

Data Literacy Learning Activity - Atmosphere



Air Temperature across GLOBE
during a year

Air Temperature across GLOBE during a year

Topic: Visual presentation and interpretation of air temperature annual pattern for sites in various countries/continents and located at similar elevation.

Age of students: 12-15

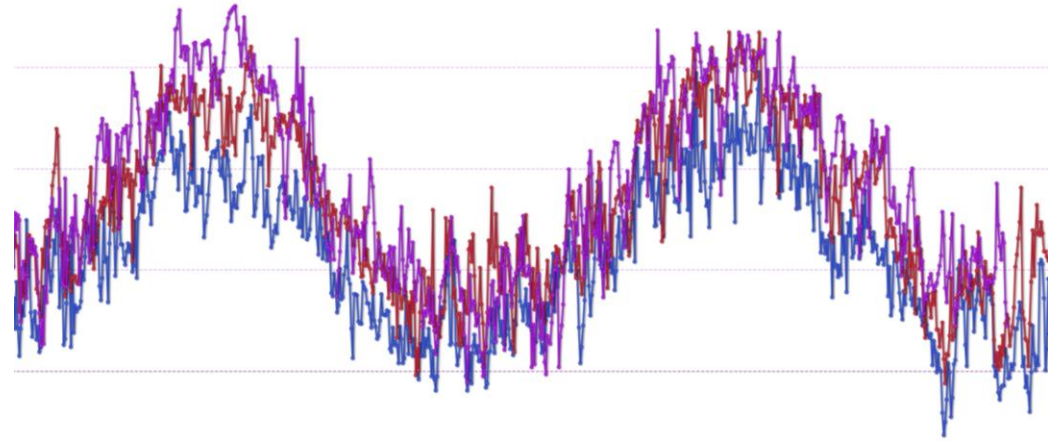
Skills developed: critical evaluation of the annual trends and patterns of the data, selecting the most efficient format of dataset visual presentation in graph, interpreting the visualized data, asking questions on why the data differ from each other

Prerequisites: knowledge on how to work with the GLOBE Visualization Tool

Big Idea: Everyone knows that air temperature is not the same at various locations across the planet. But it is not always easy to choose the best visual presentation to show that. The correct graph should not be misleading, confusing or too complicated to read. It is always important to know the limits of presentation datasets in graphs.



Content



Slide 4: Introduction

Slide 5: Work Assignment for students

Slide 6-7: Step 1 and 2: Instruction on how to filter out selected range air temperature data in the GLOBE Visualization Tool (for detailed instruction on how to work with the Tool please see one of the animated tutorials that are included in the Tool) – following the steps that the Greek team took.

