THE GLOBE PROGRAM

The 2015-2016 El Niño Event

Using GLOBE Visualization Tools and Data for Analysis

David Overoye

Sponsored by: NASA NSF Supported by: NOAA Implemented by: UCAR

Agenda

- What is El Niño?
- What GLOBE protocols could be used to study it?
- What GLOBE data retrieval tools can be used to determine or visualize the impact?

What is El Niño

- "An irregularly occurring and complex series of climatic changes affecting the equatorial Pacific region…every few years, characterized by the appearance of unusually warm..water off northern Peru and Ecuador, typically in late December."
- "El Niño is an oscillation of the ocean-atmosphere system in the tropical Pacific having important consequences for weather around the globe."
- "Among these consequences are increased rainfall across the southern tier of the US and in Peru"

http://www.oxforddictionaries.com/us/definition/american_english/el-nino
http://www.pmel.noaa.gov/elnino/what-is-el-nino

FYI - GLOBE El Niño campaign

http://
www.globe.gov/web/el-nino/el-nino-campaign/meet-the-team

Educator team - Brian Campbell, Dorian Janney, Peter Falcon, Kristin Weaver, Claudia Caro, Vascos Manta

What GLOBE protocols? -- El Niño Campaign – major event 2015/2016

- "Collect data for at least two of the following six protocols"
  - Precipitation
  - Air Temperature
  - Surface Temperature
  - Soil Temperature
  - SMAP Soil Moisture
  - Biometry – Canopy and Ground Cover
- "Take observations at least 21 days per season"
  - March 1 – May 31
  - June 1 – August 31
  - September 1 – November 30
  - December 1 – February 28/29

Two GLOBE tools to retrieve data

- GLOBE Advanced Data Access Tool (ADAT) - http://datasearch.globe.gov/
  - Used to find and return data from across sites and protocols
  - Allows you to filter by location, date and other parameters
  - Focus in on retrieving data across sites or locations
- GLOBE Visualization system - http://vis.globe.gov/GLOBE/
  - Used to see data points on a map
  - See a particular day's data – Show me the temperature today
  - Can also show data observed and graph over a period of time.
  - Focus is on specific set of data at a specific site

Using the Advanced Data Access Tool (ADAT)

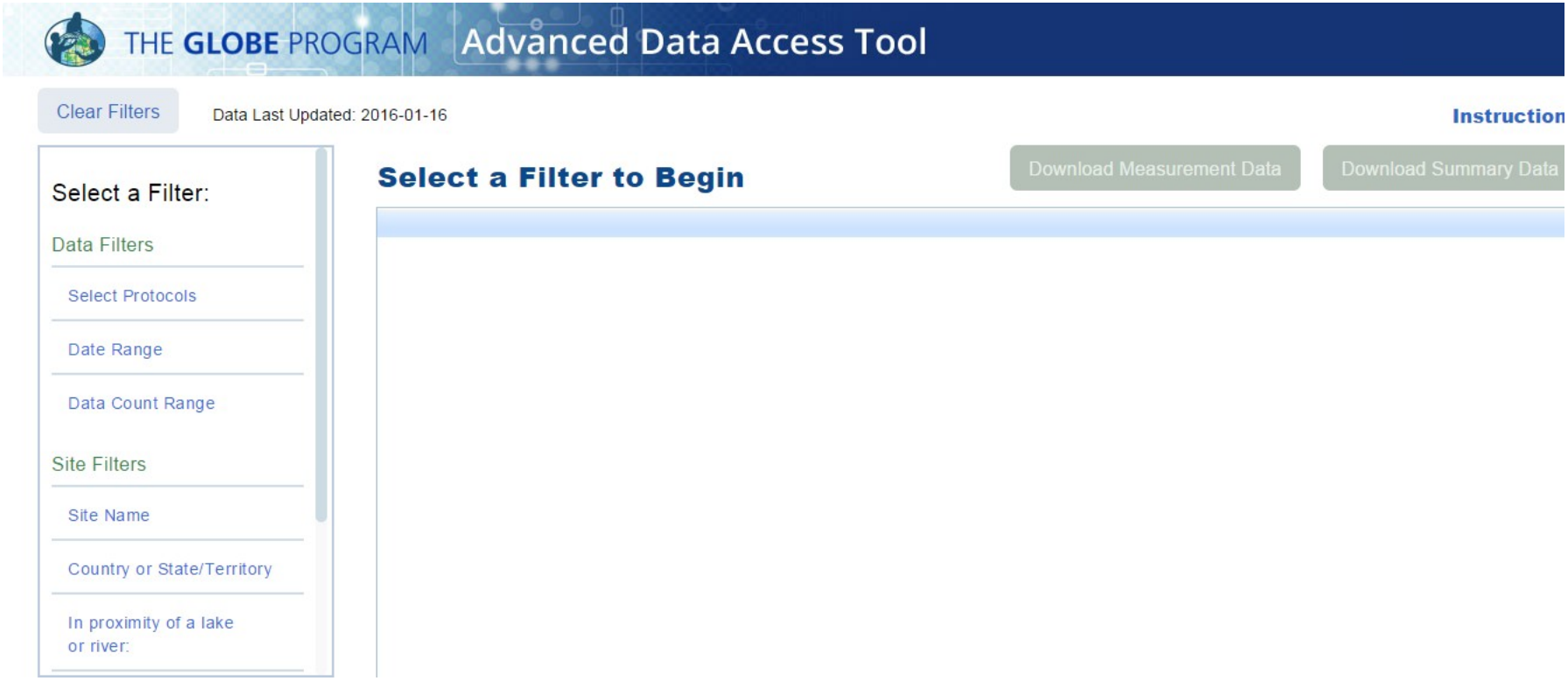
- Tool allows you to download GLOBE data from multiple protocols, schools, regions or dates without using the map
- Select GLOBE Data -> Retrieve GLOBE Data or http://datasearch.globe.gov/

- Two Steps –
  - Select Filters
    - Protocol, Date Range, Country, School or Teacher etc.
  - Select “Download Measurement Data” (may take a little while!)

Think you already know how to use ADAT?

- There are two schools in the US state of Washington that collected precipitation data from 12/1/2015 – 2/28/2016 and 12/1/2013 – 2/28/2014.
  - Retrieve the data from these schools.
  - Which school do you think is better to use for analysis? Why?
    - What are the problems caused when a school doesn't report "no rainfall"?
  - Examine the data for the school with the most data to see if the school recorded any El Niño effect

Select Filters from the left to see matching sites



What would be a good filter to setup for El Niño data?

- Protocols?
- Date Range?

What would be a good filter to setup for El Niño data?

