THE GLOBE PROGRAM

GLOBE
Visualize and Retrieve Your Data

Three steps to Visualization
Data Counts
Advanced Vis Features
Advanced Data Access Tool (ADAT)
GLOBE API

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Introduction

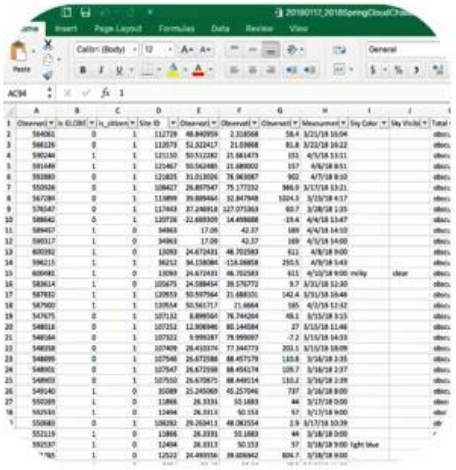
- You should have completed Part 1 for Teachers – Creating a Data Entry Site and Part 2 for Teachers – Entering Measurement Data
- The visualization system uses Production Data only. You will not see any data entered into the training system
- This presentation is available online as well as a video which walks you through the steps
- There is a section for you to try things for yourself after the demonstration and a section to test your knowledge at the end.
- Questions – contact help@nasaglobe.org

Three Ways to Access GLOBE Data on the website

Map It

Visualization System

Spreadsheet



ADAT

API

GLOBE API

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Visualize and Retrieve your Data

- Now that you've input your data, how can you find it?

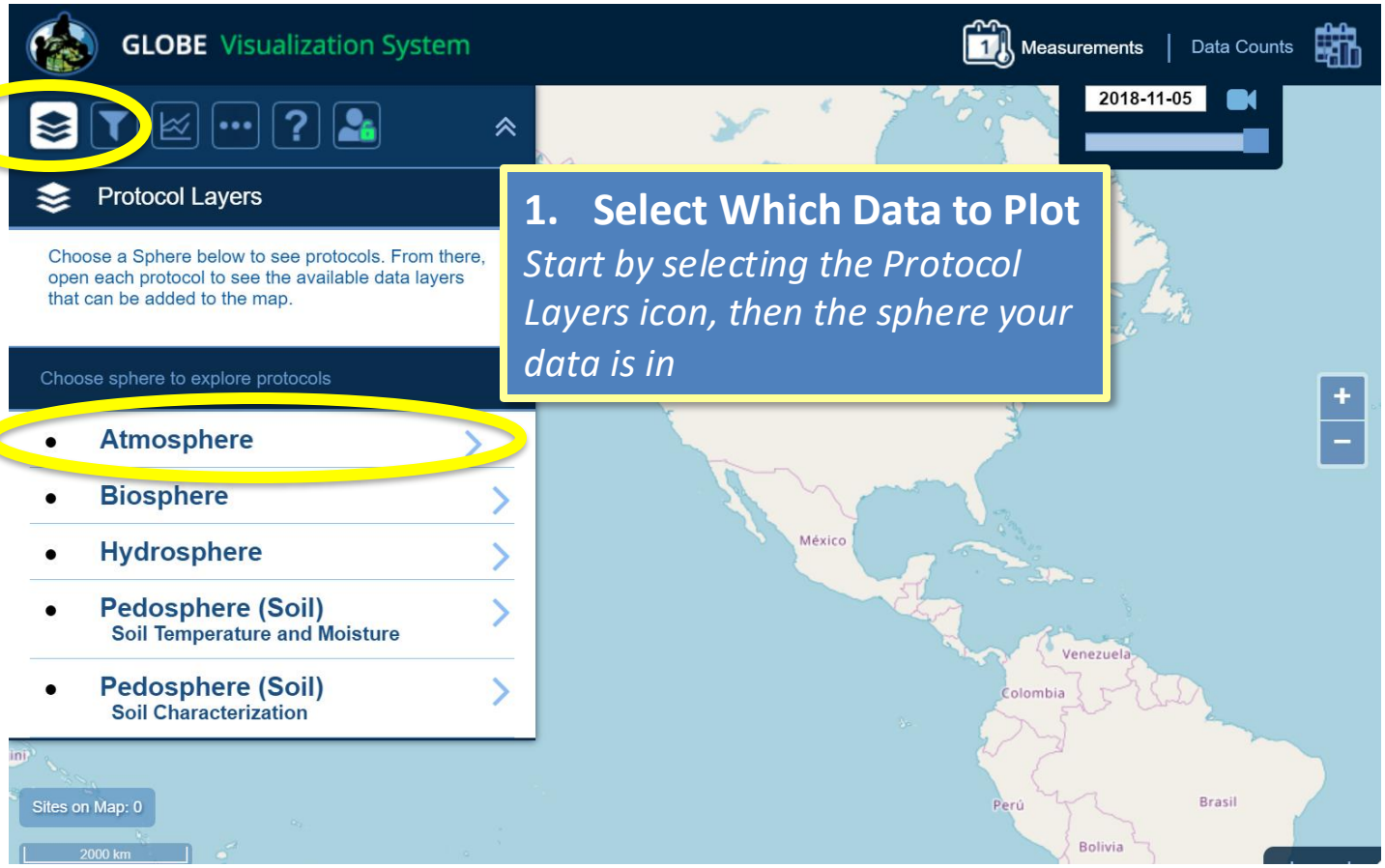
Topics - Visualization

- Navigate to the visualization system
- The pieces of the visualization system
  - Layers, Dates, Filters, Legend, Graphs
- How to view data from a specific protocol on the map
- How to graph and retrieve data for a specific protocol
- Advanced Features
- How to use data counts to find schools that are active in a given protocol

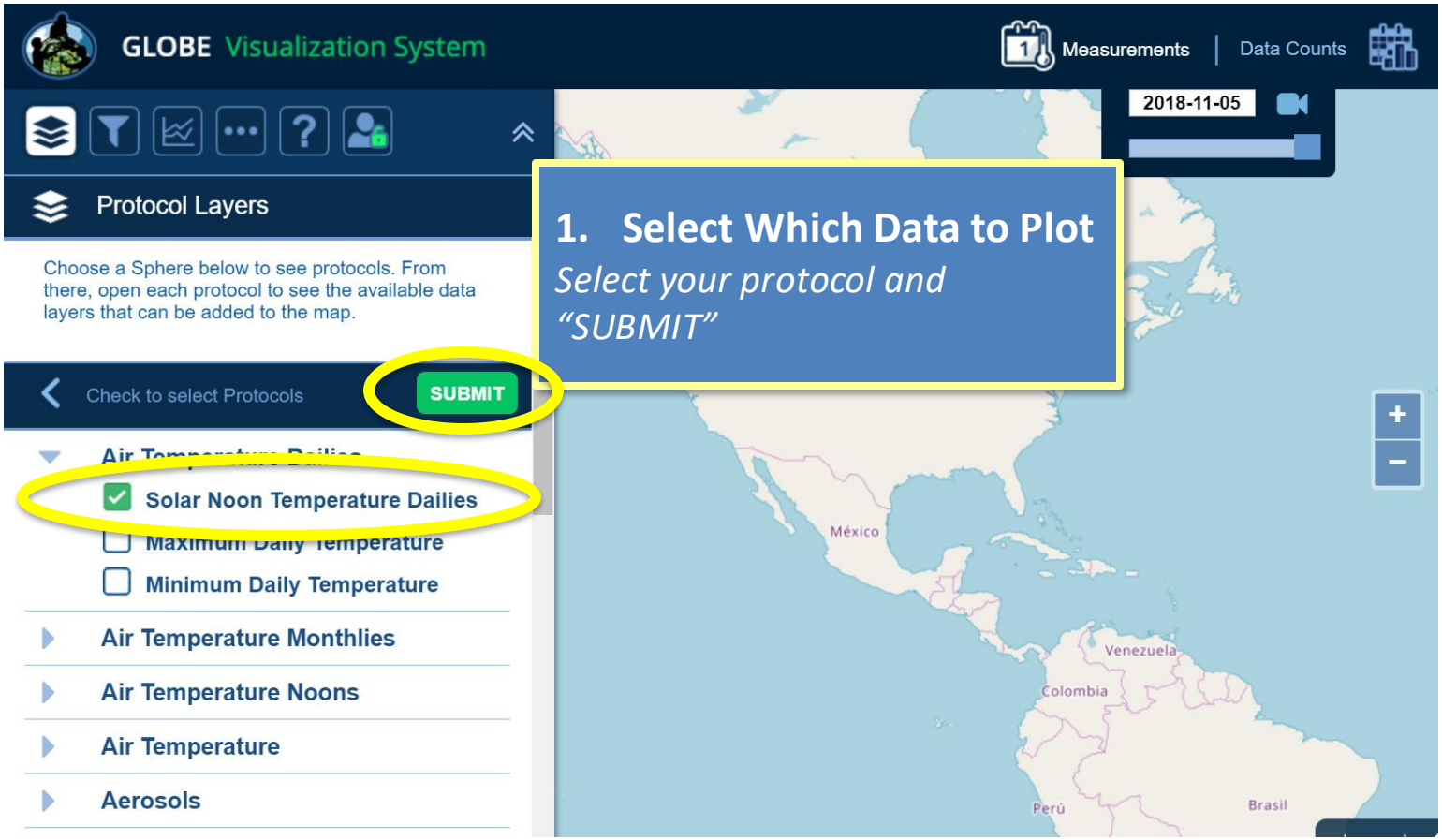
The Basics of the Visualization System

- Select Goto-> from the top and “Visualize Data”
  - Or Go to the homepage and select “Visualize Data”
  - Or http://vis.globe.gov
- Three Steps to Visualize your Data:
  1. Select the protocol data you want to see (Add Layers)
  2. Select the Date you want to see the data for
  3. Click on a data point on the map to receive table and graph information