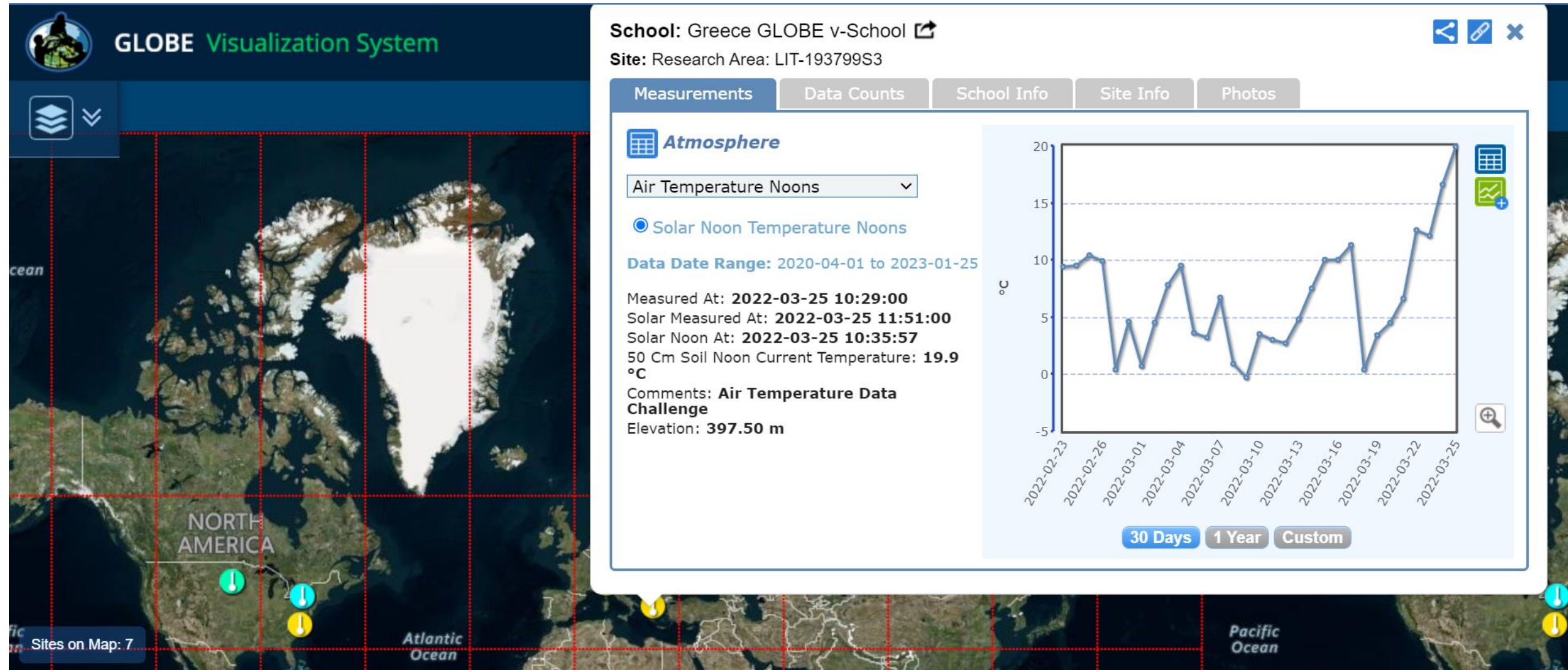
Slide 8-10: Step 3: Examples of visual presentation of the data – 3 different graphs generated by the Visualization tool, each was customized in particular way.

Slide 11: Step 4 – exercise on data interpretation – students evaluate the statements as true or false

Slide 13: Correct answers for Step 4

Slide 14: Additional graph that shows the same data in a longer dataset (in case you may need that).

This data literacy activity is based on the student research and data interpretation done by the GLOBE citizen scientists team from Greece (Tinycore lab) that they did as a part of 2022 Earth Day Air Temperature Challenge.



Work assignment for students:

Task:

Compare air temperature in GLOBE schools with elevation 380-430 m.

Comment 1: Elevation range was derived from the elevation of the author's site in Greece (397,7 m), you can come with your own.

Comment 2: The date range was selected for one year (25 March 2021 – 25 March 2022), feel free to select your own data range if you wish too.

Steps:

1. Find schools (sites) on the (moreless) the same elevation, which collected the data for air temperature in the given year.
2. Look at the longer period (1 year) and construct the graph in vizualization tool displaying the different air temperatures coming from the selected locations.
3. Think about how many different sites is reasonable to have in one graph, so that it is still possible to interpret the data (like for example different graphs A, B or C that you can see in next slides). Make sure you set up the y axis scale correctly.
4. Interpret the data displayed based on the sites that you selected for the graph (do excercise at slide 11).

Step 1: finding schools that measured air temp. on 25 March 2022 and fall within the elevation range – see set up of the filter:

The screenshot displays the GLOBE Visualization System interface. At the top, the logo and name 'GLOBE Visualization System' are on the left, and navigation links for 'Measurements' (with a '1' badge), 'Data Counts', and a language selector 'Vyberte jazyk' are on the right. A 'Welcome' message with a user icon and 'Options' link is also present.

The main map area shows a satellite view of the Atlantic Ocean and surrounding landmasses, including North America, Europe, and parts of Africa. A red dashed grid is overlaid on the map. A date filter '2022-03-25' is set at the top of the map. Several yellow and green pins are placed on the map, indicating measurement locations. A 'Davis trail' label is visible near the top of the map.