- Protocols?
  - Precipitation – one of the campaign protocols
- Date Range?
  - A campaign data collection time range - December 1, 2015 – February 28/29, 2016

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THE GLOBE PROGRAM **Advanced Data Access Tool**

Select Language ▼

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Protoc

ate Ra

Clear Filters   Data Last Updated: 2016-07-12   **Instructions**

Select a Filter:

Data Filters

- Select Protocols
  - X Precipitation
- Date Range
  - X 2015-12-01 to 2016-02-28
- Data Count Range

Site Filters

- Site Name
- Country or State/Territory
- In proximity of a lake or river:
- School or Teacher
- Elevation Range
- Lat/Long Range
- Proximity to Lat/Long

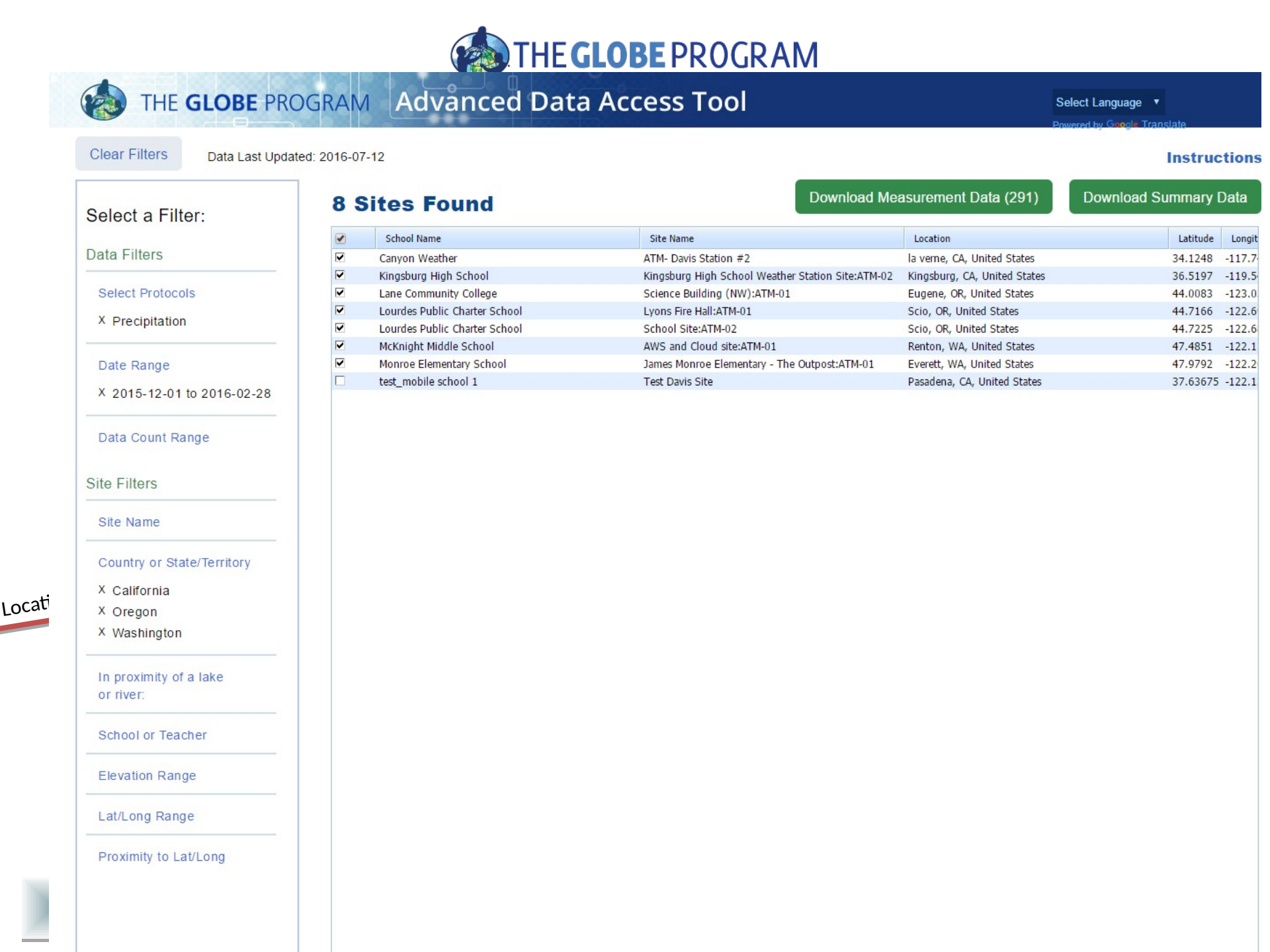
349 Sites Found

Download Measurement Data (13410)   Download Summary Data

School Name	Site Name	Location	Latitude	Longitude	Elev
2nd Arsakeio-Tositseio lyceum Ekalis	School Arsakeio Drosia-CC		38.1198	23.8661	38
Abdulah Bin Salam Secandary School at Al-Ahsa	مدرسة عبدالله بن سلام دراسة الغلاف الجوي		25.4524	49.59444	15
Agial Junior High School	METEOROLOGICAL SHELTER SCHOOL YARD		32	34.44	27
Ahmad Sameh	GREENHOUSE PATH:ATM-01		31.45	35.13	69
Al Afak School -Sur Baher	GARDEN YARD:ATM-01		31.44	35.13	59
Alexander von Humboldt Gymnasium	Humboldt Gymnasium Vordereingang:ATM-01	Konstanz, BW, Germany	47.667	9.183	36
Alexander von Humboldt Gymnasium	Radolfzell Mogginger Steig:ATM-02	Konstanz, BW, Germany	47.449	8.593	38
Al-Fahd Secondary School at Rejal Alma'a	Al-Fahd at Rejal Alma'a		17.79349	41.94154	74
Al-Farouq Intermediate School at Jeddah	ikea:ATM-01		21.5546	39.1844	15
Al-Fath Secondary School at Abha	ALfatih:ATM-01		18.1208	42.31	22
Al-Hayathem Intermediate and Secondary Girls School ;	AL-Hayathem Intermediate:ATM-01		24.1	47.1427	70
Al-Hussein Bin Ali Secondary School at Makkah Al-Muk	AL-RAFEY STREET:ATM-01		21.23	39.47	26
Aljazeera Intermediate School at Taif	Aljazeera School:ATM-01		21.21266	40.26944	36
Al-Khaleej Secondary School at Dammam	ALKalig:ATM-02		26.2589	50.0669	10
Al Majd Junior High School	School almjad		32.6047	35.44457	10
Al-Masaudi Intermediate School at Jeddah	Al-Masaudi Intermediate School at Jeddah		21.56452	39.20419	32
Al Mustakbal Elementary School	METEOROLOGICAL SHELTER ON THE ROOF		32.09	34.57	59
AL MUTANABI JUNIOR HIGH SCHOOL (GLIDUZ3N)	SCHOOL RIGHT MAIN ENTRANCE:ATM-01		32.8507	35.2142	21
Al Mutran	SCHOOL YARD:ATM-01		32.41	35.16	41
AL Salam Elementary School	School Entrance Garden Yard:ATM-01		31.25	34.46	25
Anyksciai distr. Troskunai K. Inciura Gymnasium	TROSKUNAI:ATM-01		55.5869	24.8866	50
Apeitio Gymanasio Agrou	atm-1:ATM-01		34.91643	33.0144	99
As-Siddiq Secondary School at Rejal Alma'a	Alsedeeq Secondary School Atmosphere:ATM-01		19.26422	46.53181	12
Athens Intermediate School	AIS 2:ATM-02	Athens, AL, United States	34.47649	-86.59782	24
AT-Tahawy High School at Al-Hofuf	موقع دراسة الغلاف الجوي		25.21	49.36	17
Attour Junior High School For Girls	School Entrance Garden Yard:ATM-01		31.46	35.14	82
aum hany	sumail atm		23	57	39
aum hany	I'm Hani atm2		23	58	36
Bagy Bin Mekhled School at Riyadh	bagy atmosphere		24.81287	46.88946	59
Barta'a Junior High School	School Roof:ATM-01		32.475	35.08	4
Berufskolleg Institut Dr. Flad	School Location:ATM-01	Stuttgart, BW, Germany	48.774	9.1543	27
Brazil Secondary School	BHS Instrument Shelter:ATM-01		10.561	-61.27	25
Brazil Secondary School	BHS Car Park:ATM-02		10.561	-61.27	25
Bundeshandelsakademie und Bundeshandelsschule Bre	School Location:ATM-01		47.49139	9.72331	40
Bunyawat Wittayalai School	Fongsiri		20	99	47
Cabrini High School	Cabrini High Back Yard:ATM-01	New Orleans, LA, United States	29.9815	-90.088	1
Canyon Weather	ATM- Davis Station #2	la verne, CA, United States	34.1248	-117.7493	47
Cedar Grove Elementary	Atmosphere	Germantown, MD, United States	39.24907	-77.23223	13
CEIP Pérez Zamora	huerto de los abuelos:ATM-01		28.3773	-16.5833	33
CEIP Puntallana	Jardín del CEIP Puntallana		28	17	42

What would be a good filter to setup for El Niño data?