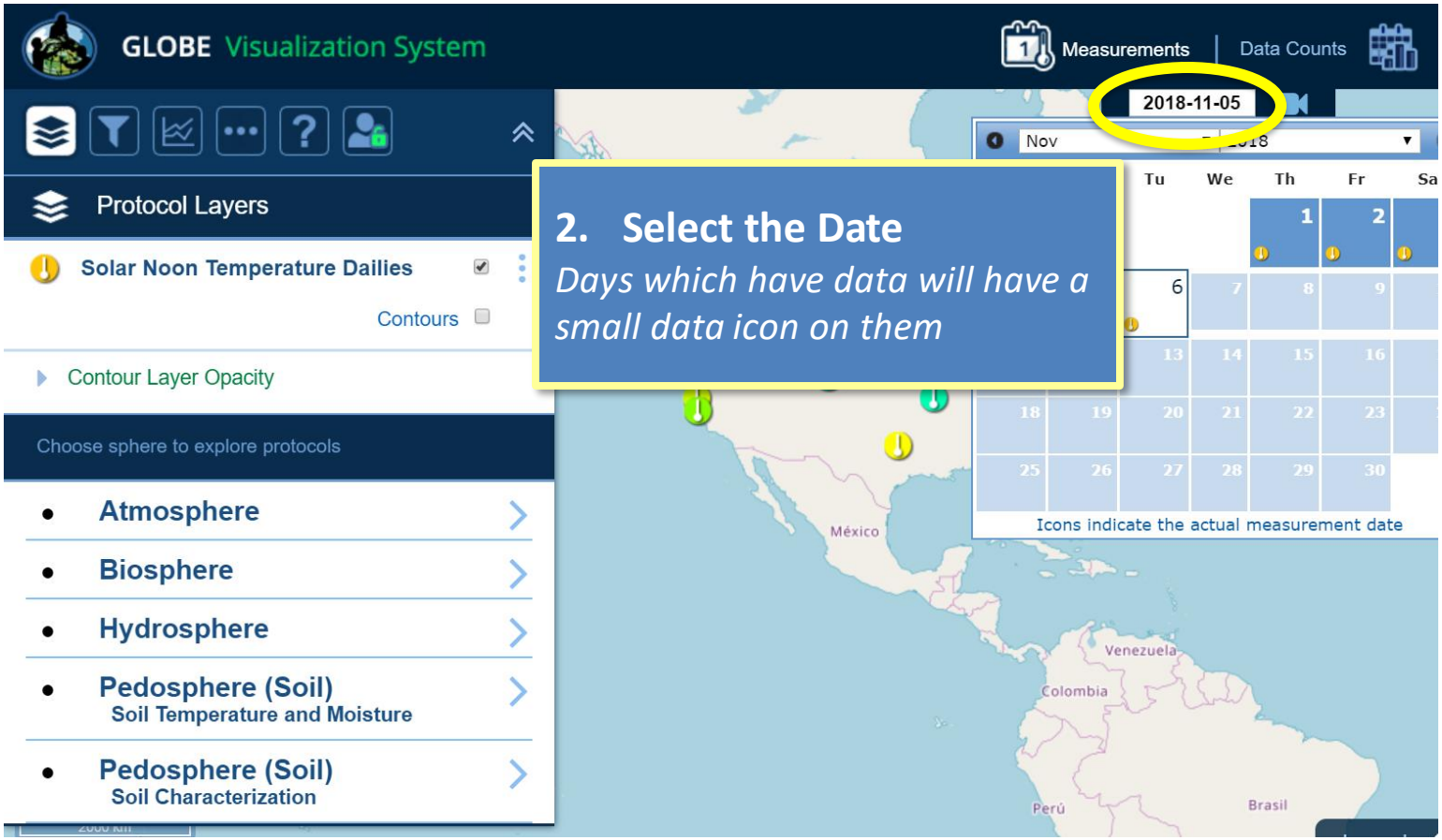
Step 1 – Add Data Layers



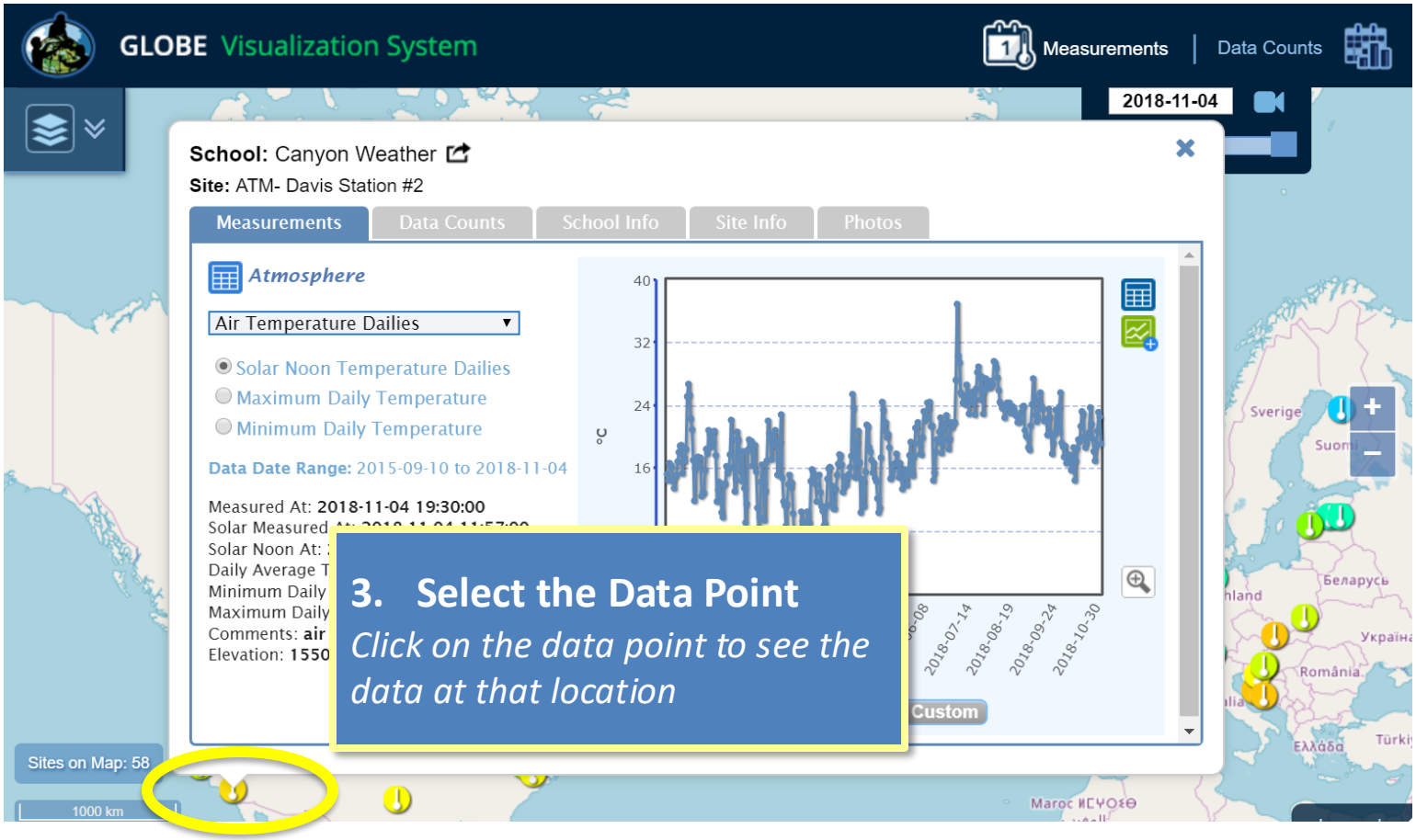
Step 1 – Add Data Layers



Step 2 – Select the Date



Step 3 – Select the Data Point



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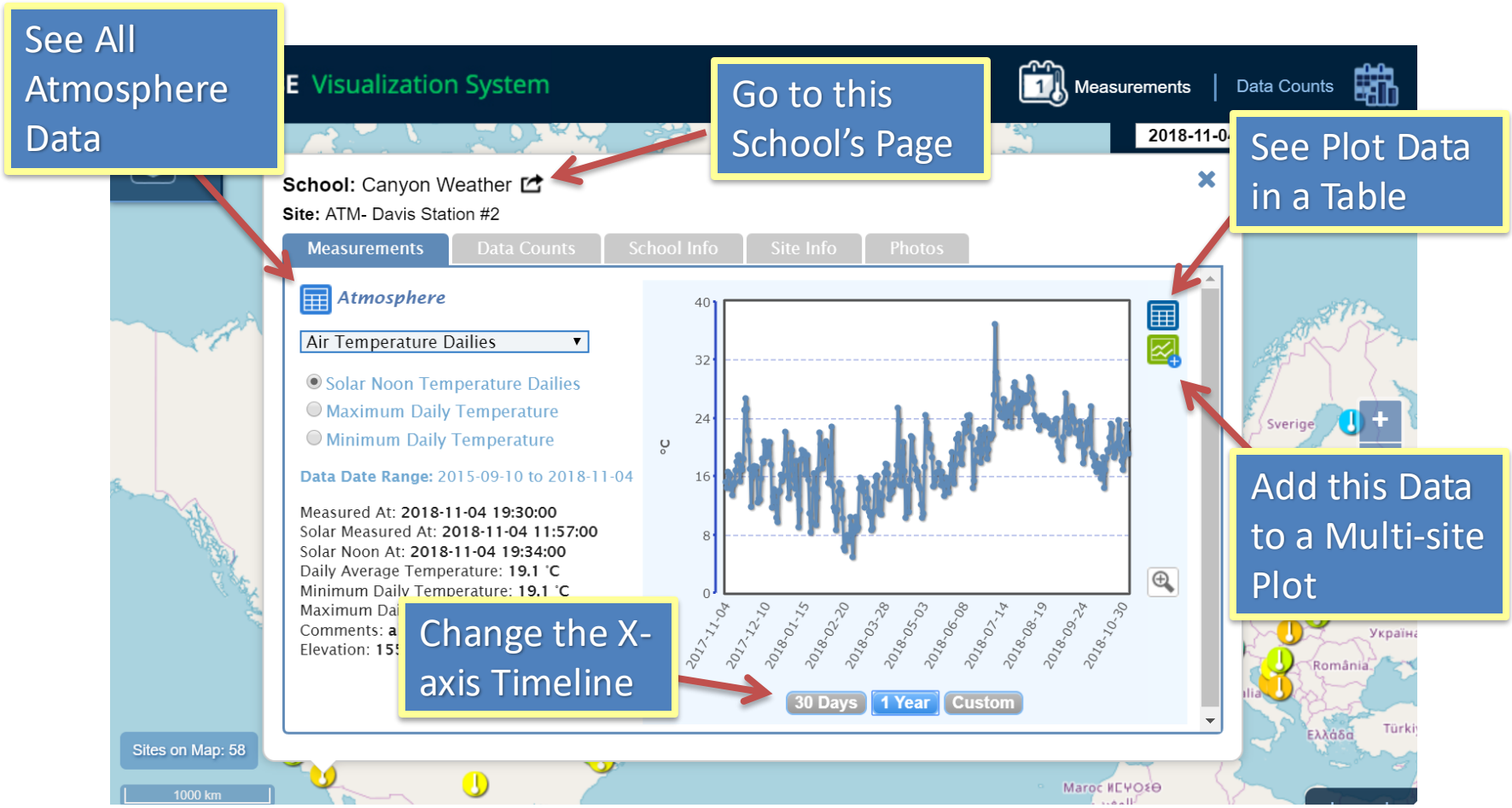
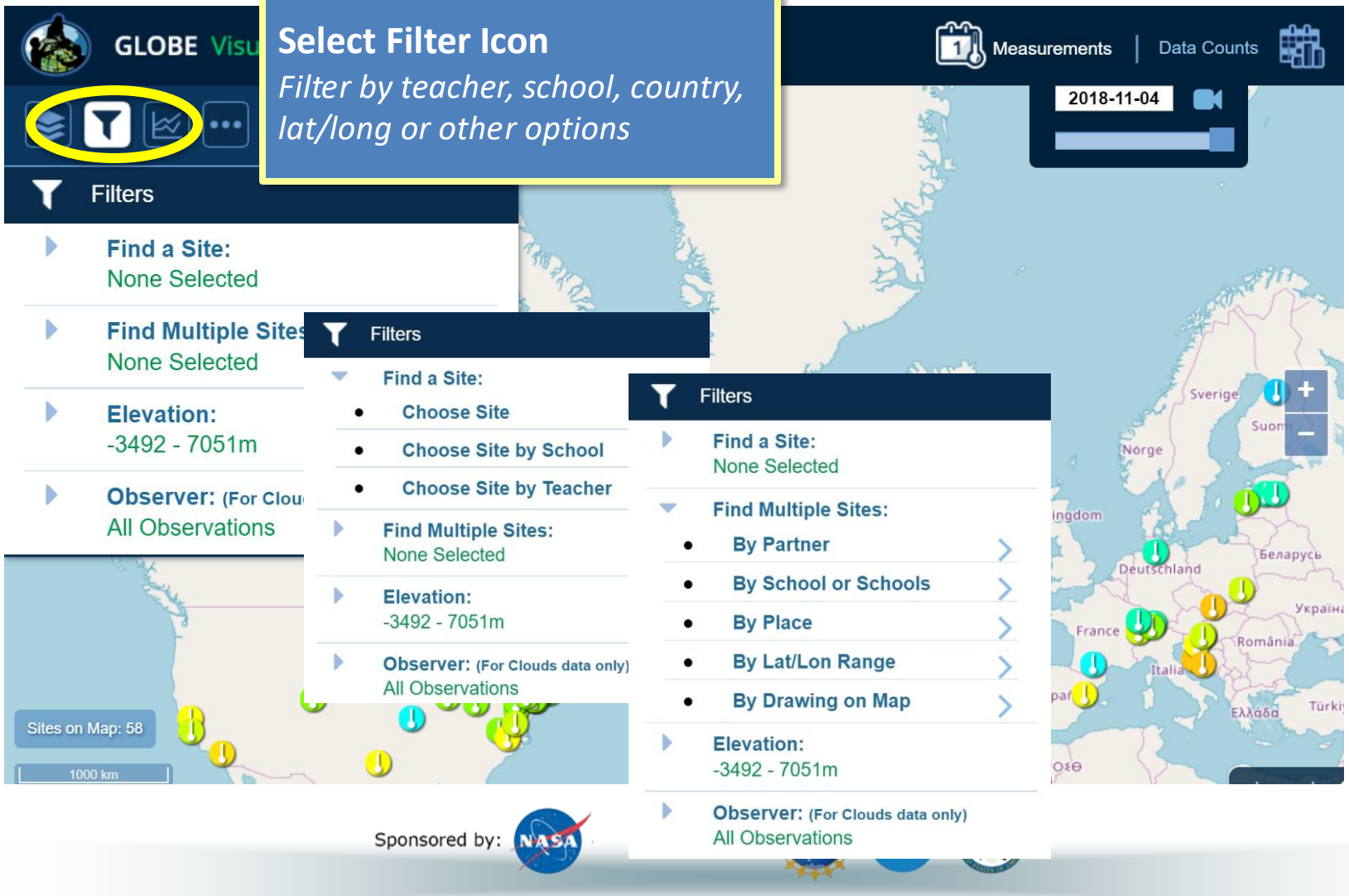
Vis system popup window