On the left side, a 'Filters' panel is open, showing the following options:

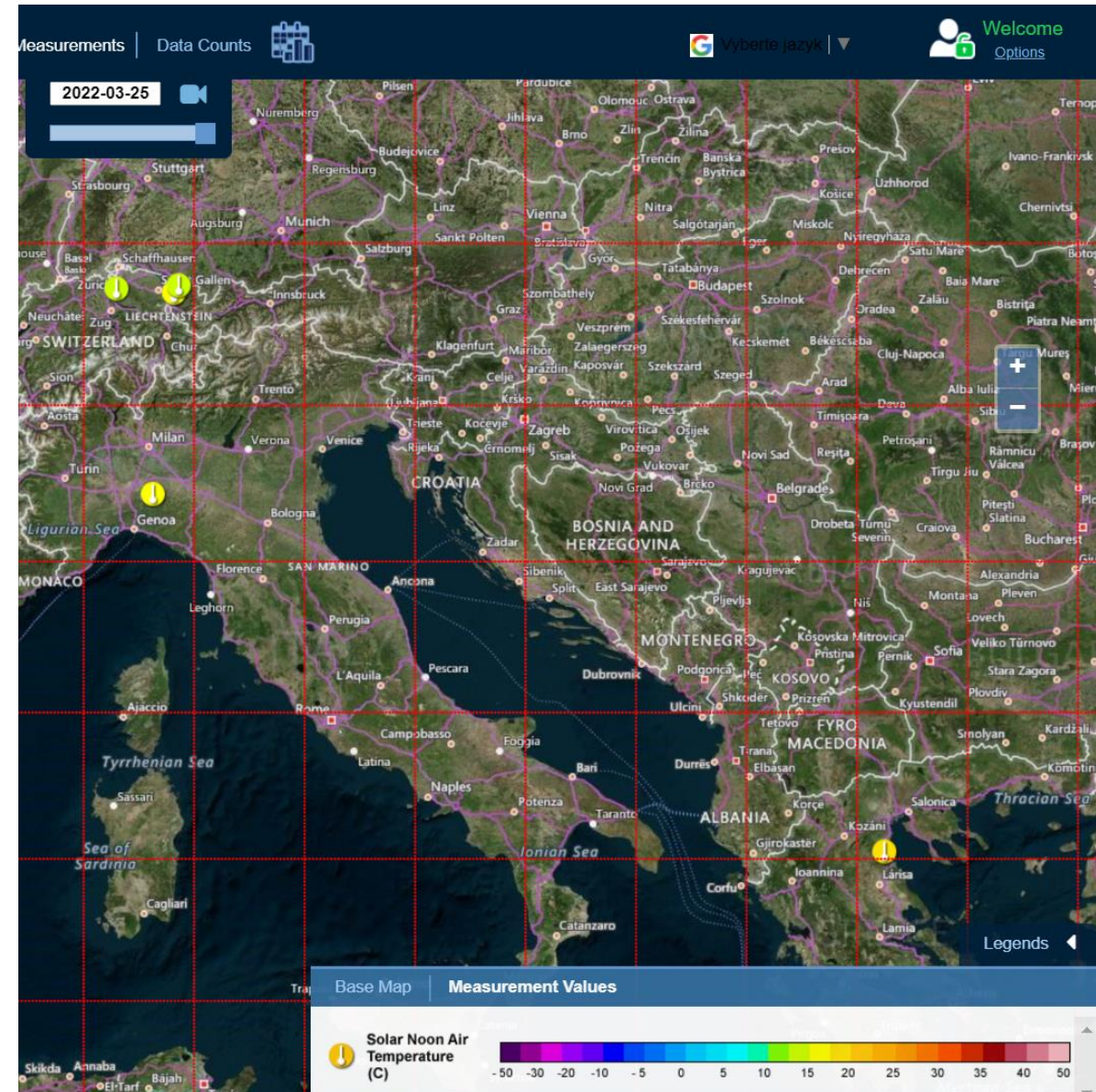