- Protocols?
  - Precipitation – one of the campaign protocols
- Date Range?
  - December 1, 2015 – February 28/29, 2016 – a campaign data collection time range
- Location too!
  - California, Oregon, Washington (US West Coast)


THE GLOBE PROGRAM
THE GLOBE PROGRAM Advanced Data Access Tool
Select Language
Powered by Google Translate
Clear Filters
Data Last Updated: 2016-07-12
Instructions
Select a Filter:
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X Precipitation
Date Range
X 2015-12-01 to 2016-02-28
Data Count Range
Site Filters
Site Name
Country or State/Territory
X California
X Oregon
X Washington
In proximity of a lake or river:
School or Teacher
Elevation Range
Lat/Long Range
Proximity to Lat/Long
8 Sites Found
Download Measurement Data (291)
Download Summary Data
School Name
Site Name
Location
Latitude
Longit
Canyon Weather
ATM- Davis Station #2
la verne, CA, United States
34.1248
-117.7
Kingsburg High School
Kingsburg High School Weather Station Site:ATM-02
Kingsburg, CA, United States
36.5197
-119.5
Lane Community College
Science Building (NW):ATM-01
Eugene, OR, United States
44.0083
-123.0
Lourdes Public Charter School
Lyons Fire Hall:ATM-01
Scio, OR, United States
44.7166
-122.6
Lourdes Public Charter School
School Site:ATM-02
Scio, OR, United States
44.7225
-122.6
McKnight Middle School
AWS and Cloud site:ATM-01
Renton, WA, United States
47.4851
-122.1
Monroe Elementary School
James Monroe Elementary - The Outpost:ATM-01
Everett, WA, United States
47.9792
-122.2
test_mobile school 1
Test Davis Site
Pasadena, CA, United States
37.63675
-122.1

THE GLOBE PROGRAM **Advanced Data Access Tool**

Select Language ▾

Powered by Google Translate

Clear Filters Data Last Updated: 2016-07-12 **Instructions**

Select a Filter:

Data Filters

Select Protocols

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X 2015-12-01 to 2016-02-28

Data Count Range

Site Filters

Site Name

Country or State/Territory

X California
X Oregon
X Washington

In proximity of a lake or river:

School or Teacher

Elevation Range

Lat/Long Range

Proximity to Lat/Long

8 Sites Found

Download Measurement Data (291) Download Summary Data

	School Name	Site Name	Location	Latitude	Longit
☐	Canyon Weather	ATM- Davis Station #2	la verne, CA, United States	34.1248	-117.7
☐	Kingsburg High School	Kingsburg High School Weather Station Site:ATM-02	Kingsburg, CA, United States	36.5197	-119.5
☐	Lane Community College	Science Building (NW):ATM-01	Eugene, OR, United States	44.0083	-123.0
☐	Lourdes Public Charter School	Lyons Fire Hall:ATM-01	Scio, OR, United States	44.7166	-122.6
☐	Lourdes Public Charter School	School Site:ATM-02	Scio, OR, United States	44.7225	-122.6
☑	McKnight Middle School	AWS and Cloud site:ATM-01	Renton, WA, United States	47.4851	-122.1
☐	Monroe Elementary School	James Monroe Elementary - The Outpost:ATM-01	Everett, WA, United States	47.9792	-122.2
☐	test_mobile school 1	Test Davis Site	Pasadena, CA, United States	37.63675	-122.1

Ready for Download

What would be a good filter to setup for El Niño data?

- Protocols?
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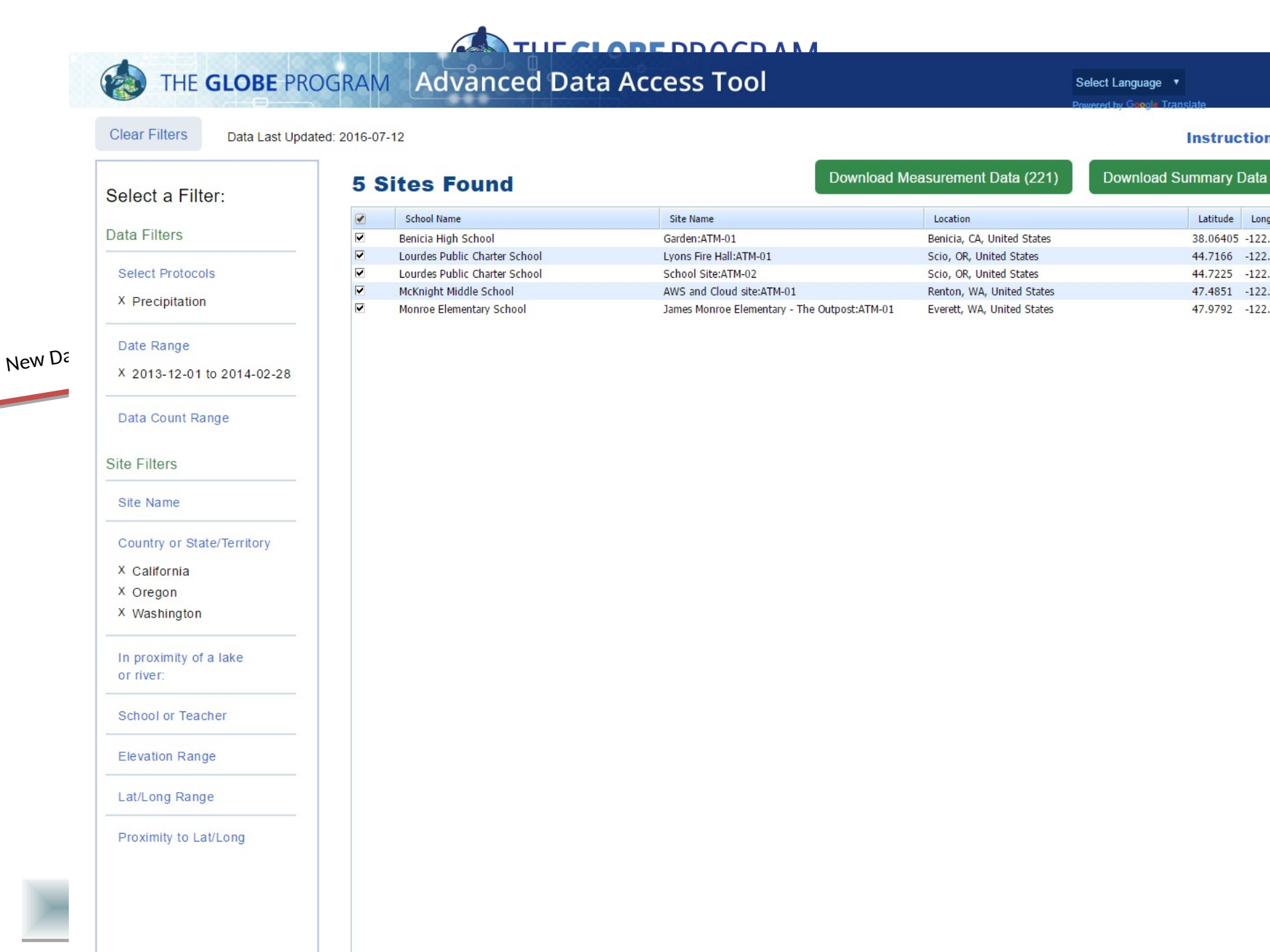
- Date Range?
  - December 1, 2015 – February 28/29, 2016 – a campaign data collection time range
  - Compare to 2013/2014
- Location too?
  - California, Oregon, Washington (US West Coast)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Lat/Long Range
Proximity to Lat/Long
5 Sites Found
Download Measurement Data (221)
Download Summary Data
School Name
Site Name
Location
Latitude
Long
Benicia High School
Garden:ATM-01
Benicia, CA, United States
38.06405
-122.
Lourdes Public Charter School
Lyons Fire Hall:ATM-01
Scio, OR, United States
44.7166
-122.
Lourdes Public Charter School
School Site:ATM-02
Scio, OR, United States
44.7225
-122.
McKnight Middle School
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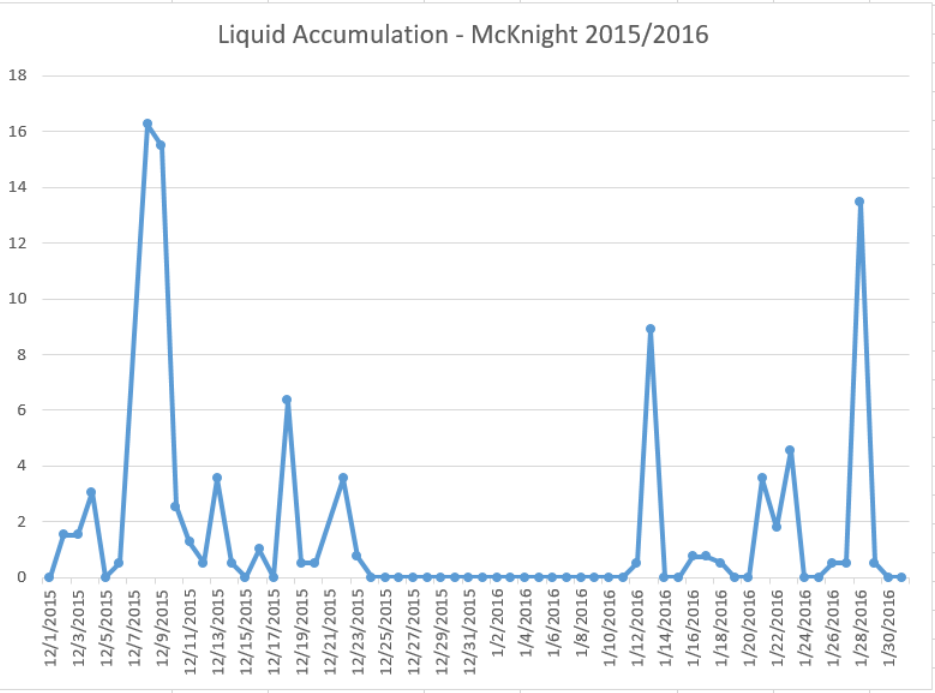
Renton, WA, United States
47.4851
-122.
Monroe Elementary School
James Monroe Elementary - The Outpost:ATM-01
Everett, WA, United States
47.9792
-122.