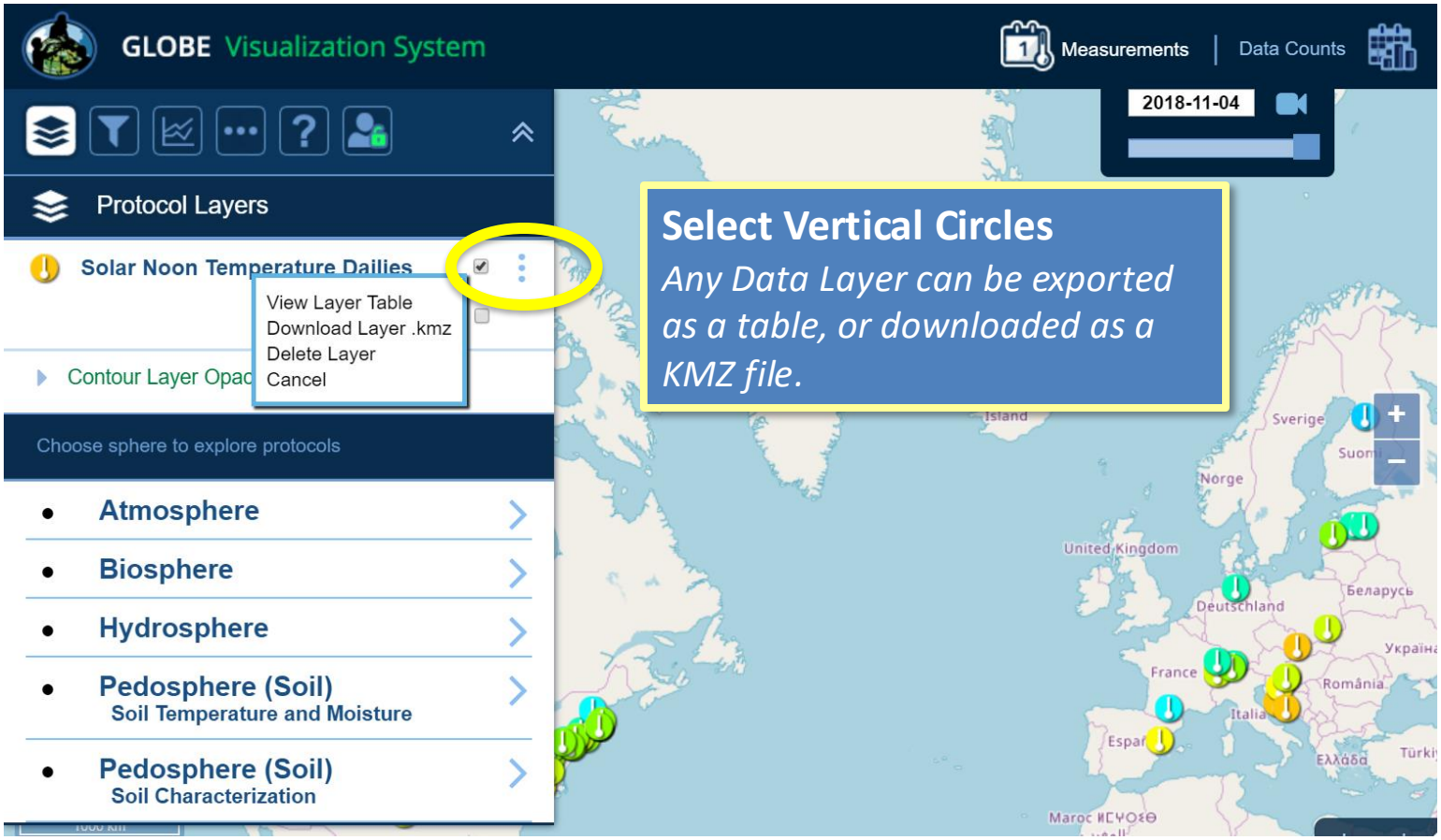
Advanced Features

- Use Filters - Location/Site/Elevation to find specific locations – school, country, city etc.
- Create an animation
- Use the graph with the + icon to select multiple data sets to graph
  - Allows you to overlay data from multiple sites
- Export layers to KMZ format for using with Google Earth and other similar tools

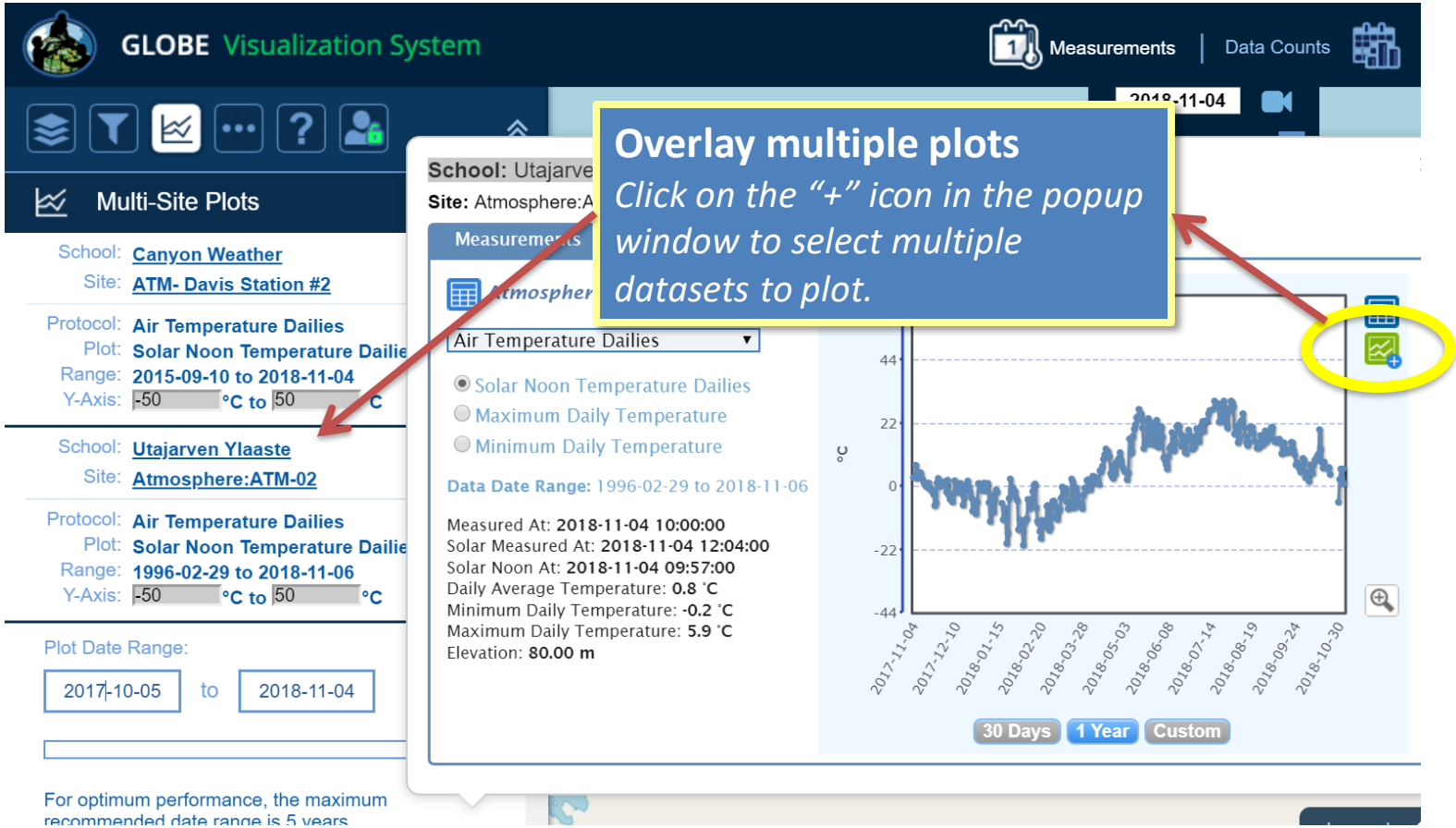
Filter your results



Export Layer

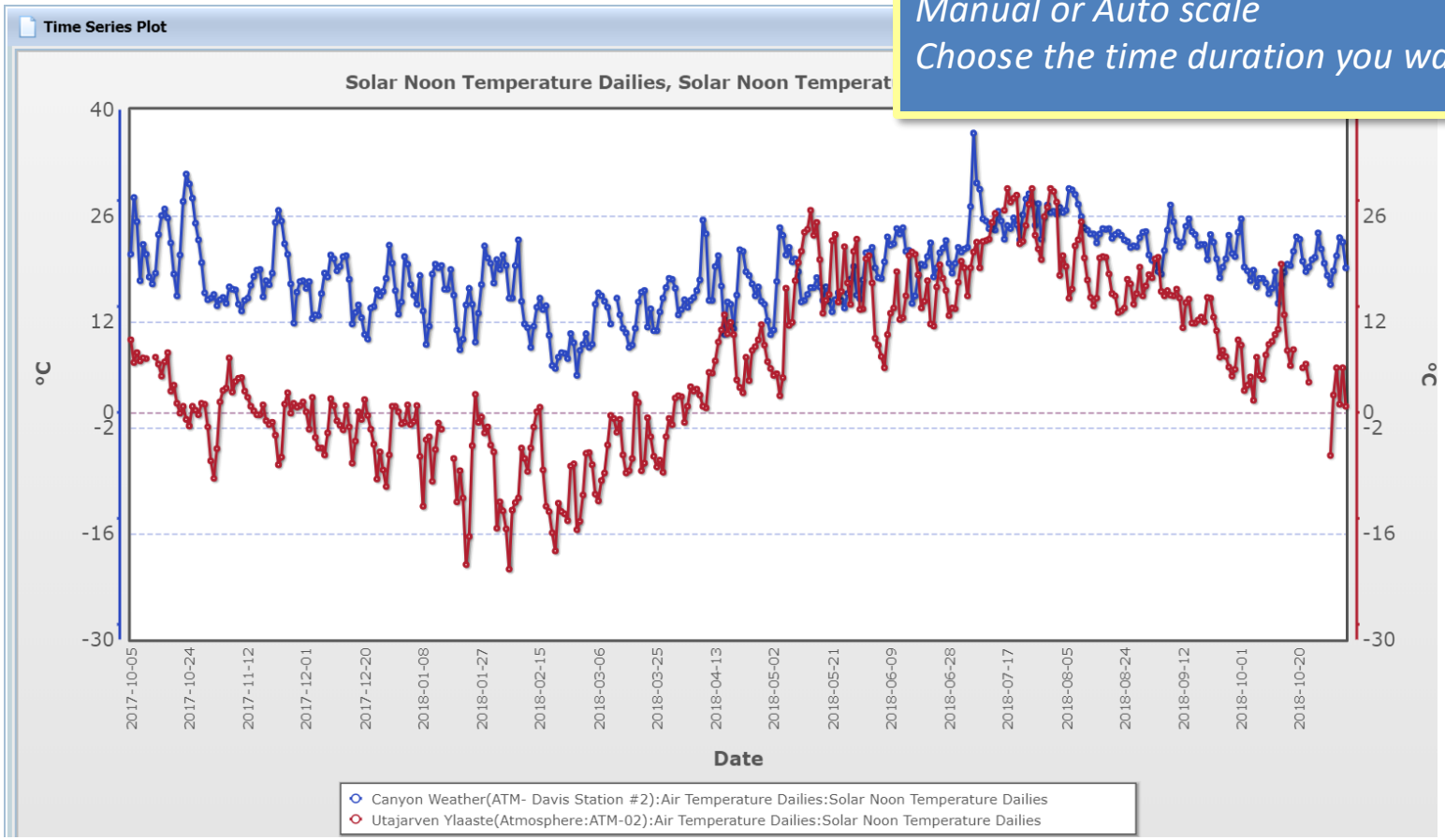


Setup Multi-Site Plot



Setup Multi-Site Plot

Multiplot up to 6 data sets
Manual or Auto scale
Choose the time duration you want