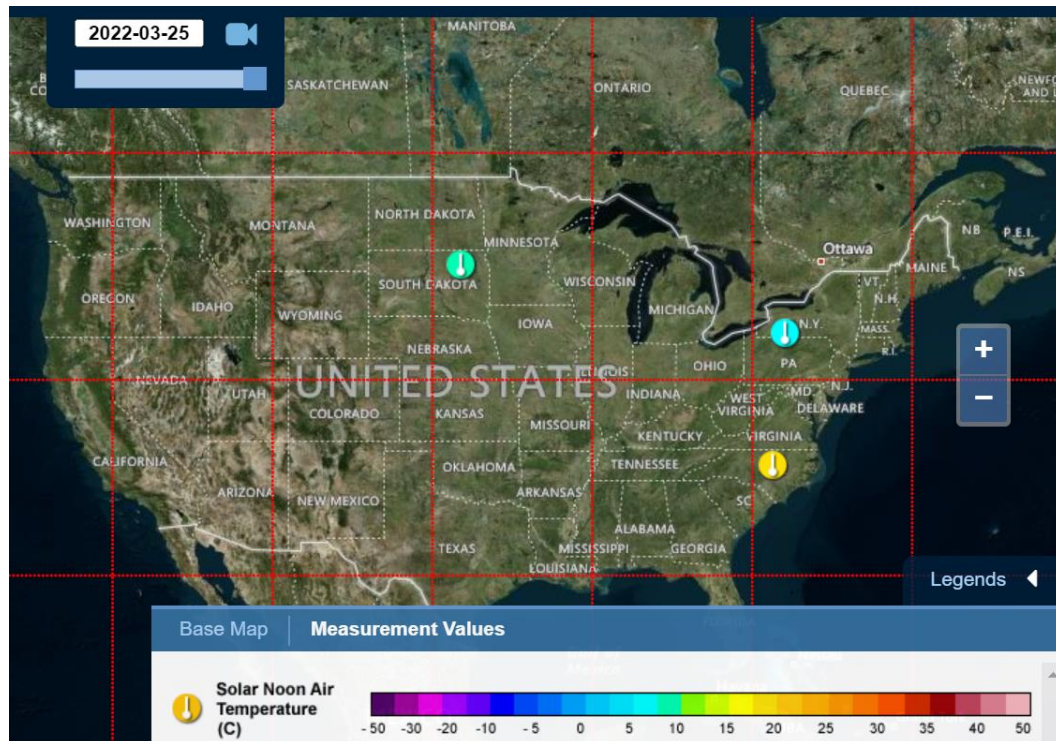
- By Partner
- By School or Schools
- By Place
- By Lat/Lon Range
- By Drawing on Map