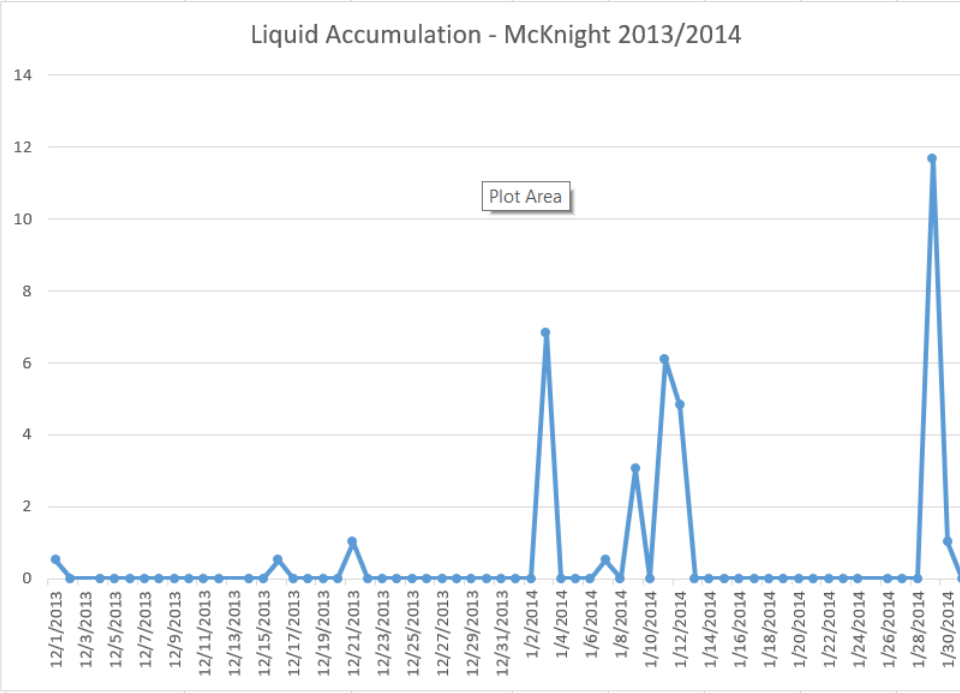
McKnight Middle School – Data 2013 and 2015 Download to Excel

	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

Comparison 2013 and 2015 Precipitation

	Total 2015/2016	95.74		Total 2013/2014	36.1





Note - 2015/2016 data only through 1/30/2016

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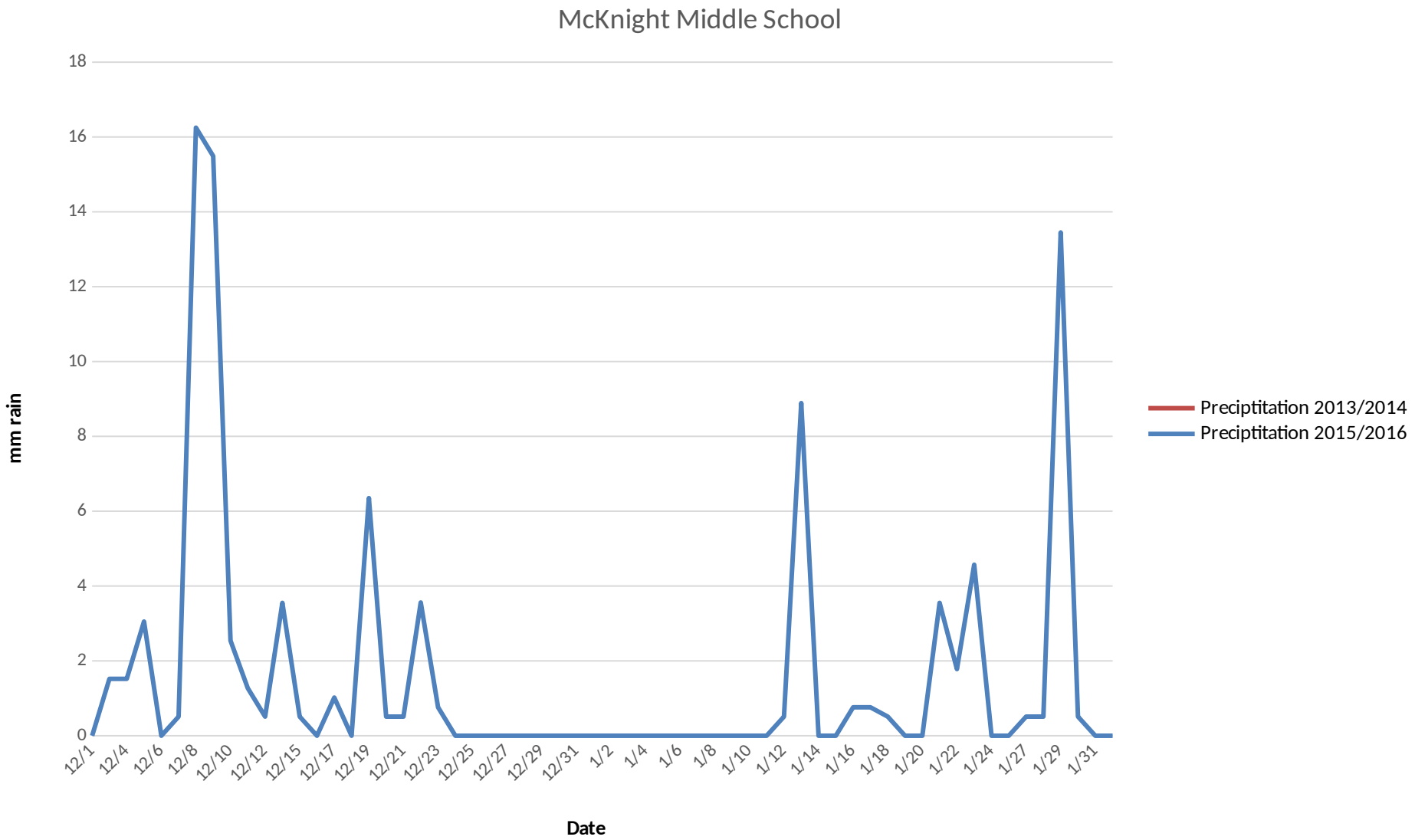