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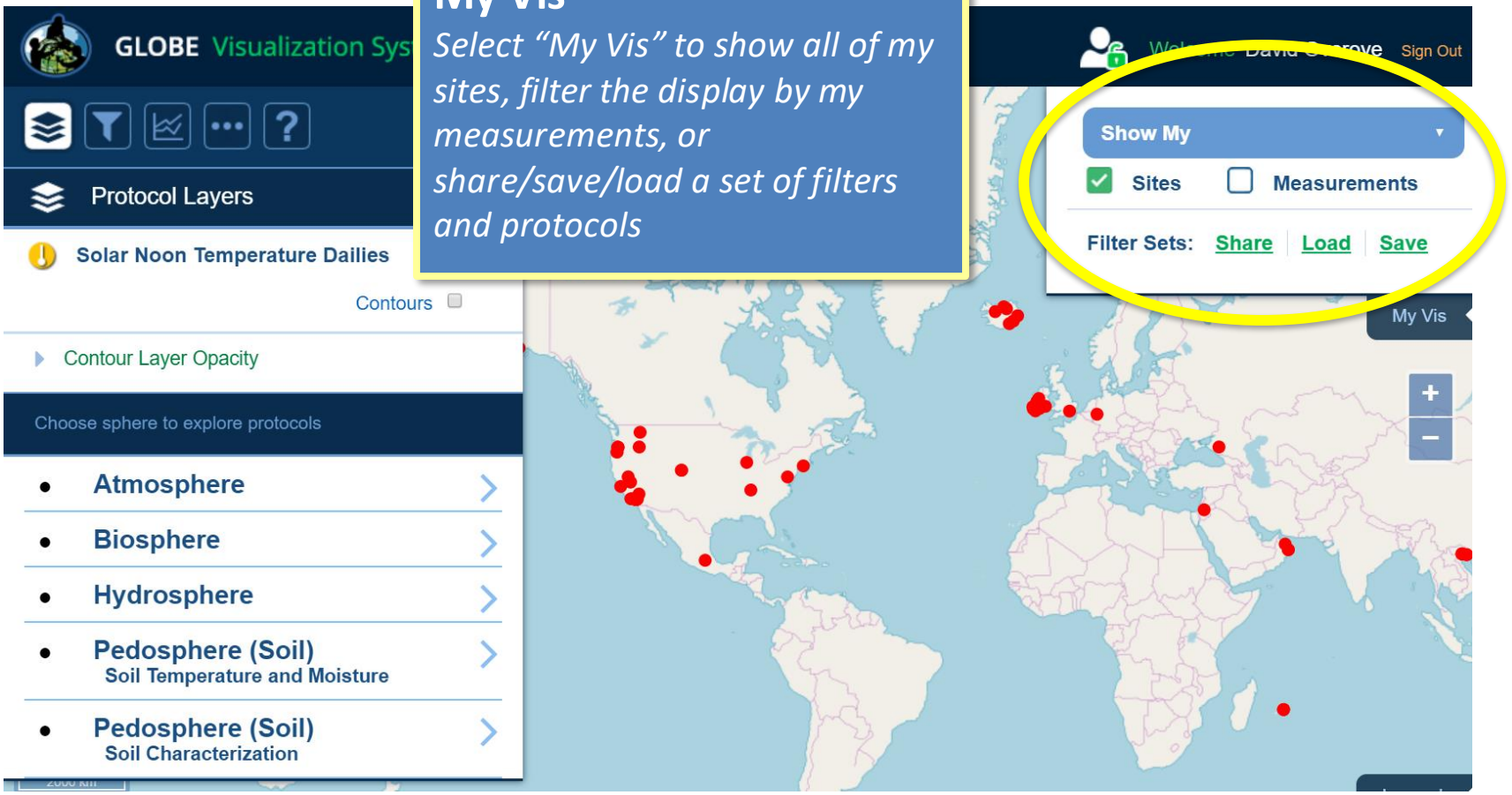
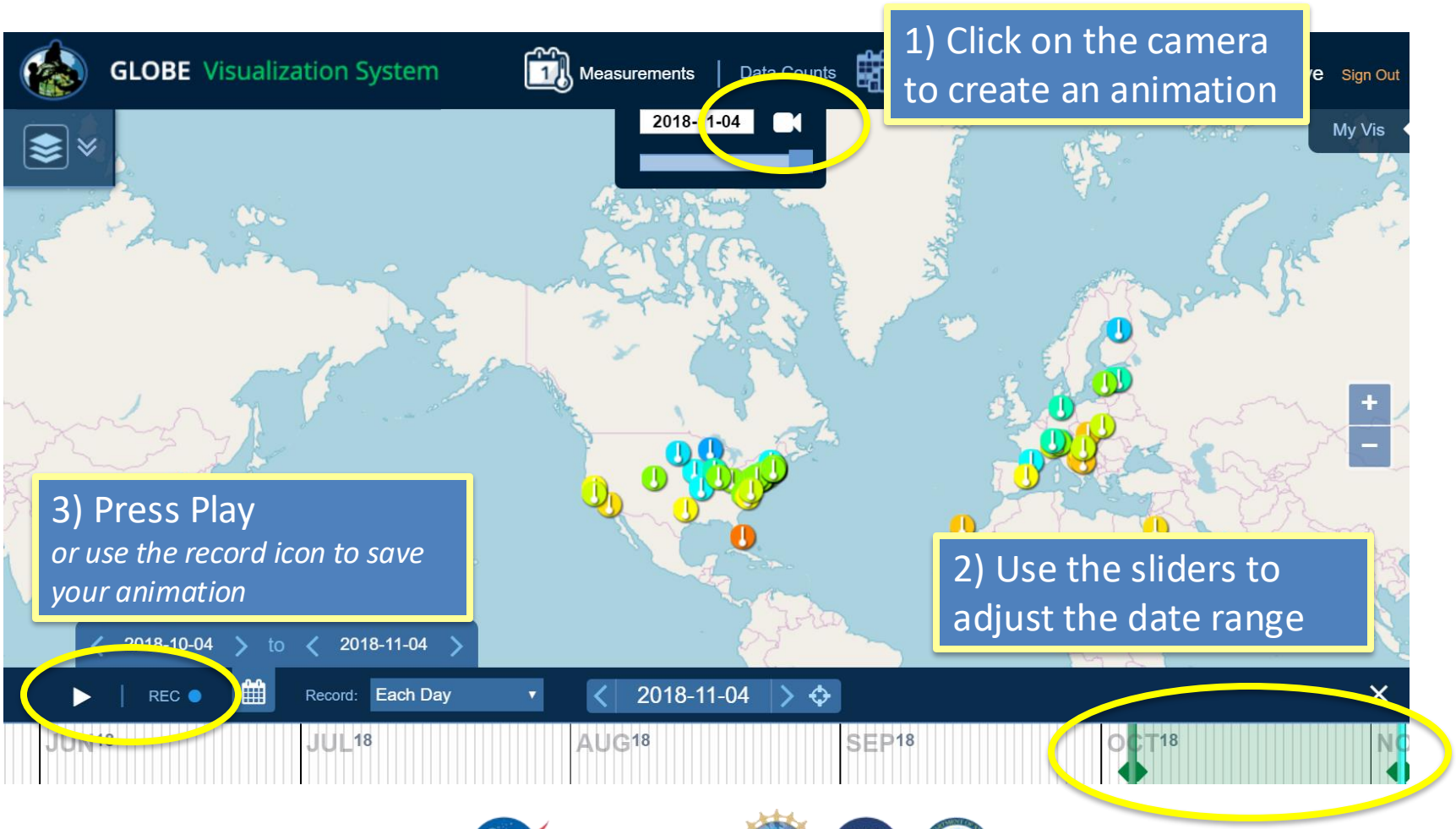
My Vis

Select "My Vis" to show all of my sites, filter the display by my measurements, or share/save/load a set of filters and protocols



Animating Vis



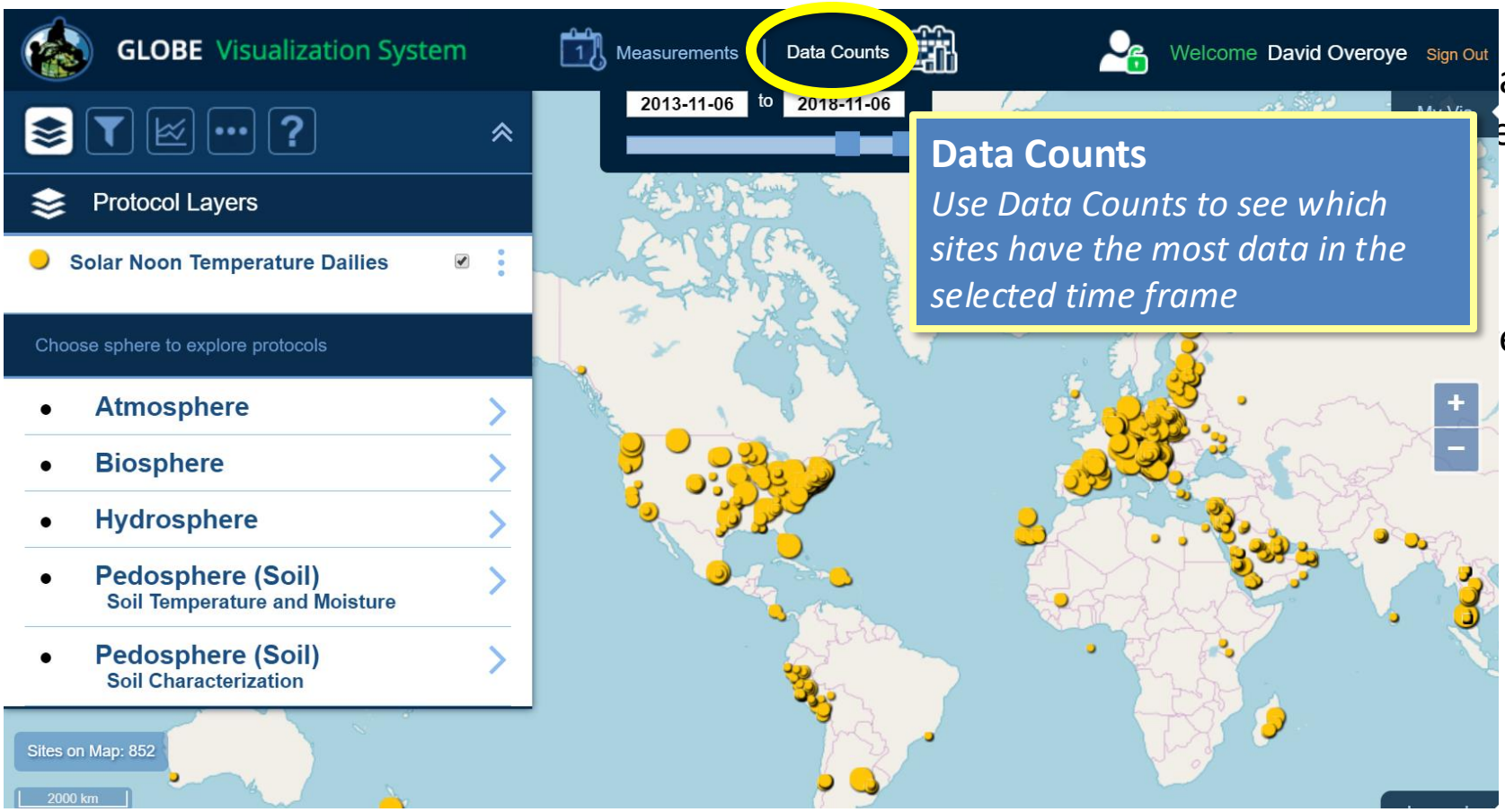
Why use Data Counts?

- The Data Counts tab tells you how much data a given location has entered in a particular period of time for a given protocol.
- Looking for someone to collaborate with? Looking for the most current data? Use Data Counts.

How to Use Data Counts

- Select Data Counts on the top menu of the vis system
- Select the protocol(s) you are interested in (ie Solar Noon Temperature Dailies)
- The map will show the total number of measurements which have occurred at any location since the beginning of the GLOBE program.
- Use the Date Range Filter to adjust the date range
- Select a site which has data
  - You can find the school and teacher if you are interested in collaborating.

Data Counts



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Your Turn

- What school reported the coldest solar noon temperature in Poland on 2/16/2014? What was the temperature?
- What was the temperature for the one school which reported data in Argentina on that date?
- Make a chart showing the Solar Noon Temperature Dailies for 1 year with data from the school in Poland and the school in Argentina.
  - What do you see happening?
  - Why does it happen
  - Try checking and un-checking the “Auto Y-Axis” button to see what happens
- Find someone in another country that is doing the clouds protocol this year (or a protocol of your choice) and request to be a friend

Your Turn - Answers

- What school reported the coldest temperature in Poland on 2/16/2014? What was the temperature?
  - If you did solar noon dailies - **Gymnasium No 1, daily average -1C, minimum daily, -5C**
  - If you did minimum - **Gimnazium por. J.Czumy in Celestynów -6C**

- What was the average temperature for the one school which reported data in Argentina on that date?