The 'Elevation:' filter is expanded, showing a range of '380 m to 430 m' with a corresponding slider below it.

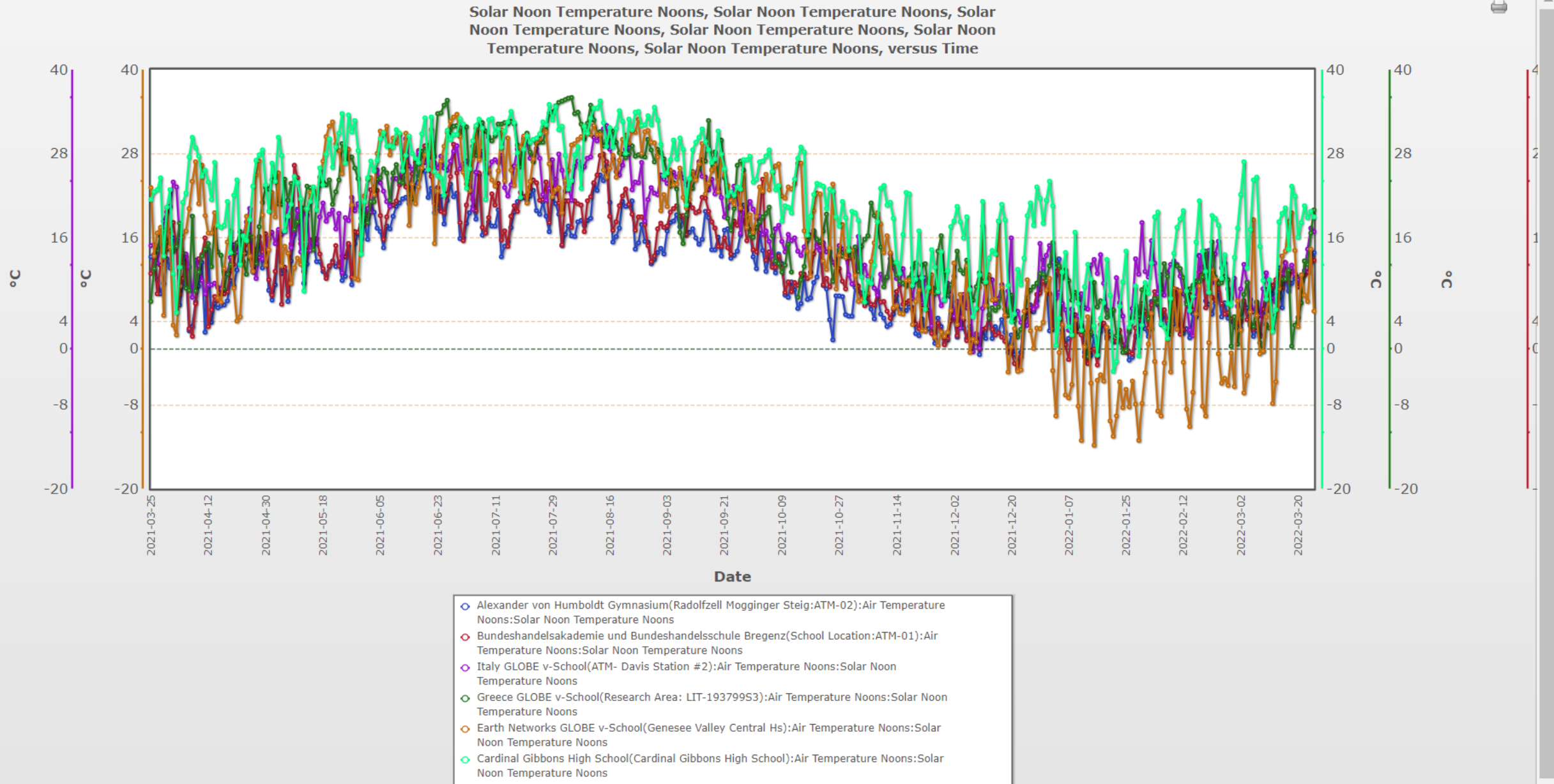
At the bottom, there are two tabs: 'Base Map' and 'Measurement Values'. The 'Measurement Values' tab is active, displaying a color scale for 'Solar Noon Air Temperature (C)' ranging from -50 to 50. The color scale transitions from dark purple (-50) through blue, green, yellow, orange, and red to dark red (50).

