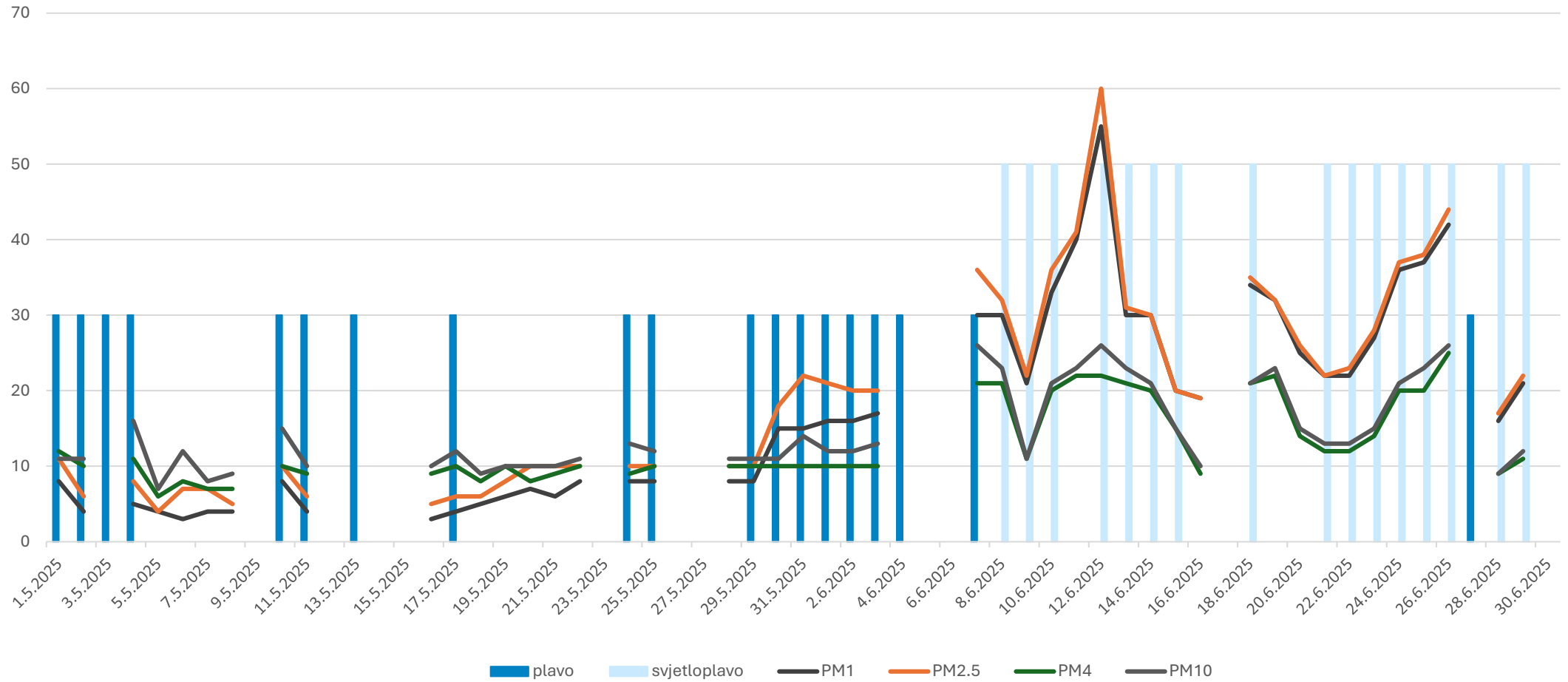
We compared the color of the sky on days with less than 50% cloud cover with the values of suspended particles from March 1 to October 1, 2025