--- **21.7 C**

- Make a chart showing the Solar Noon Temperature Dailies for 1 year with data from the school in Poland and the school in Argentina.
  - What do you see happening?
  - Why does it happen
  - Try checking and un-checking the “Auto Y-Axis” button to see what happens

--- **The temperature cycles are shifted relative to each other…because they are in the north/south latitudes**

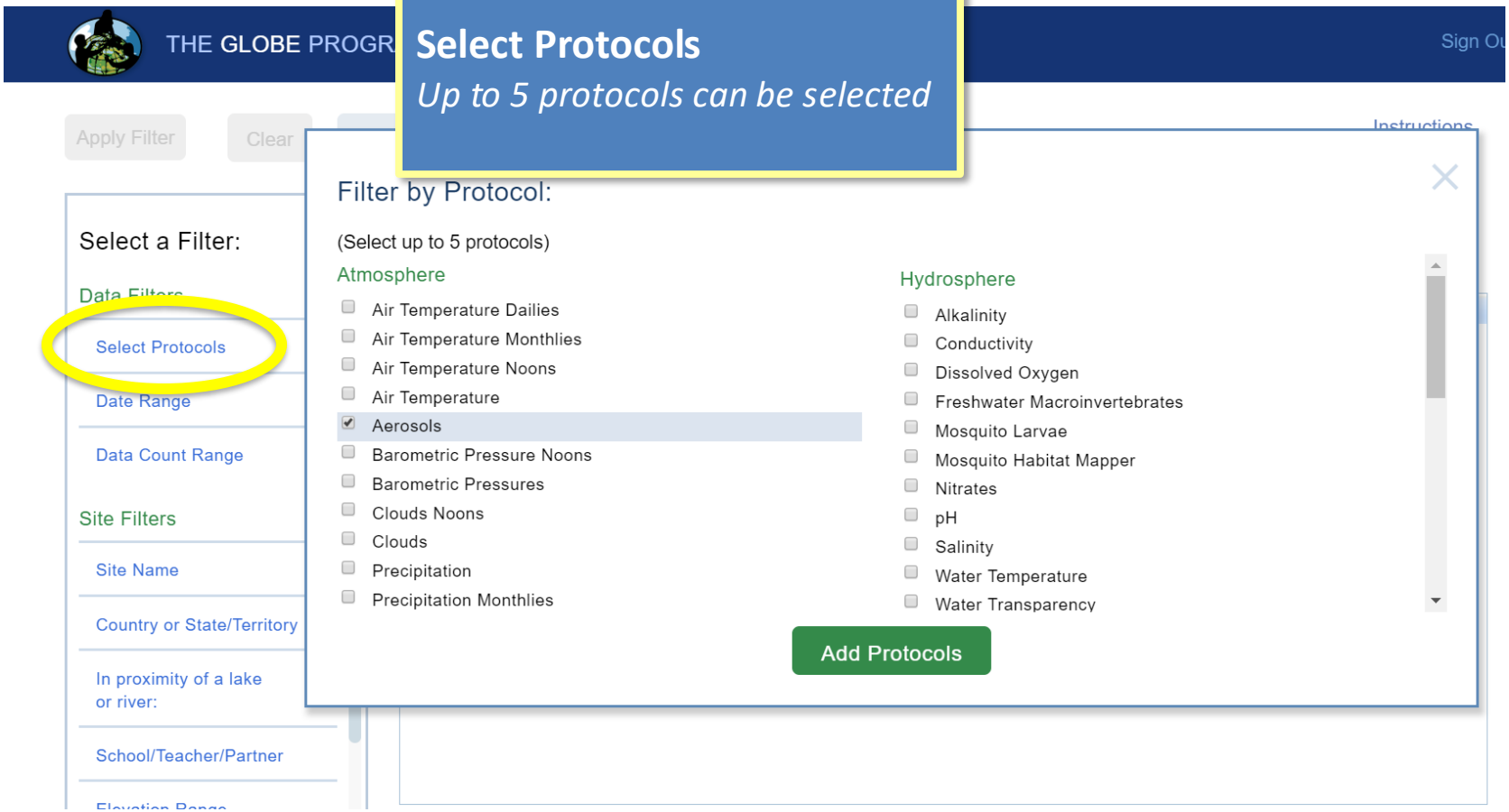
- Find someone in another country that is doing the clouds protocol this year (or a protocol of your choice) and request to be a friend

Retrieving Data
Using the Advanced Data Access Tool (ADAT)

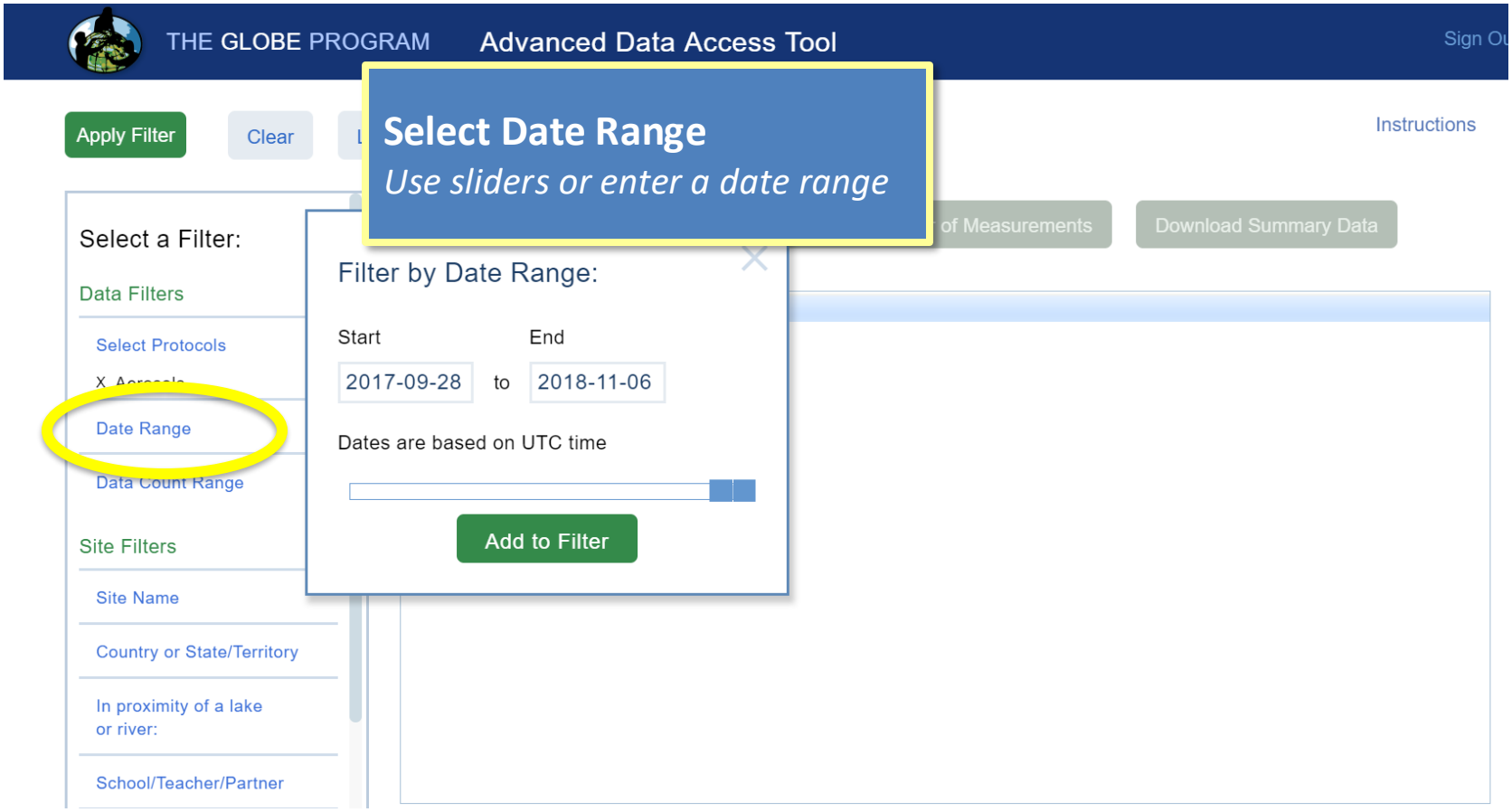
- Tool allows you to download GLOBE data from multiple protocols, schools, regions or dates without using the map
  - Used for downloading large quantities of data – multiple protocols and multiple sites
- Select GLOBE Data -> Retrieve GLOBE Data or http://datasearch.globe.gov/

- Three Steps –
  1. Select the Protocols you're interested in
  2. Select Filters
     1. Date Range, Country, School or Teacher etc.
  3. Select "Download Measurement Data" (may take a little while!)

Select your protocols



Select the date range



Add other filters if needed then "Apply Filter"

Apply Filters

Select any additional filtering, then click "Apply Filter" to see how much data is available for download

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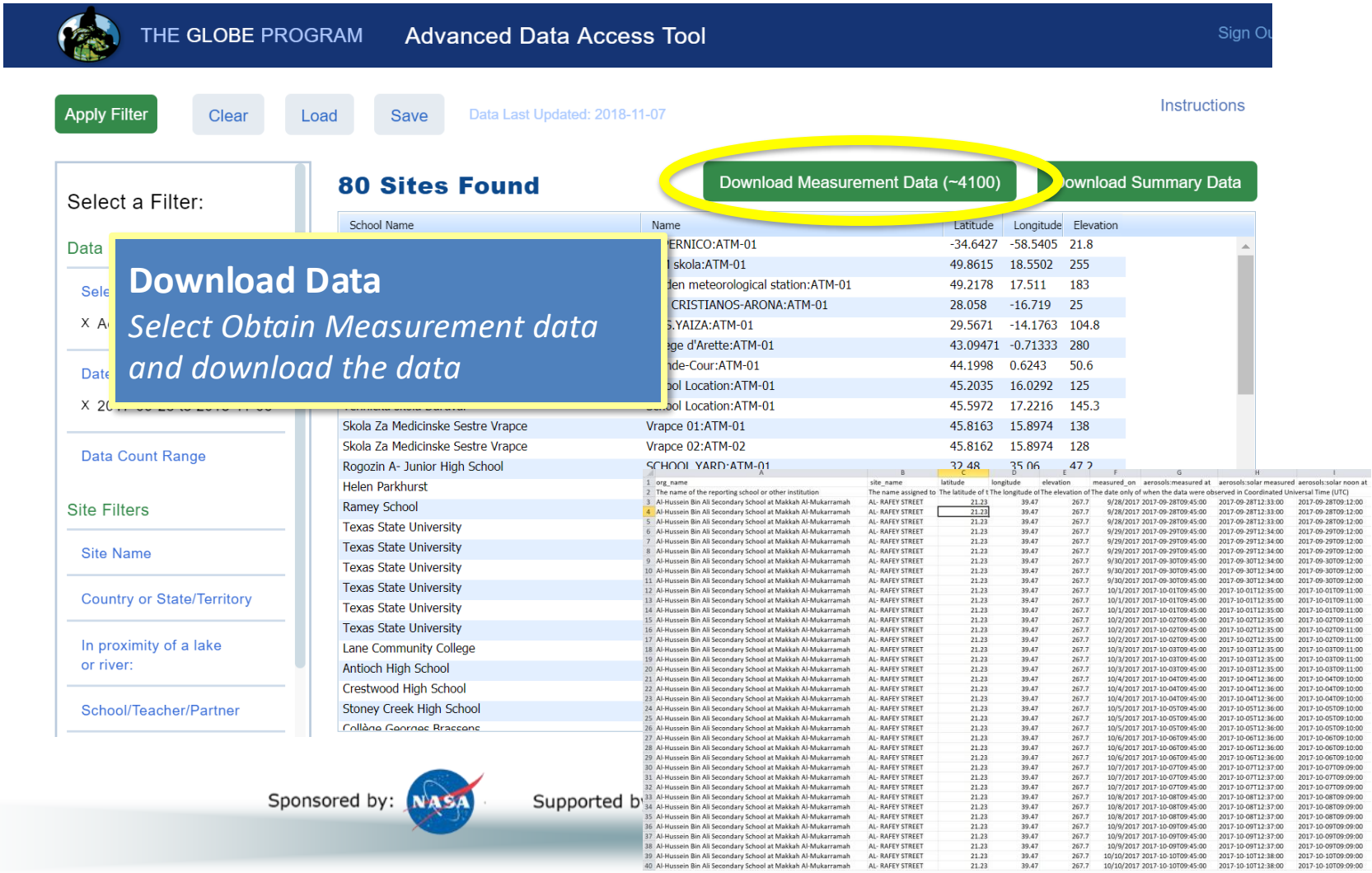
Download the Measurement Data

