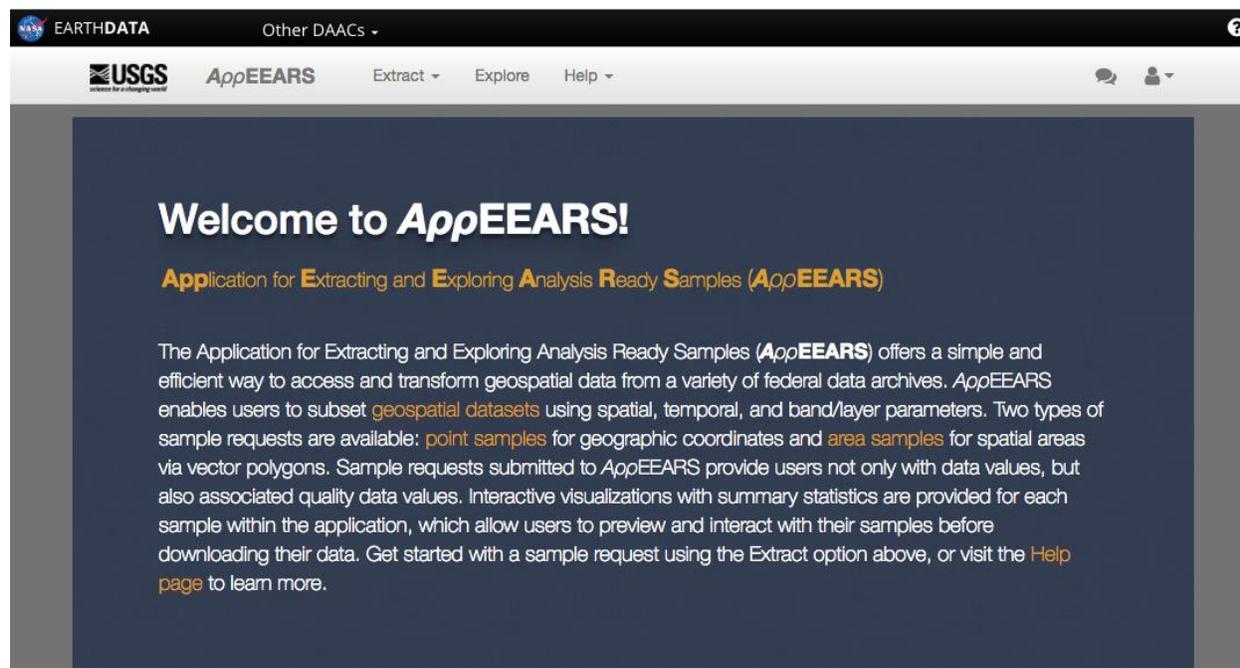


Point and area samples of SMAP data using AppEEARS

In this step-by-step tutorial, we will demonstrate how to access SMAP data using the Application for Extracting and Exploring Analysis Ready Samples (AppEEARS). AppEEARS allows users to obtain and display point and area data using spatial, temporal, and layer subsets. SMAP data from NSIDC that are accessible in AppEEARS includes the complete time series of **SPL3SMP, SPL3SMP_E, SPL3FTP, SPL4CMDL, SPL4SMGP** (31 March 2015 to current). Time series data is displayed in several AppEEARS interface graphs and can also be downloaded in .csv files (point data) or GeoTiff and NetCDF (area data).

Step 1: Access the AppEEARS interface, <https://lpdaacsvc.cr.usgs.gov/appeears/>. An Earthdata login is required.