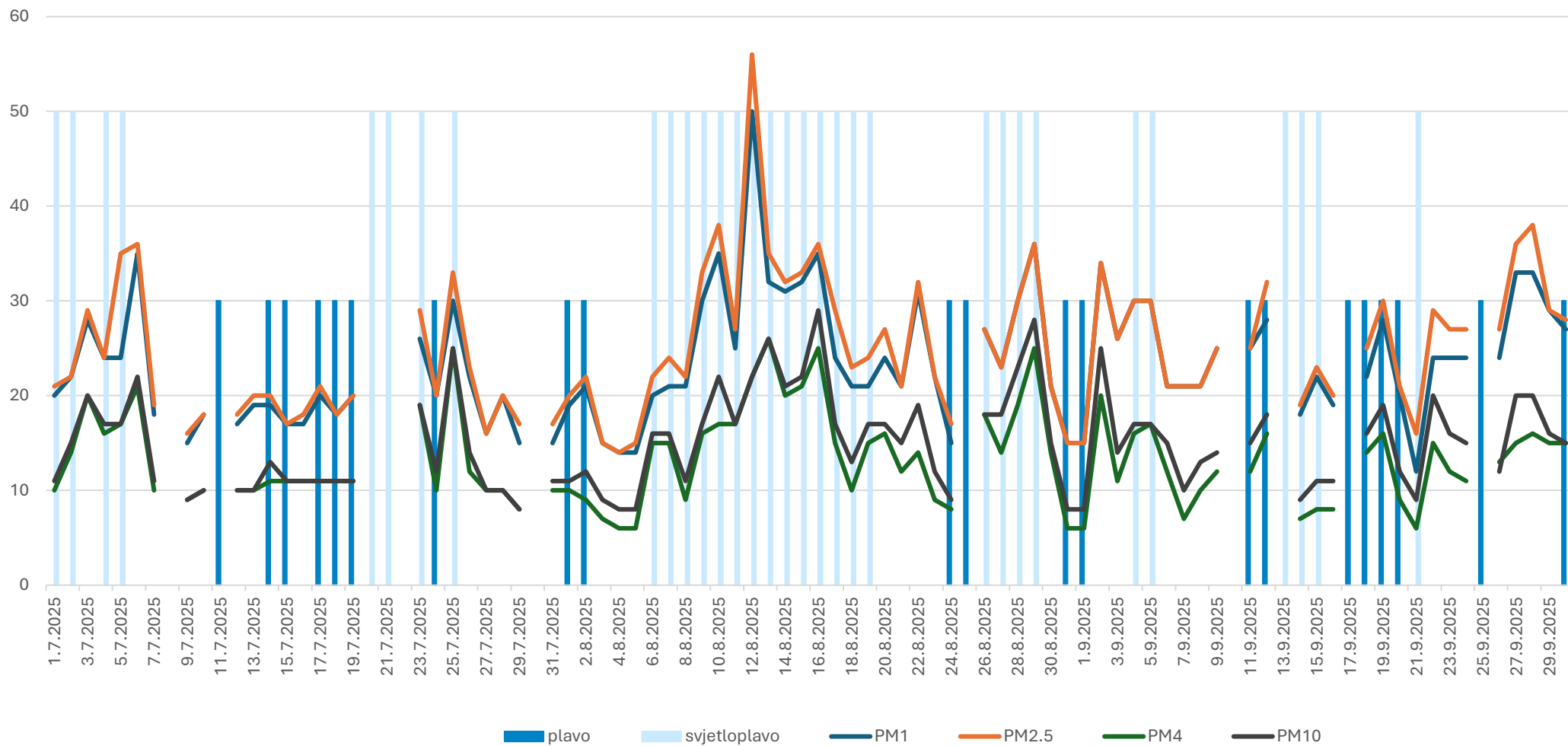
Color of the sky and PM, March 1st – April 30th 2025



Color of the sky and PM, May 1 st – Jun 30th 2025



Color of the sky and PM, July 1st – October 1st 2025



Conclusion

- We believe it is important to monitor air quality and inform citizens about air quality for their health
- We plan to report on the values of suspended particles on the school website
- We plan to educate students, teachers and citizens so that they can assess air quality based on the color of the sky and visibility, and then sensitive groups of citizens could avoid spending longer periods outdoors

The written form of the project was published on the website of the Faculty of Science and Mathematics in Zagreb.

Program for the meeting in April

- April 20: evening meeting in the sports hall
 - April 21:
 - morning - biometric measurements in the school park
 - hydrological measurements on the Kupa river
 - Lunch
 - afternoon - city tour and visit to the Aquatika Museum (freshwater aquarium)
-