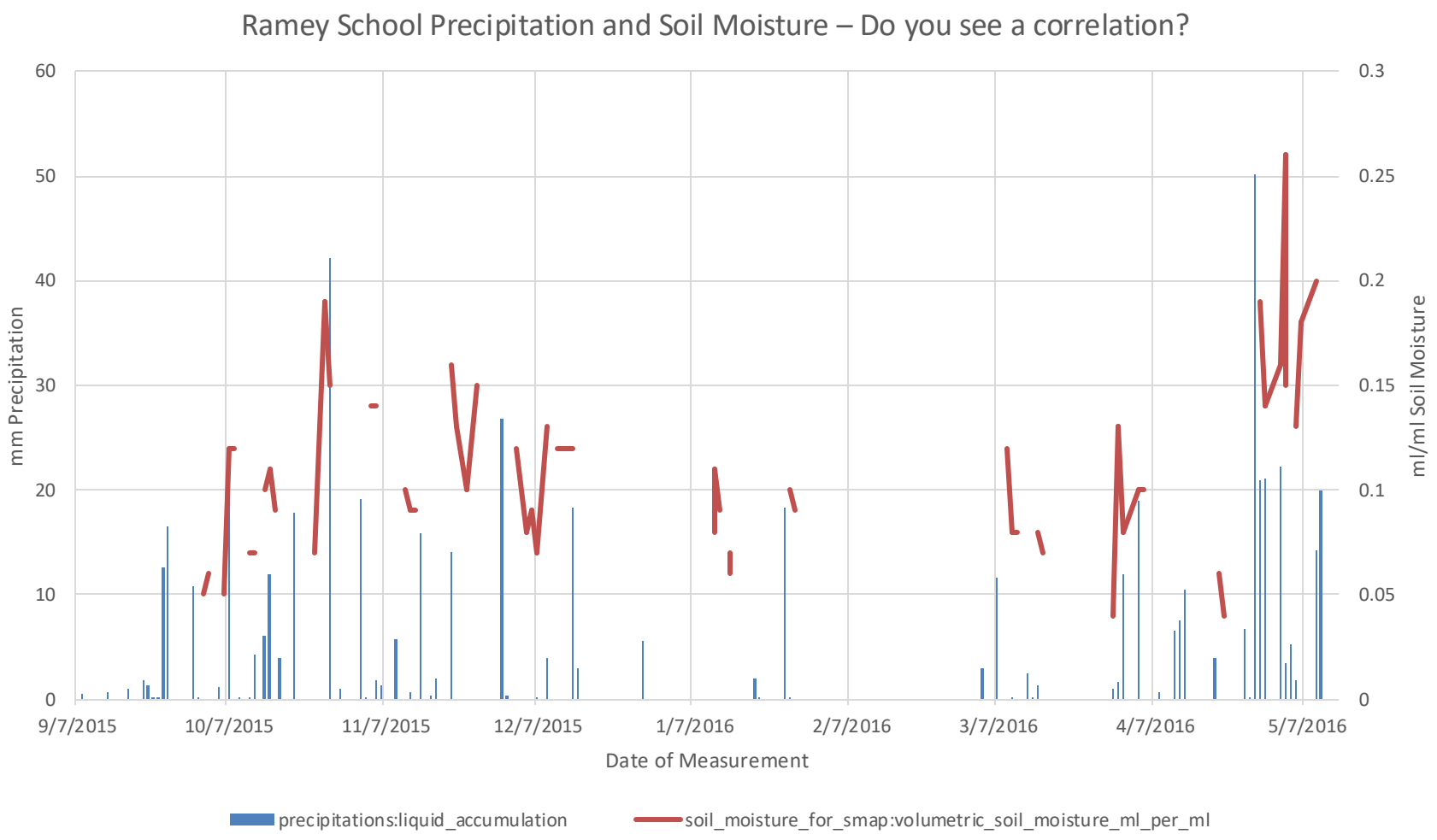


ADAT – Your Turn

- How many sites measured Soil Moisture (SMAP) during the Northern Hemisphere Fall and Winter periods (9/1/2015 – 2/29/2016) – 87 Sites
  - How many data points were taken
  - Which school and site had the highest gravimetric soil moisture (g/g), when was it measured, and what was the value?
- Export all Precipitation and SMAP data from the Ramey School for the period 9/1/2015 thought 5/17/2016
  - Plot the data – Is there a correlation between precipitation and Soil Moisture?

Answers - ADAT

- How many sites measured Soil Moisture (SMAP) during the Northern Hemisphere Fall and Winter periods (9/1/2015 – 2/29/2016) – 87 Sites
  - How many data points were taken (1168)
- Which school and site had the highest gravimetric soil moisture (g/g), when was it measured, and what was the value?
  - Srednja skola Vela Luka, 1/15/2016, 0.85 g/g
- Export all Precipitation and SMAP data from the Ramey School for the period 9/1/2015 thought 5/17/2016
  - Plot the data – Is there a correlation between precipitation and Soil Moisture? [see next page – what do you think?]


Ramey School Precipitation and Soil Moisture – Do you see a correlation?
mm Precipitation
ml/ml Soil Moisture
Date of Measurement
9/7/2015
10/7/2015
11/7/2015
12/7/2015
1/7/2016
2/7/2016
3/7/2016
4/7/2016
5/7/2016
precipitations:liquid_accumulation
soil_moisture_for_smap:volumetric_soil_moisture_ml_per_ml

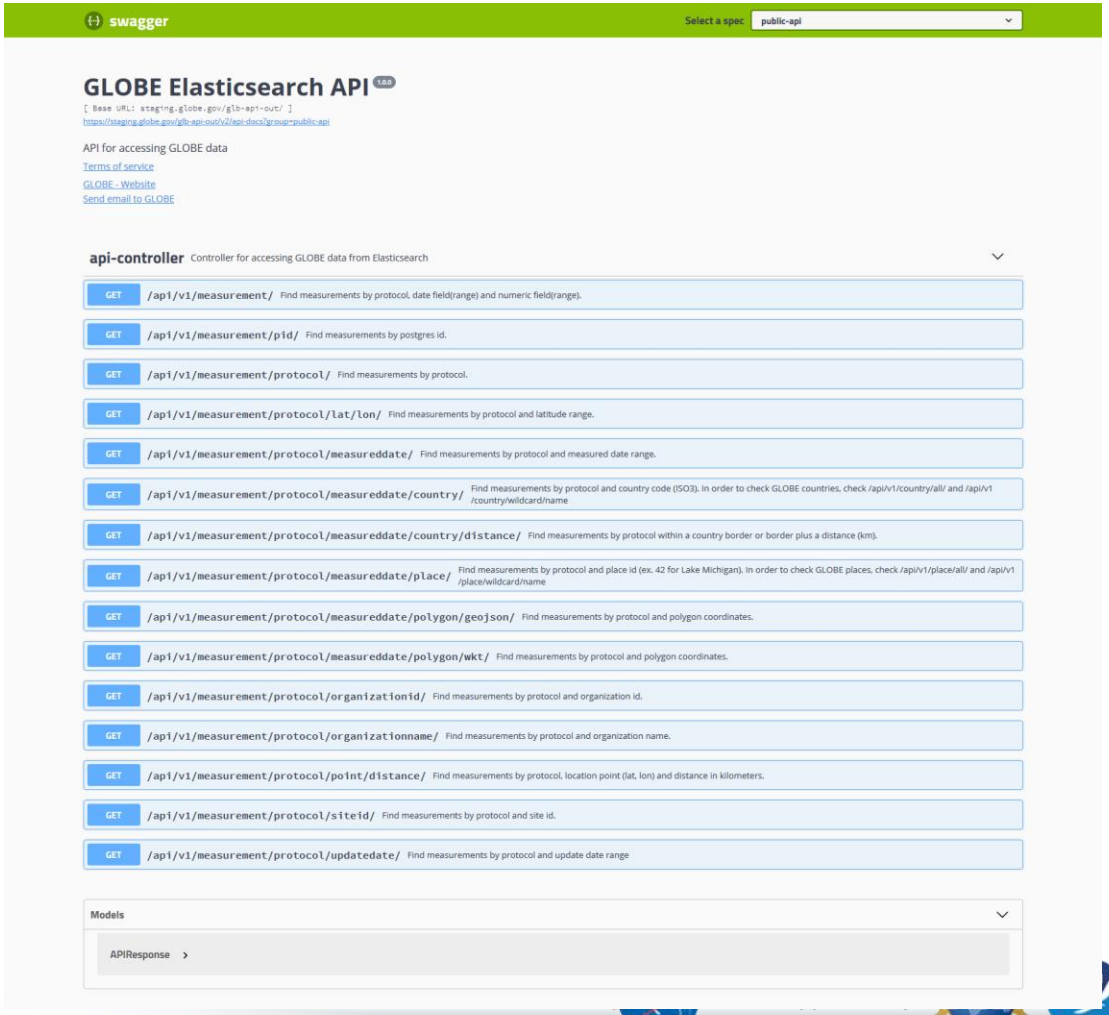
Retrieving Data – the GLOBE API

- API - allows users to pull data from GLOBE programmatically
  - Programmatically = something I can call via a program/script/URL
  - Simple but useful interface
  - Fast
  - Provides support for getting data that is similar to ADAT

Info: https://www.globe.gov/globe-data/globe-api

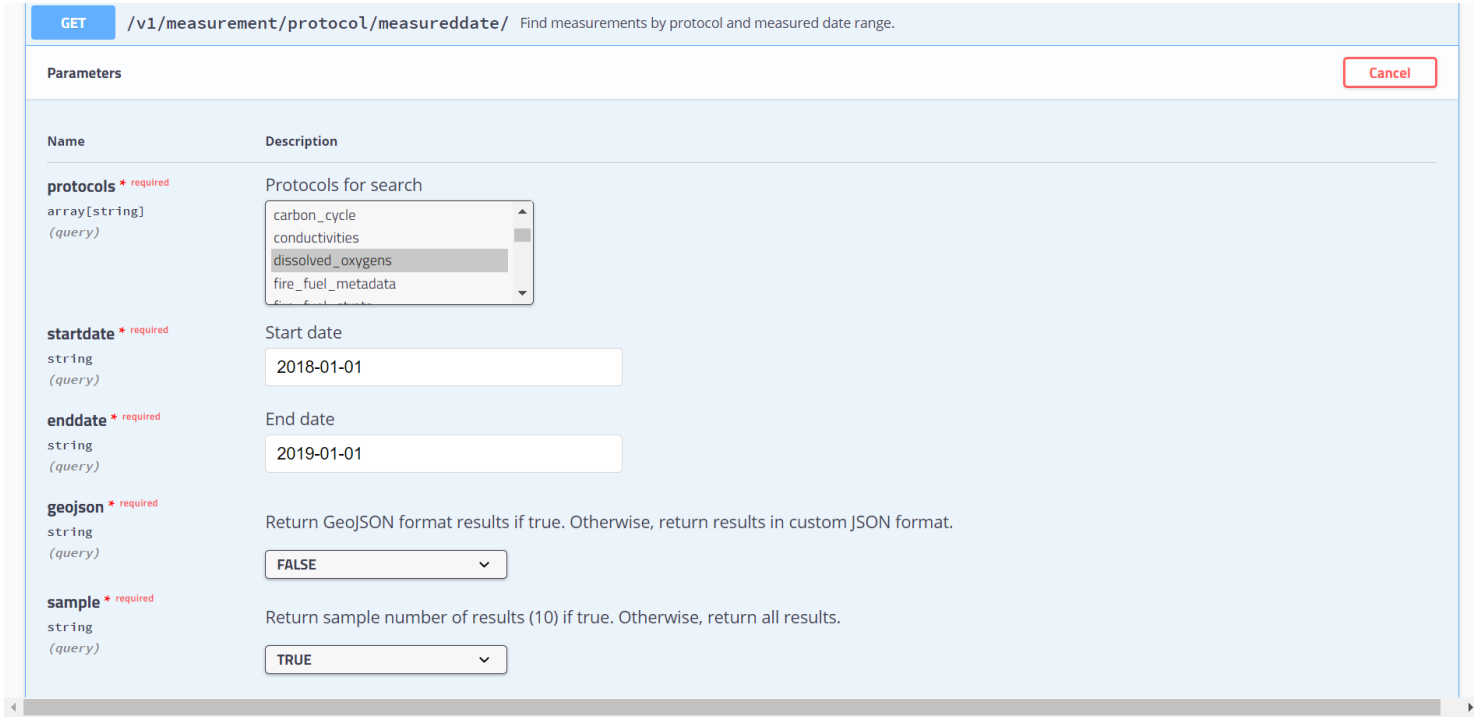
Tool: https://api.globe.gov/search/swagger-ui.html

Main Interface



- Divided into different paths depending on what type of query you want to make

Use the interface to build your query



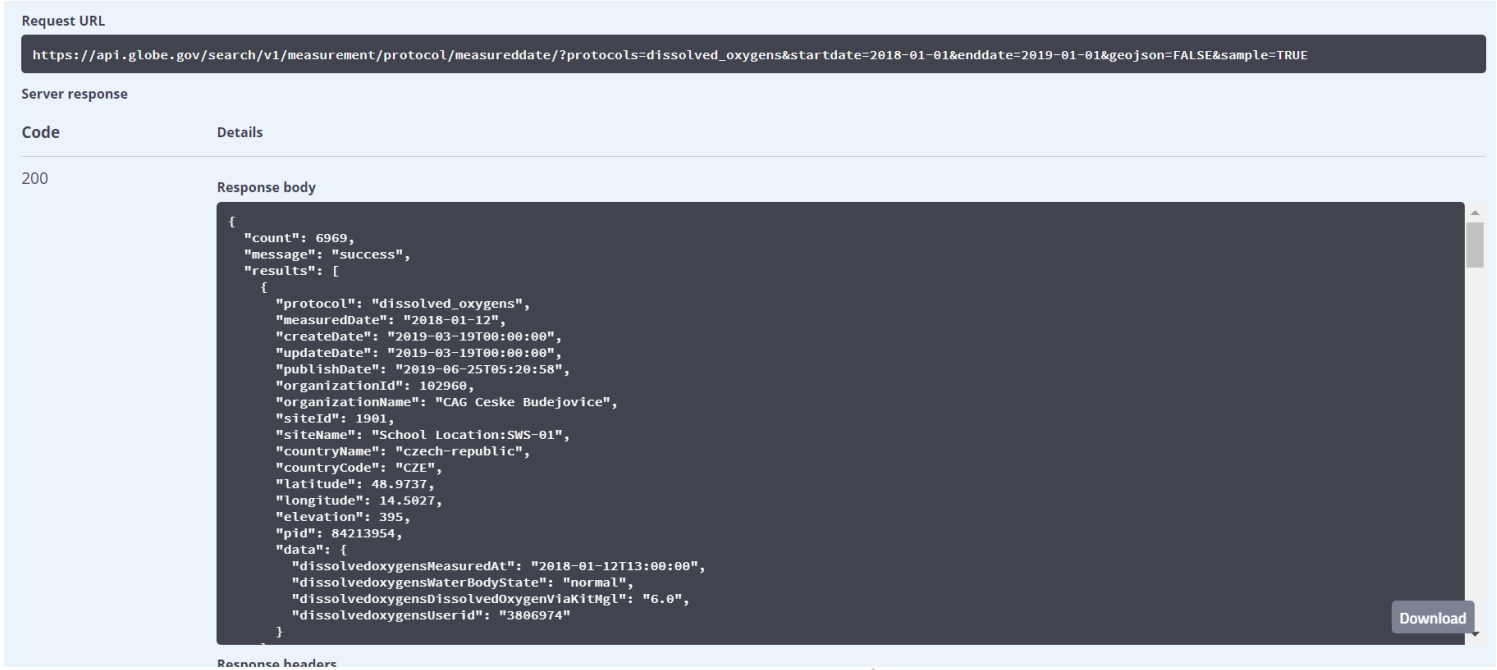
https://api.globe.gov/search/v1/measurement/protocol/measureddate/?protocols=dissolved_oxygens&startdate=2018-01-01&enddate=2019-01-01&geojson=FALSE&sample=TRUE