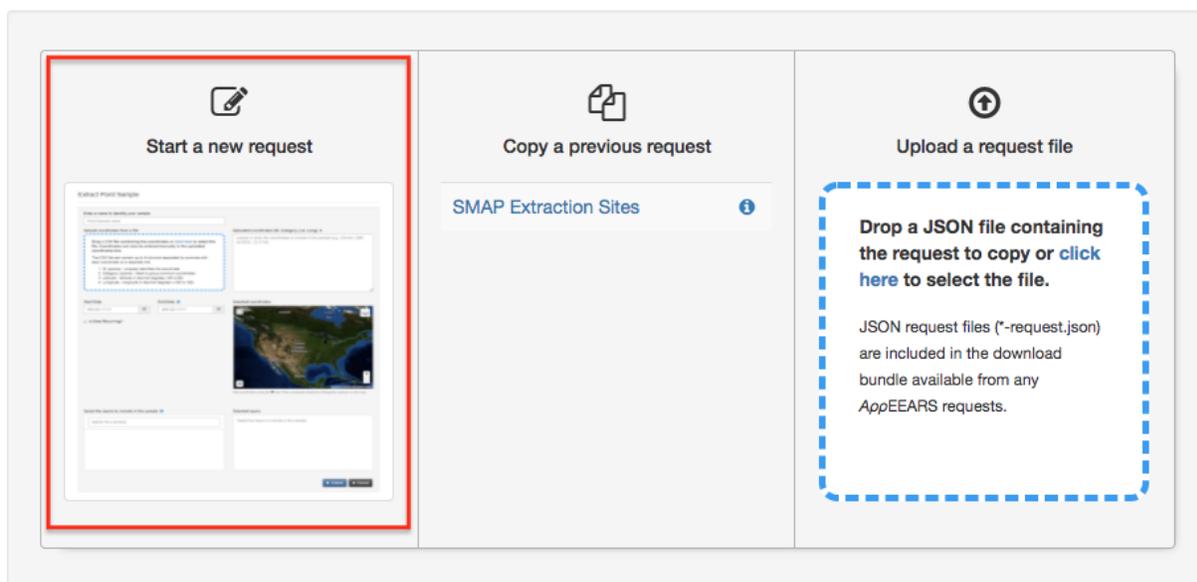
Step 2: Under the *Extract* dropdown, choose *Point Sample*.

Area samples can also be chosen but the steps and options are slightly different than what are outlined in this article.

Step 3: Choose *Start a new request*.

Users can also copy a previous request or upload a JSON file. Both options are beneficial to load previous order details, such as lat/long coordinates, temporal coverage, and data layers.

Extract Point Sample



Step 4: Fill in the data submission details.

For this article, we will use the following details.

- Name your project: **SPL3SMP Test**
- Start Date: **01-01-2016**
- End Date: **12-31-2016**
- Enter product: **SPL3SMP**
- Add layers of interest: **Soil_Moisture_Retrieval_Data_AM_soil_moisture** and **Soil_Moisture_Retrieval_Data_PM_soil_moisture**. Click on + to add individual layers and – to remove individual layers.
- Enter coordinates of points you wish to obtain data for. A .csv file can be loaded if the format matches what is described on the page. Or, use the *Add a coordinate* tool on the map to populate the coordinates field with where the marker is placed. For this article, simply copy/paste the coordinates below:

Aspen, 39.1911, -106.8175
Boulder, 40.0150, -105.2705
Denver, 39.7392, -104.9903
Durango, 37.2753, -107.8801
Grand Junction, 39.0639, -108.5506
Fort Collins, 40.5853, -105.0844
La Junta, 37.9850, -103.5438
Steamboat Springs, 40.4850, -106.8317

g. Click *Submit*

Enter a name to identify your sample

SPL3SMP Test

Upload coordinates from a file

Drop a CSV file containing the coordinates or [click here](#) to select the file. Coordinates can also be entered manually in the uploaded coordinates box.

The CSV file can contain up to 4 columns separated by commas with each coordinate on a separate line.

1. ID (*optional*) - uniquely identifies the coordinate
2. Category (*optional*) - label to group common coordinates
3. Latitude - latitude in decimal degrees (-90 to 90)
4. Longitude - longitude in decimal degrees (-180 to 180)

Start Date

01-01-2016

End Date ⓘ

12-31-2016

Is Date Recurring?

Select the layers to include in the sample ⓘ

SMAP Soil Moisture
SPL3SMP004, 36000m, Daily, (2015-03-31 to Present)

- Soil_Moisture_Retrieval_Data_PM_soil_moisture_error_pm +
- Soil_Moisture_Retrieval_Data_PM_static_water_body_fraction_pm +
- Soil_Moisture_Retrieval_Data_PM_surface_flag_pm +
- Soil_Moisture_Retrieval_Data_PM_surface_temperature_pm +

Uploaded coordinates (ID, Category, Lat, Long): 8

Aspen, 39.1911, -106.8175
Boulder, 40.0150, -105.2705
Denver, 39.7392, -104.9903
Durango, 37.2753, -107.8801
Grand Junction, 39.0639, -108.5506
Fort Collins, 40.5853, -105.0844
La Junta, 37.9850, -103.5438
Steamboat Springs, 40.4850, -106.8317

Selected coordinates



Add coordinates using the tool. View coordinate details by clicking the markers on the map.