Step 2: analyzing results given by the Visualization Tool

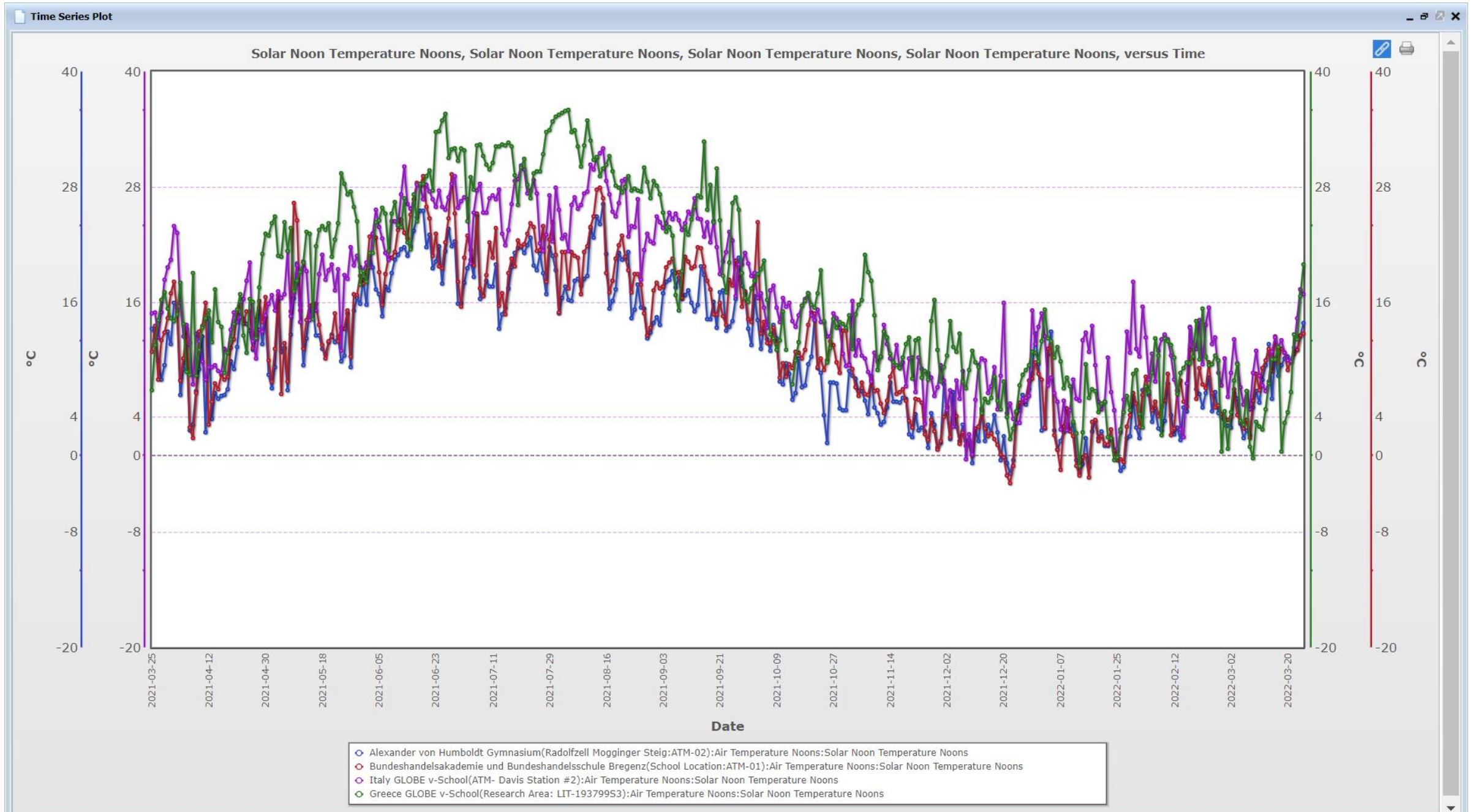
- 3 schools in USA
- 3 schools in Switzerland
- 1 school in Italy
- 1 site in Greece