API – Tips on inputs

- Use Sample="TRUE" to return 10 records to make sure your query is correct BEFORE trying it "for real" (Sample="FALSE")
- Use GeoJSON=TRUE to return data in GeoJSON format. Use GeoJSON=FALSE to return data in custom JSON format (this response includes the total records which will be returned)
- Currently limited to 1,000,000 records

API – Download your data

- We recommend putting the URL directly into the browser for larger datasets, otherwise use the “Download button” in the response window



Your Turn

- Which query would you use to find all dissolved oxygen measurements between 1/01/2010 and 1/01/2011
- Which format option would you use to determine how many measurements there are in that time frame?
- Download the dissolved oxygen data using the GeoJSON format, save the file and plot it at geojson.io

Answers

- Which query would you use to find all dissolved oxygen measurements between 1/01/2010 and 1/01/2011
  - Use /measurement/protocol/measureddate
- Which format option would you use to determine how many measurements there are in that time frame?
  - Use GeoJSON="FALSE" and Return sample results="TRUE" to get a count of how many measurements there are in that timeframe:

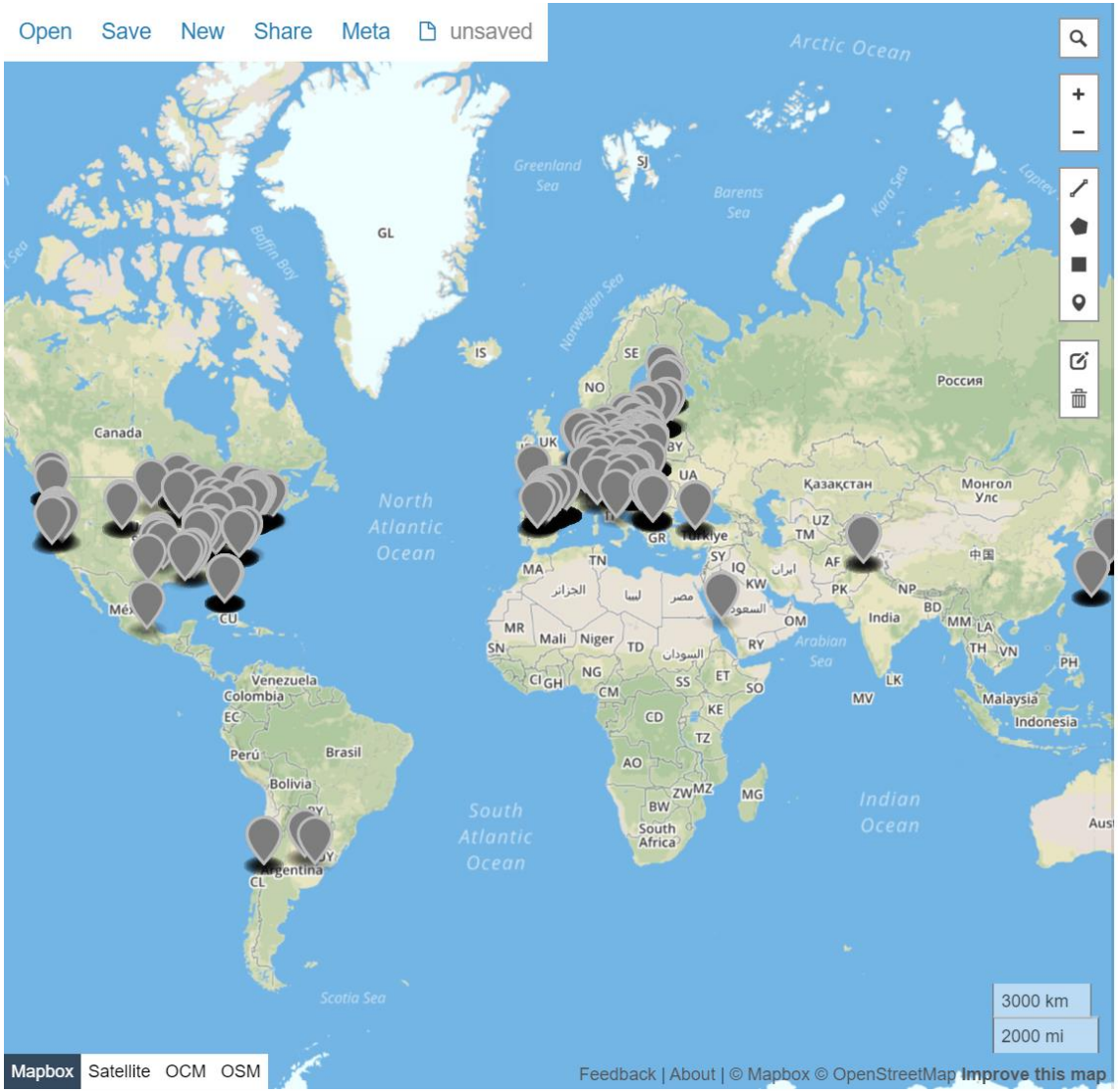
https://api.globe.gov/search/v1/measurement/protocol/measureddate/?protocols=dissolved_oxygens&startdate=2010-01-01&enddate=2011-01-01&geojson=FALSE&sample=TRUE

[Answer: count: 3096]

- Download the dissolved oxygen data using the GeoJSON format, save the file and plot it at geojson.io (Note geojson="True" and sample="false"

https://api.globe.gov/search/v1/measurement/protocol/measureddate/?protocols=dissolved_oxygens&startdate=2010-01-01&enddate=2011-01-01&geojson=TRUE&sample=FALSE

Geojson.io plot




```
{
  "type": "FeatureCollection",
  "features": [
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      "properties": {
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        "countryName": "Argentina",
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        "dissolvedoxygensDissolvedOxygenViaKitMgl":
        "dissolvedoxygensMeasuredAt": "2010-09-08T17
        "dissolvedoxygensOxygenKitMfg": "lamotte",
        "dissolvedoxygensOxygenKitModel": 7414,
        "dissolvedoxygensUserid": -1,
        "dissolvedoxygensWaterBodyState": "normal",
        "elevation": 64.3,
        "organizationId": "organizationId",
        "organizationName": "Escuela de Educación Se
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        "siteId": "siteId",
        "siteName": "Subafluente del Ludueña 1:SWS-0
      },
      "geometry": {
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        "coordinates": [
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          -33.01783
        ]
      }
    },
    {
      "type": "Feature",
```


JSON | Table | ? Help | anon | log

Next Steps

- Congratulations – you should:
  - Know how to find your school data
  - Know how to find data from other schools around the world
  - Know how to find schools and teachers who are entering data so you can collaborate with them
- You can now
  - Start creating sites and entering data into the GLOBE system
  - Next Training – 4. Teachers - How to use Setup your GLOBE account

Questions – contact the GLOBE Helpdesk – help@globe.gov

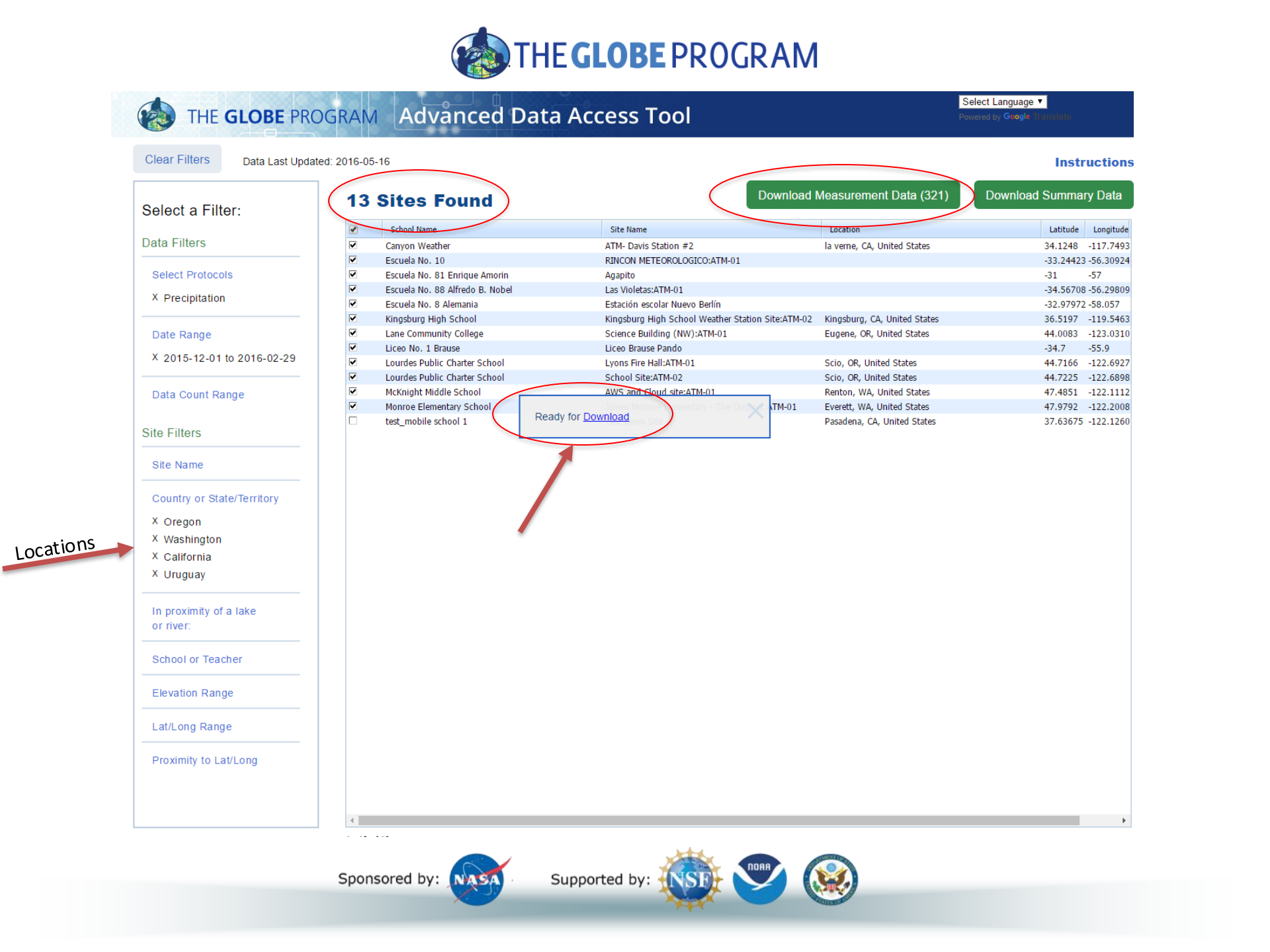
ADAT Case Study

ADAT Case Study - What would be a good filter to setup to see if GLOBE data "saw" El Nino?