Selected layers

- Soil_Moisture_Retrieval_Data_AM_soil_moisture 36000m, Daily —
- Soil_Moisture_Retrieval_Data_PM_soil_moisture_pm 36000m, Daily —

▶ Submit **✕ Cancel**

Step 5: Under *Explore*, track the progress of a submission
An email confirmation will also be sent when the submission is completed.

Explore Requests

Request	Type	Status	Details	Date Submitted	Date Completed	
SPL3SMP Test	Point Sample	11%		04-05-2018 2:49:28 pm CDT		
SMAP Extraction Sites	Point Sample	Done		03-07-2018 10:43:57 am CST	03-08-2018 2:51:30 am CST	

Step 6: Explore the results:

- When completed, click on the *contents* button (highlighted above) to view graphs and compare layers.
- The *Temporal Comparison* tab displays data values from individual sites and data layers over time in various ways. The time scales on the graphs can be adjusted in the *Time Series* graph. Also, hover over a point on each graph with a mouse to view the date and value.



c. The *Layer Comparison* tab allows comparison of each data layer with a time series and scatter plot graph at individual sites.

Temporal Comparison Layer Comparison Categorical Overview

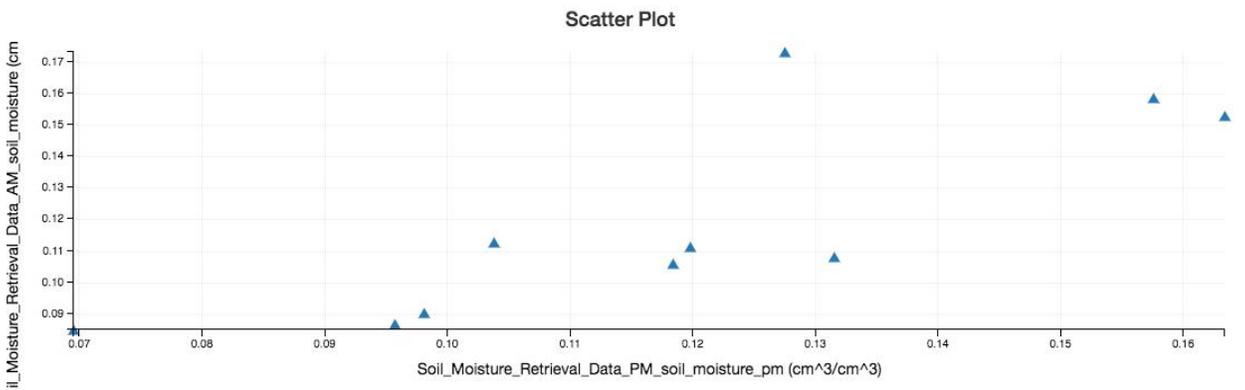
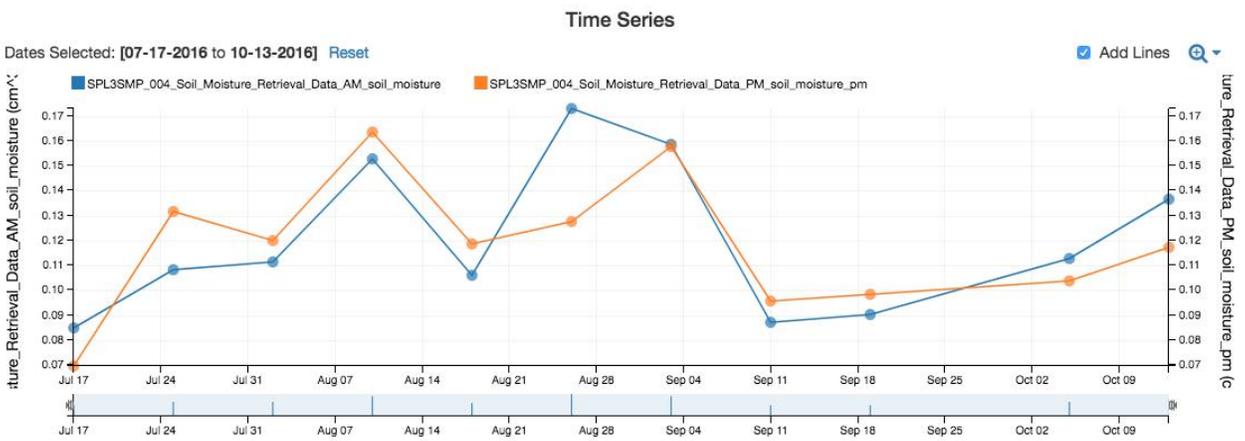
Site: Aspen, 39.1911, -106.8175