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Using the Visualization System to examine El Nino protocols

- Is there a correlation between precipitation and soil moisture?

Think you know the vis system?

- The Ramey School in Puerto Rico has done an excellent job of monitoring precipitation and Soil Moisture during the El Niño Campaign
  - Start with 9/9/2015
  - Add Soil Moisture – SMAP Block Pattern
  - Plot the data from the Ramey School for the period 9/1/2015 – 5/31/2016
  - Add the data to a combined plot
  - Switch to precipitation for the same period and add it to the multi-site plot
  - View the multi-site plot for this period and determine if there is a correlation between the two variables

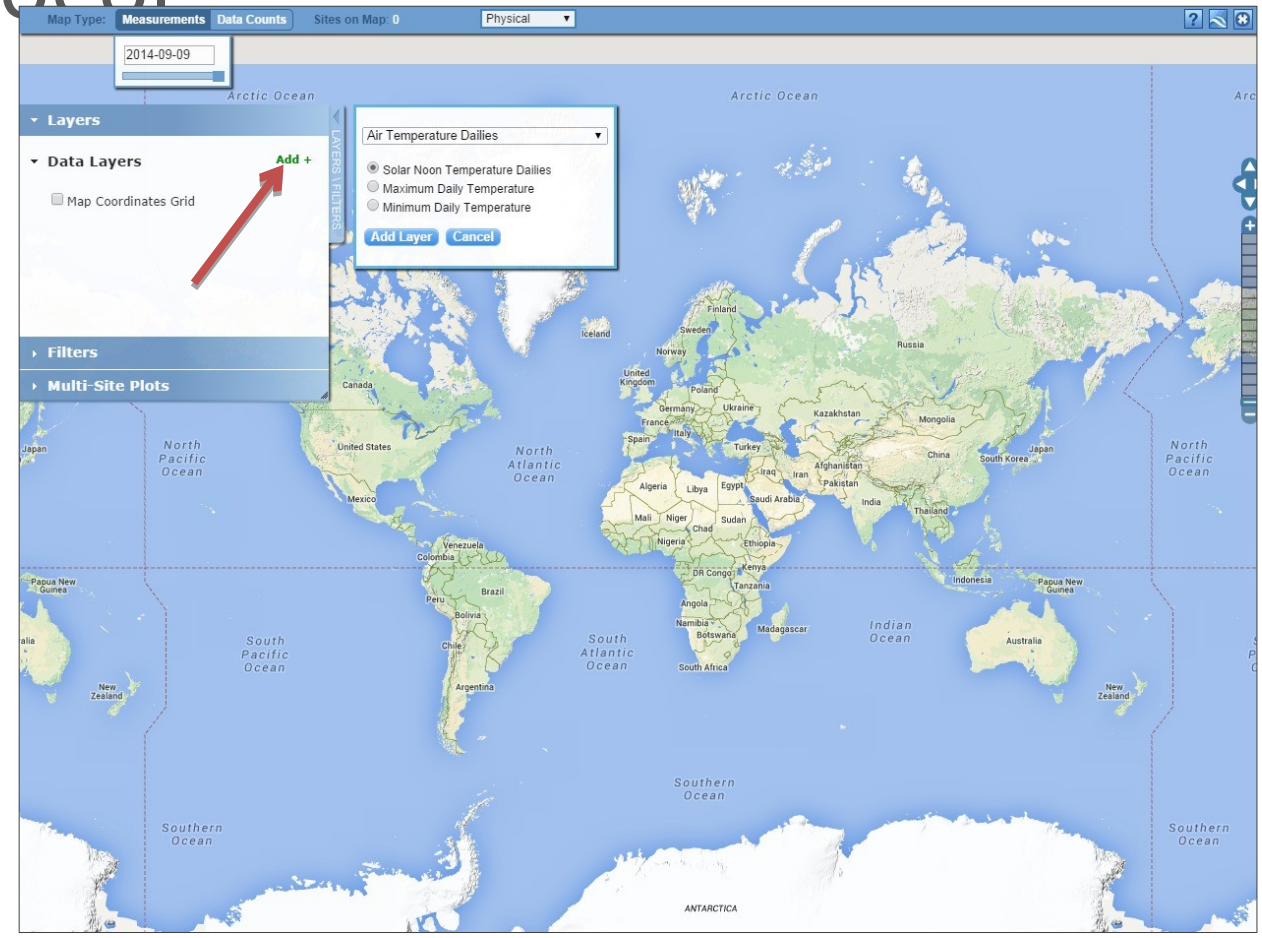
The Basics of the Visualization System

- Go to the homepage and select “Visualize Data”