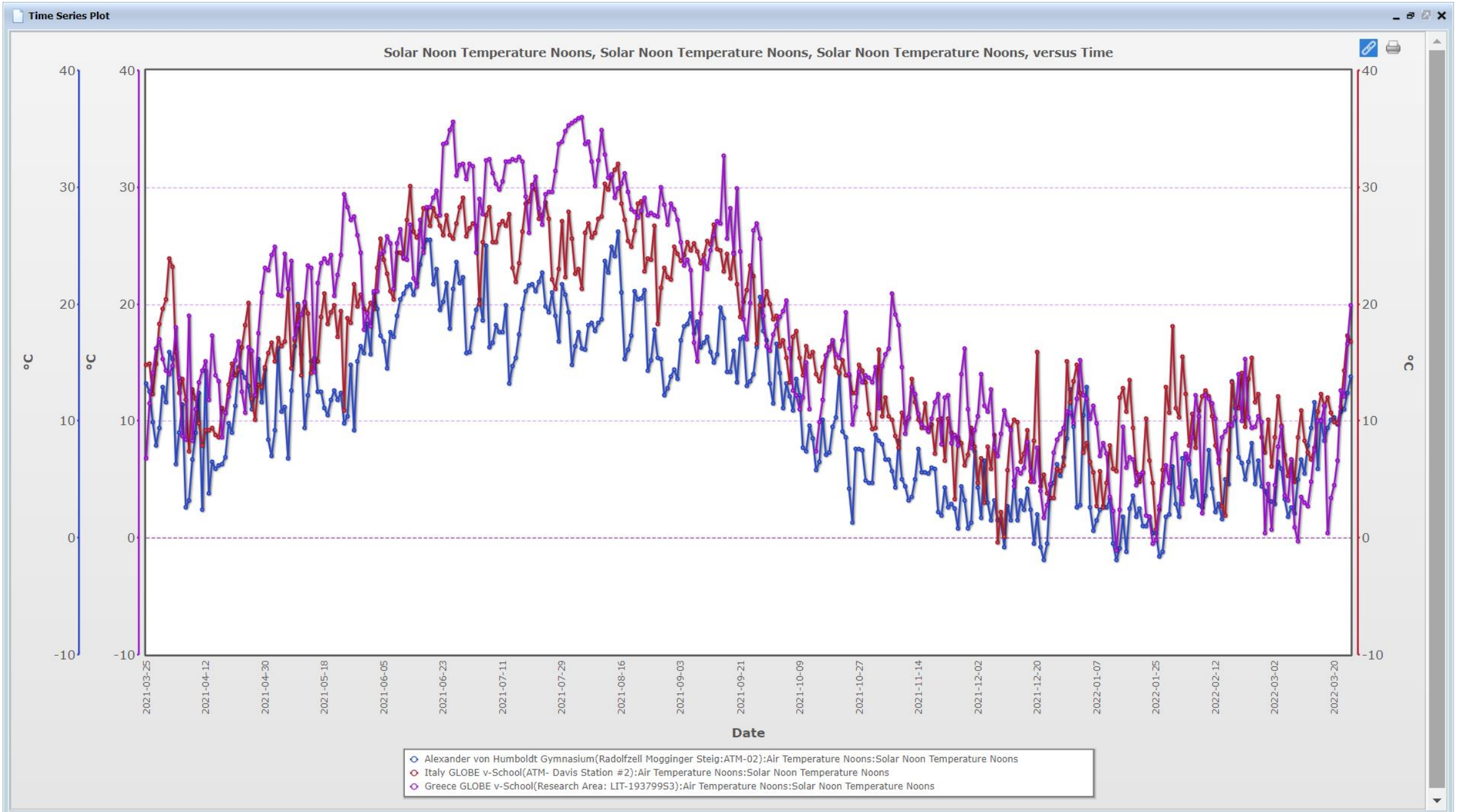
Graph A: air temperature values of 6 sites over 1 year displayed in one plot



Graph B: Only values of 4 schools from Europe displayed (U.S. schools left out)



Graph C: values of 3 schools displayed - comparison of Swiss, Italian and Greek site



Step 4: Data interpretation – look at graph C and say what sentence is true/false

- The temperatures in winter did not go below zero at any of the sites.
- The place, which seems to be the coldest (in general) out of those three sites, is that one in Italy.
- In all the sites, temperature crossed 30°C in summer.
- The difference between the highest and the lowest temperature at the Greek site is more than 40 degrees.
- When I compare the temperatures at 3 sites, on average they differ only slightly in winter, but they are significantly different in summer.
- The lowest temperature at Swiss site in summer (July-August) is higher than the highest temperature at Italian site in winter (December-January)

For answers to the questions go to the next slide 😊

Data interpretation – look at graph C and say what sentence is true/false

- The temperatures in winter did not go below zero at any of the sites. **FALSE**
- The place, which seems to be the coldest (in general) out of those three sites, is that one in Italy. **FALSE**
- In all the sites, temperature crossed 30°C in summer. **FALSE**
- The difference between the highest and the lowest temperature at the Greek site is more than 40 degrees. **FALSE**
- When I compare the temperatures at 3 sites, on average they differ only slightly in winter, but they are significantly different in summer. **TRUE**
- The lowest temperature at Swiss site in summer (July-August) is higher than the highest temperature at Italian site in winter (December-January) **FALSE**

Addition - Graph D: The same 3 sites displayed (Swiss, Italian and Greek) over longer time