- Background
  - El Nino is a phenomenon that happens approximately every 7 years that results in increased rain along the western side of the US, Latin and South America. The last El Nino occurred in 2015/2016.
- Which protocol to measure?
  - Precipitation
- Date Range?
  - Compare 2013/2014 to 2015/2016 (El Nino Year)

Protocol

Date Range


THE GLOBE PROGRAM
THE GLOBE PROGRAM Advanced Data Access Tool
Select Language
Powered by Google Translate
Clear Filters
Data Last Updated: 2016-05-16
Instructions
Select a Filter:
Data Filters
Select Protocols
X Precipitation
Date Range
X 2015-12-01 to 2016-02-29
Data Count Range
Site Filters
Site Name
Country or State/Territory
X Oregon
X Washington
X California
X Uruguay
In proximity of a lake or river:
School or Teacher
Elevation Range
Lat/Long Range
Proximity to Lat/Long
13 Sites Found
Download Measurement Data (321)
Download Summary Data
School Name
Site Name
Location
Latitude
Longitude
Canyon Weather
ATM- Davis Station #2
la verne, CA, United States
34.1248
-117.7493
Escuela No. 10
RINCON METEOROLOGICO:ATM-01
-33.24423
-56.30924
Escuela No. 81 Enrique Amorin
Agapito
-31
-57
Escuela No. 88 Alfredo B. Nobel
Las Violetas:ATM-01
-34.56708
-56.29809
Escuela No. 8 Alemania
Estación escolar Nuevo Berlín
-32.97972
-58.057
Kingsburg High School
Kingsburg High School Weather Station Site:ATM-02
Kingsburg, CA, United States
36.5197
-119.5463
Lane Community College
Science Building (NW):ATM-01
Eugene, OR, United States
44.0083
-123.0310
Liceo No. 1 Brause
Liceo Brause Pando
-34.7
-55.9
Lourdes Public Charter School
Lyons Fire Hall:ATM-01
Scio, OR, United States
44.7166
-122.6927
Lourdes Public Charter School
School Site:ATM-02
Scio, OR, United States
44.7225
-122.6898
McKnight Middle School
AWS and Cloud site:ATM-01
Renton, WA, United States
47.4851
-122.1112
Monroe Elementary School
Everett, WA, United States
47.9792
-122.2008
test_mobile school 1
Pasadena, CA, United States
37.63675
-122.1260
Ready for Download
Locations
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McKnight Middle School – Data from 2013 and 2015 - Download to Excel

	A	B	C	D	E	F	J	K
1	org_name	site_name	latitude	longitude	elevation	measured_on	precipitations	precipitations:o
106	McKnight Middle S	AWS and Cloud site:ATM	47.4851	-122.111	161	12/1/2015	0	no occurrence
107	McKnight Middle S	AWS and Cloud site:ATM	47.4851	-122.111	161	12/2/2015	1.52	rain
108	McKnight Middle S	AWS and Cloud site:ATM	47.4851	-122.111	161	12/3/2015	1.52	rain
109	McKnight Middle S	AWS and Cloud site:ATM	47.4851	-122.111	161	12/4/2015	3.05	rain
110	McKnight Middle S	AWS and Cloud site:ATM	47.4851	-122.111	161	12/5/2015	0	no occurrence
111	McKnight Middle S	AWS and Cloud site:ATM	47.4851	-122.111	161	12/6/2015	0.51	rain
112	McKnight Middle S	AWS and Cloud site:ATM	47.4851	-122.111	161	12/8/2015	16.25	rain
113	McKnight Middle S	AWS and Cloud site:ATM	47.4851	-122.111	161	12/9/2015	15.49	rain
114	McKnight Middle S	AWS and Cloud site:ATM	47.4851	-122.111	161	12/10/2015	2.54	rain
115	McKnight Middle S	AWS and Cloud site:ATM	47.4851	-122.111	161	12/11/2015	1.27	rain
116	McKnight Middle S	AWS and Cloud site:ATM	47.4851	-122.111	161	12/12/2015	0.51	rain
117	McKnight Middle S	AWS and Cloud site:ATM	47.4851	-122.111	161	12/13/2015	3.55	rain
118	McKnight Middle S	AWS and Cloud site:ATM	47.4851	-122.111	161	12/14/2015	0.51	rain
119	McKnight Middle S	AWS and Cloud site:ATM	47.4851	-122.111	161	12/15/2015	0	no occurrence
120	McKnight Middle S	AWS and Cloud site:ATM	47.4851	-122.111	161	12/16/2015	1.02	rain
121	McKnight Middle S	AWS and Cloud site:ATM	47.4851	-122.111	161	12/17/2015	0	no occurrence
122	McKnight Middle S	AWS and Cloud site:ATM	47.4851	-122.111	161	12/18/2015	6.35	rain
123	McKnight Middle S	AWS and Cloud site:ATM	47.4851	-122.111	161	12/19/2015	0.51	rain
124	McKnight Middle S	AWS and Cloud site:ATM	47.4851	-122.111	161	12/20/2015	0.51	rain
125	McKnight Middle S	AWS and Cloud site:ATM	47.4851	-122.111	161	12/22/2015	3.56	rain
126	McKnight Middle S	AWS and Cloud site:ATM	47.4851	-122.111	161	12/23/2015	0.76	rain
127	McKnight Middle S	AWS and Cloud site:ATM	47.4851	-122.111	161	12/24/2015	0	no occurrence

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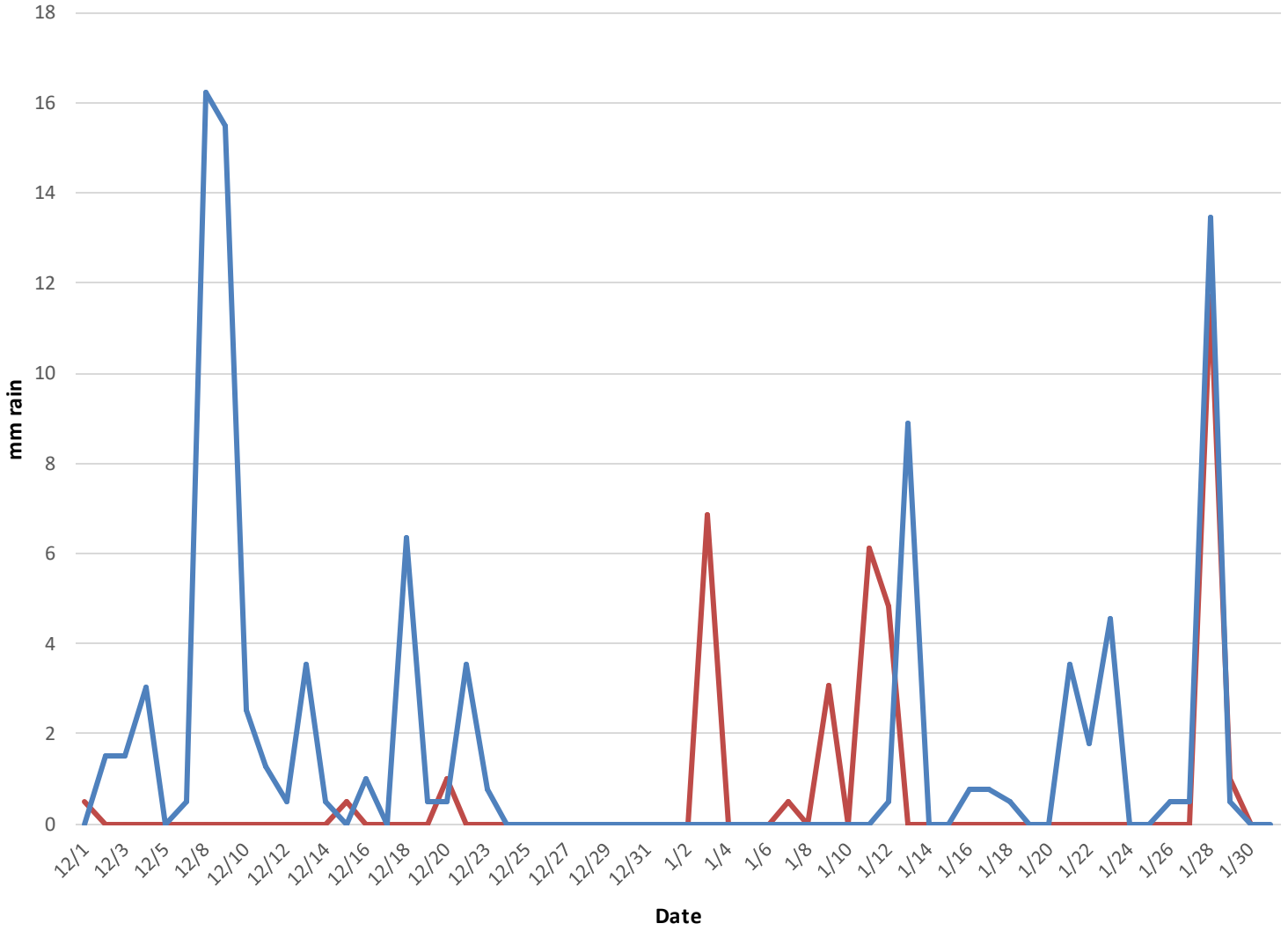
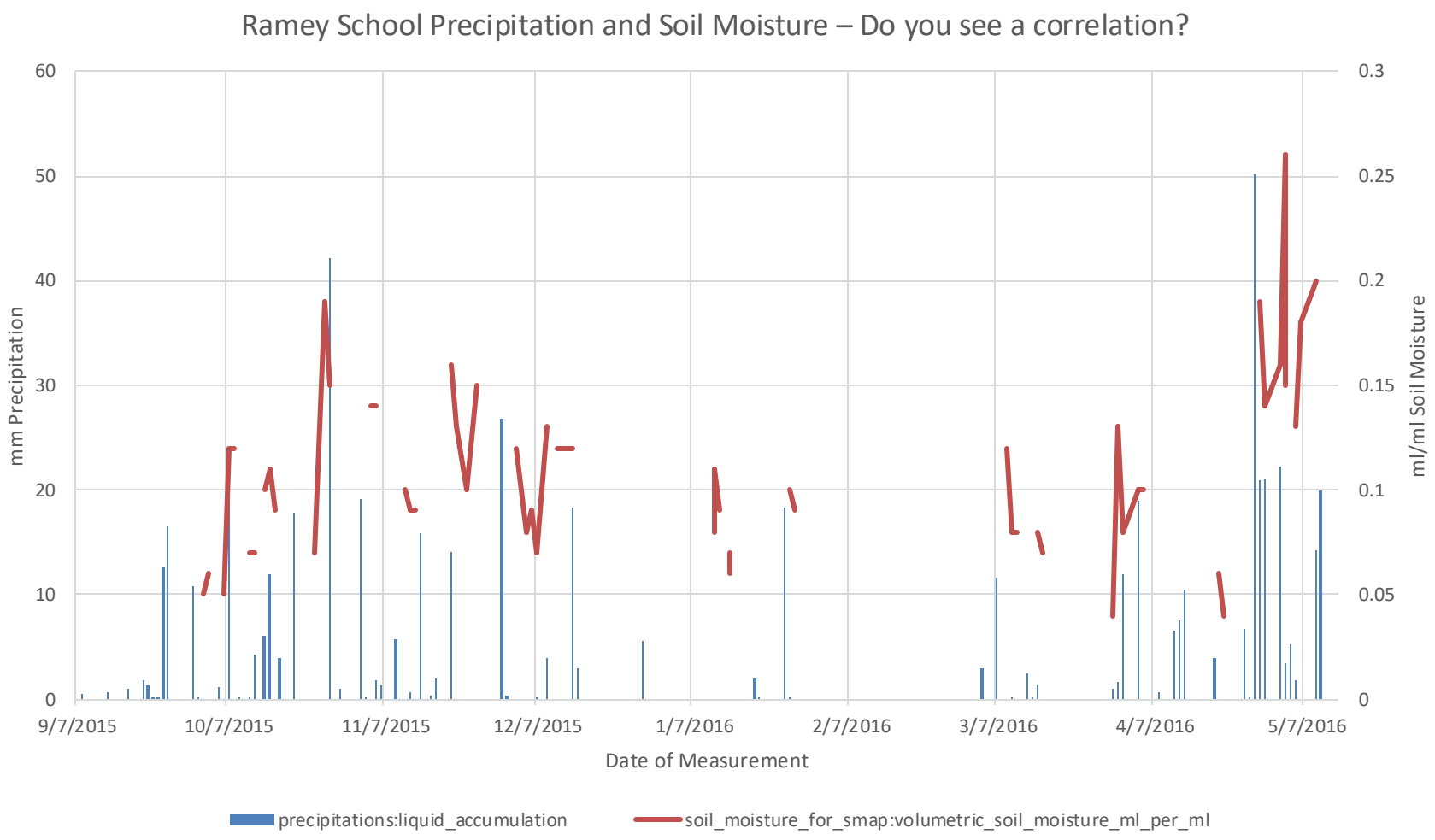
McKnight Middle School – Compare Precipitation 2013/14 to 2015/16



2013/14 Average .6 mm
2015/16 Average 1.6 mm

Sponsored by: NASA

Supported by: NSF NOAA


Ramey School Precipitation and Soil Moisture – Do you see a correlation?
mm Precipitation
ml/ml Soil Moisture
Date of Measurement
9/7/2015
10/7/2015
11/7/2015
12/7/2015
1/7/2016
2/7/2016
3/7/2016
4/7/2016
5/7/2016
precipitations:liquid_accumulation
soil_moisture_for_smap:volumetric_soil_moisture_ml_per_ml