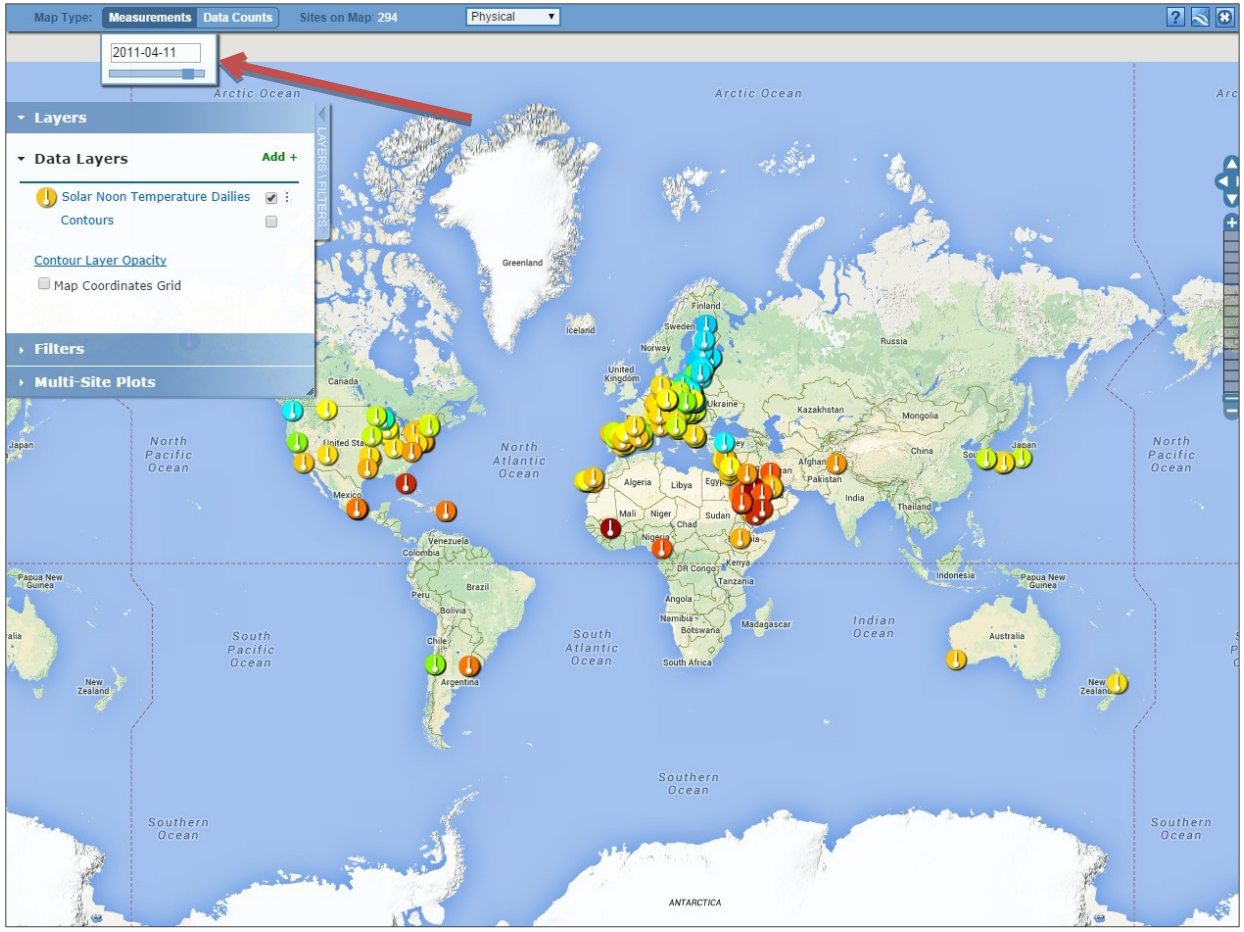
- Three Steps to Visualize your Data:
  1. Select the type of data you want to see (Add Layers)
  2. Select the Date you want to see the data for
  3. Click on a data point on the map to receive table and graph information

Full Training material – slides and video available at: http://www.globe.gov/get-trained/using-the-globe-website/retrieve-and-visualize-your-data

Step 1 – Add Data Layers – Choose the Protocol



Step 2 – Select the Date



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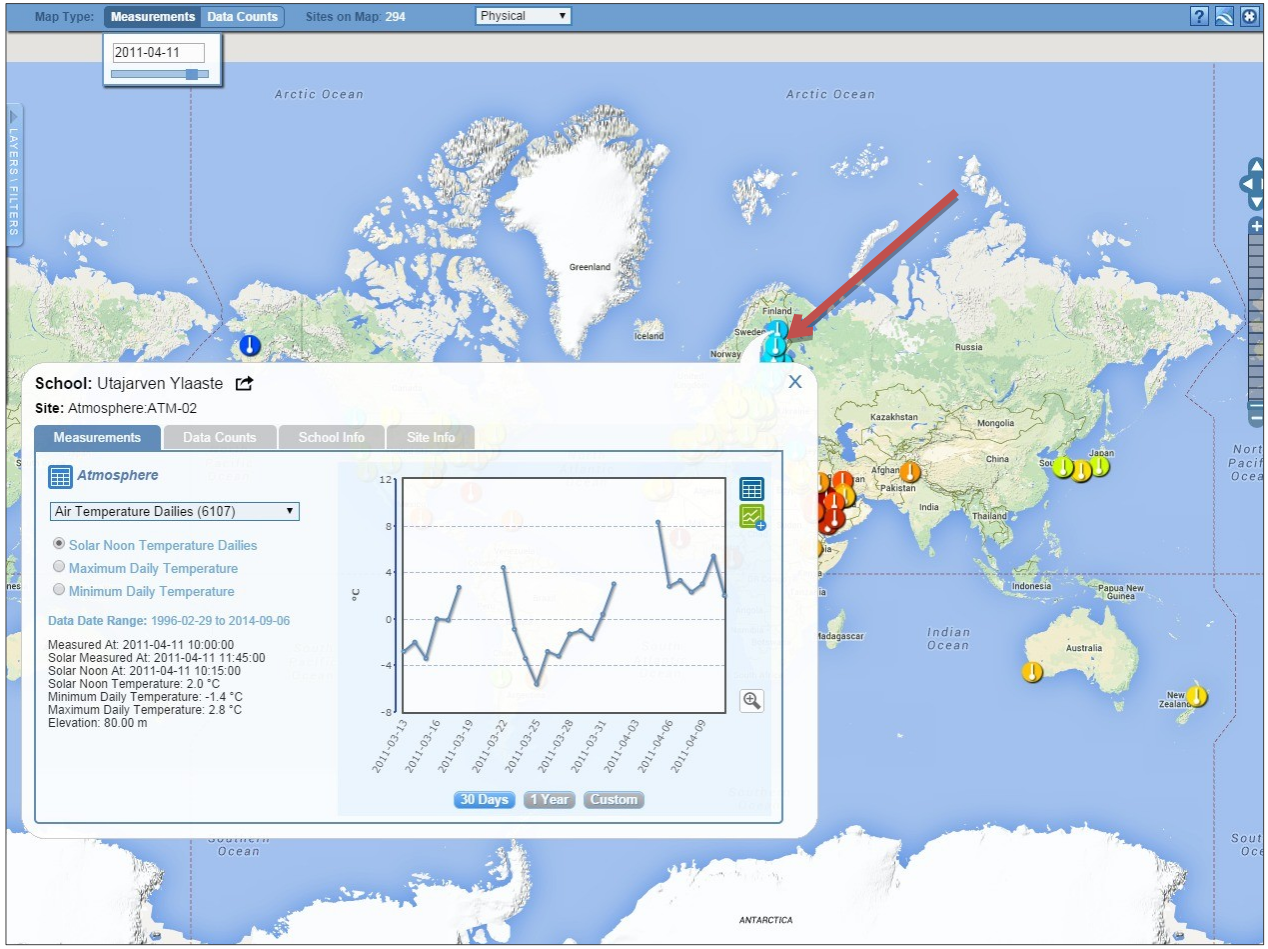
Step 3 – Click on the Data Point