Layer 1: SPL3SMP_004_Soil_Moisture_Retrieval_Data_AM_soil_moisture

Layer 2: SPL3SMP_004_Soil_Moisture_Retrieval_Data_PM_soil_moisture



Select a site and view coordinate details by clicking the markers on the map.

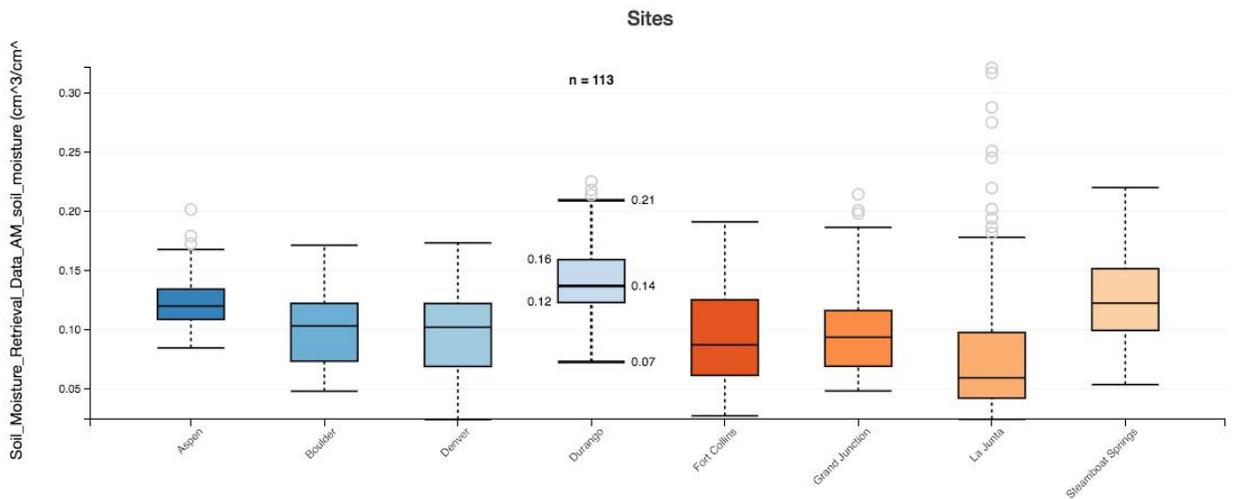


- d. The *Categorical Overview* tab displays a box and whisker plot of all sites for individual layers for the entire time series. Hover over individual plots to view related data values.

Temporal Comparison Layer Comparison **Categorical Overview**

Layer:

Data Selected: All



Step 7: Download all data results

Back in the *Explore* tab, click the *Download all Contents of the request* button. Deliverables include the following:

- .csv file with all the data
- .json file with order details
- .txt file with a list of all science granules used in the order as well as links to the data at NSIDC
- .xml file of related metadata

Explore Requests

Request	Type	Status	Details	Date Submitted	Date Completed	
SPL3SMP Test	Point Sample	Done	i	04-05-2018 2:49:28 pm CDT	04-05-2018 3:02:28 pm CDT	i ↓ i
SMAP Extraction Sites	Point Sample	Done	i	03-07-2018 10:43:57 am CST	03-08-2018 2:51:30 am CST	i ↓ i

For more detailed instructions of AppEEARS, please visit <https://lpdaacsvc.cr.usgs.gov/appeears/help>.