Vis system popup window

See all Atmosphere Data

Go to this school's page

See Plot Data in a Table

Add this Data to a multi-site Plot

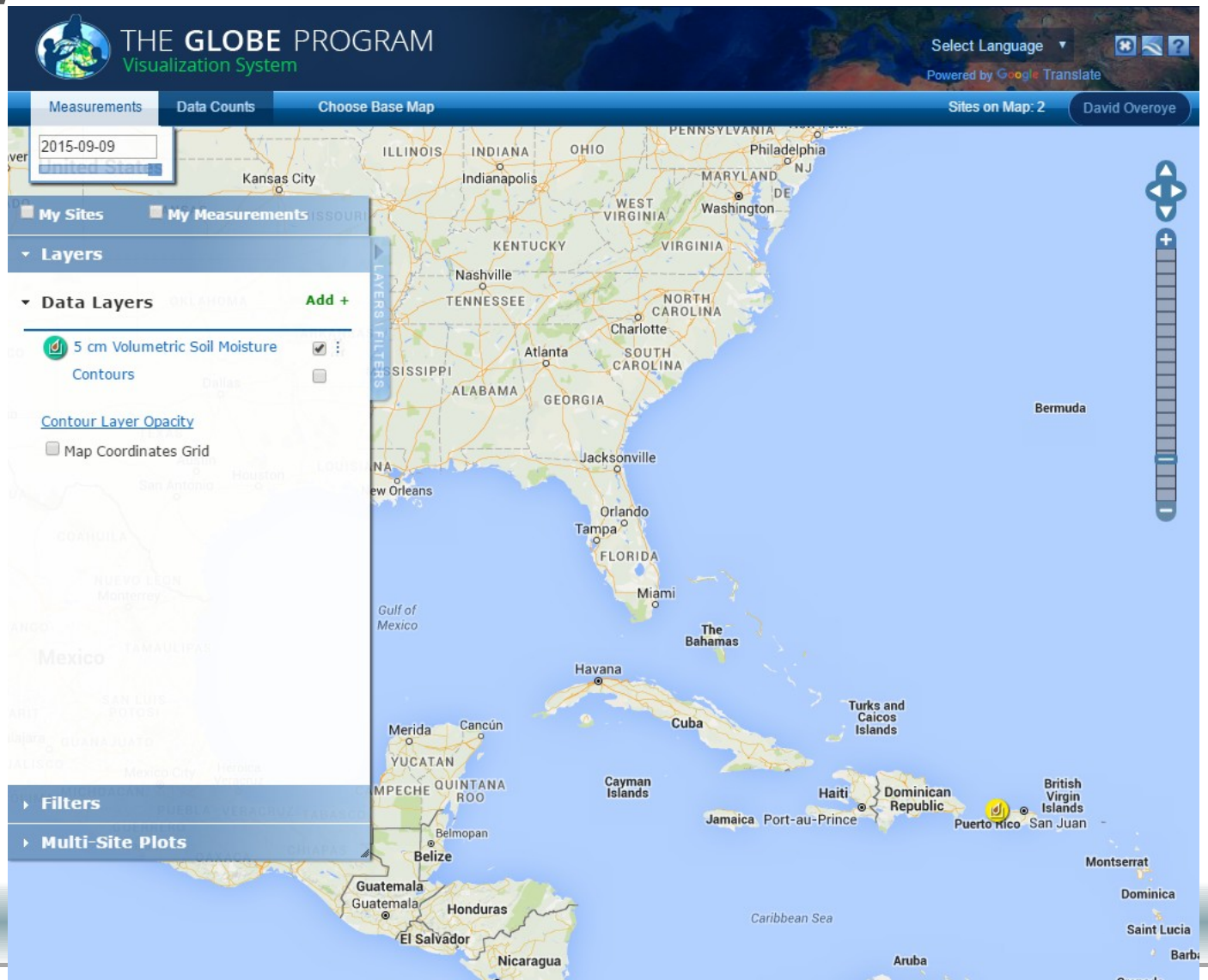
Change the X axis Timeline

Advanced Features

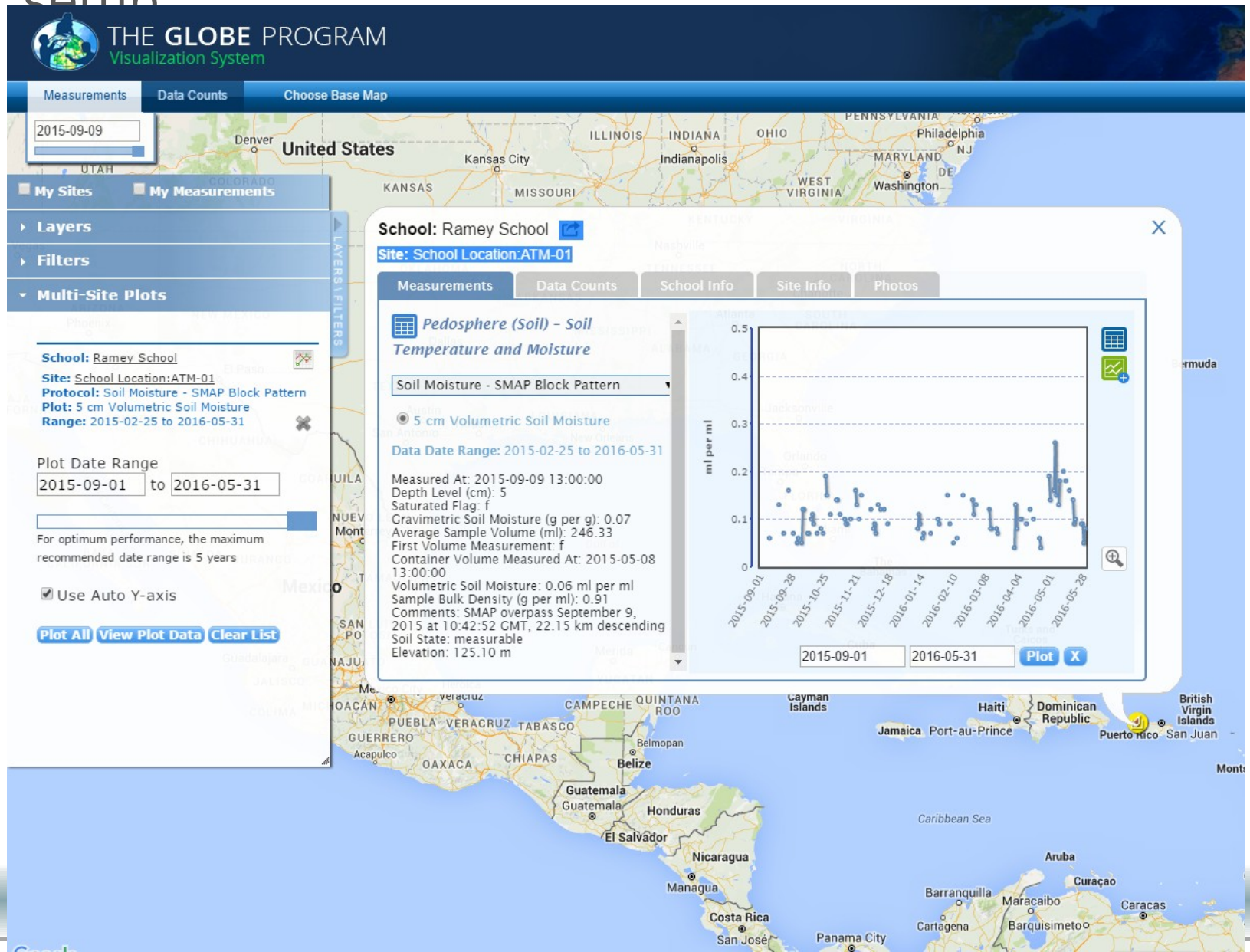
- Use Filters - Location/Site/Elevation to find specific locations – school, country, city etc.
- Use the graph with the + icon to select multiple data sets to graph
  - Allows you to overlay data from multiple sites
- Export layers to KMZ format for using with Google Earth and other similar tools
- Use “Data Counts” to see schools which have entered the most data during a particular period of time

Full Training material – slides and video available at: http://www.globe.gov/get-trained/using-the-globe-website/retrieve-and-visualize-your-data

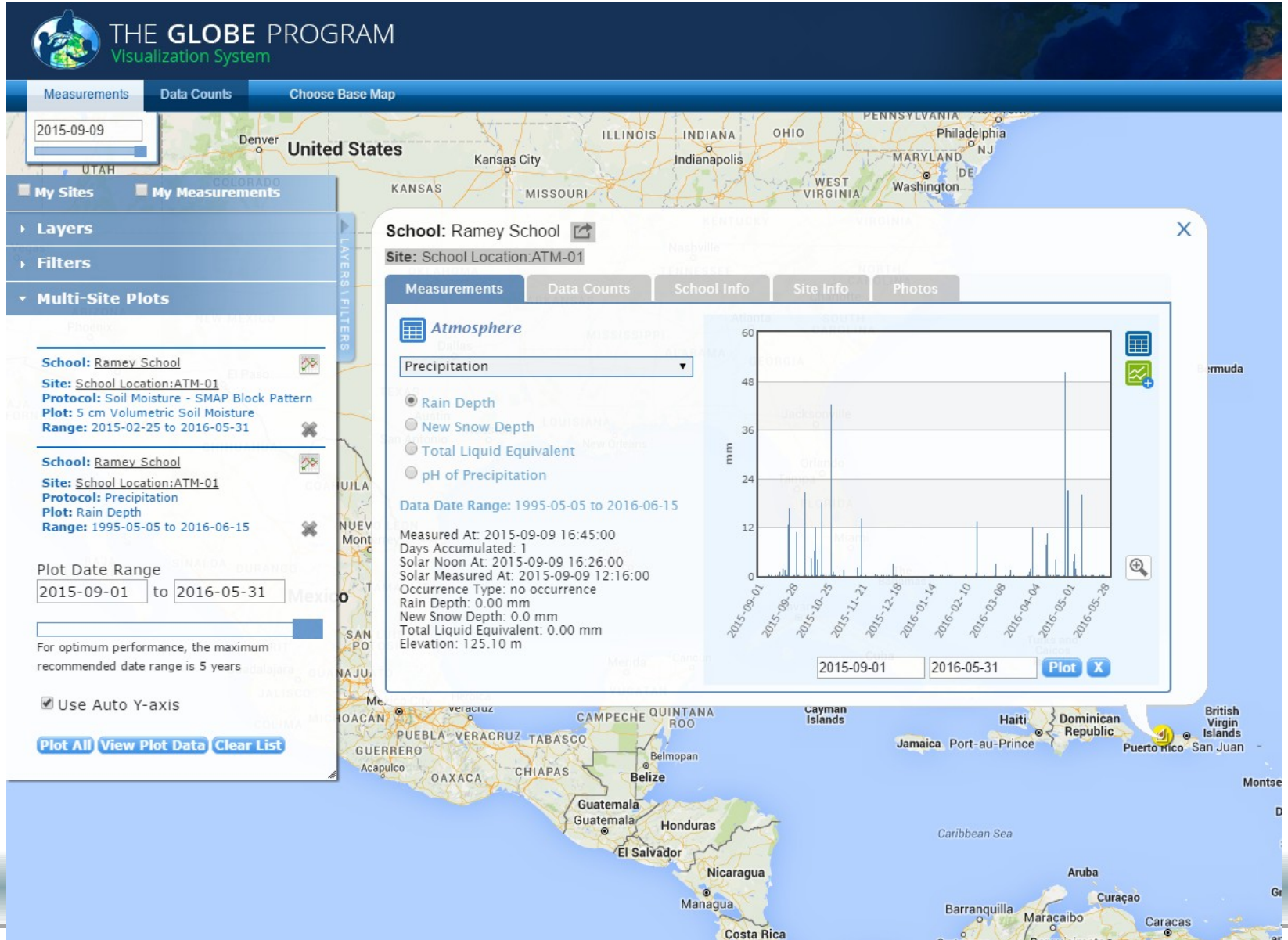
SMAP Measurement-Ramey School 9/9/2015



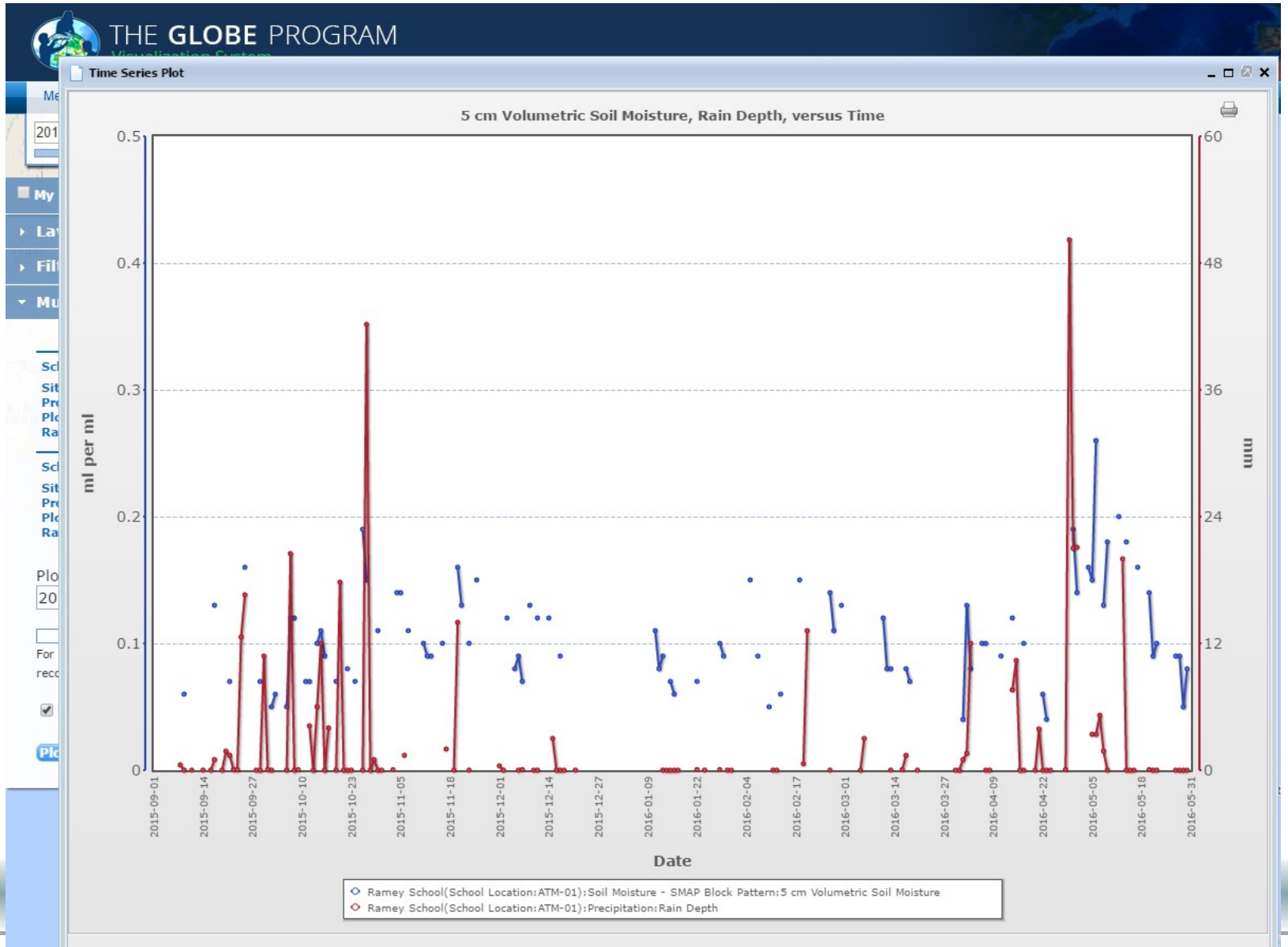
PLOT of measured SMAP data with multi-site setup



PLOT of measured SMAP data with multi-site setup



Data Comparison – do you see a correlation?



Questions?

- Thank you!