

## ARSET

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# Session Three: Accessing Soil Moisture Active Passive (SMAP) Data

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# SMAP Data Access Options

## Data Search, Documentation and Access: NSIDC

NSIDC National Snow & Ice Data Center

Scientific Data Search

spl3smp

Showing 1-25 of 41 Data Sets

Sort by: Relevance (highest to lowest) Per page: 25

Parameter

- Active Layer (1)
- Antenna Temper... (1)
- Bathymetry (1)
- Biosphere (1)
- Brightness Tem... (12)
- Elevation (2)
- Freeze/Thaw (1)
- Ice Depth/Thick... (3)
- Ice Topography (1)
- Infrared Imagery... (4)

SMAP L3 Radiometer Global Daily 36 km EASE-Grid Soil Moisture

Temporal Coverage 2015-03-31 to continuous

Parameter Brightness Temperature | Soil Moisture

Data Format HDF5

Summary This Level-3 (L3) soil moisture product provides a composite of daily estimates of global land surface conditions retrieved by the Soil Moisture Active Passive (SMAP) passive ...More Detail

SMAP L2 Radiometer Half-Orbit 36 km EASE-Grid Soil Moisture

<http://nsidc.org/data/search>

## Data Access and Output Customization: Earthdata Search

EARTHDATA

Search

spl3smp

Temporal Spatial Clear Filters

Back to Collections

SMAP L3 Radiometer Global Daily 36 km EASE-Grid Soil Moisture V003

Retrieve Collection Data

Showing 20 of 497 matching granules

Sort by: Start Date, Newest first

SMAP\_L3\_SM\_P\_20160815\_R13080\_001.h5

2016-08-15T00:00:00Z to 2016-08-15T23:59:59Z

<https://search.earthdata.nasa.gov>

## Data Visualization and Download: Worldview

NASA WORLDVIEW

Layers Events Data

OVERLAYS

- Soil Moisture (L3, Passive) SMAP / Radiometer
- Place Labels
- Coastlines / Borders / Roads
- Coastlines

BASE LAYERS

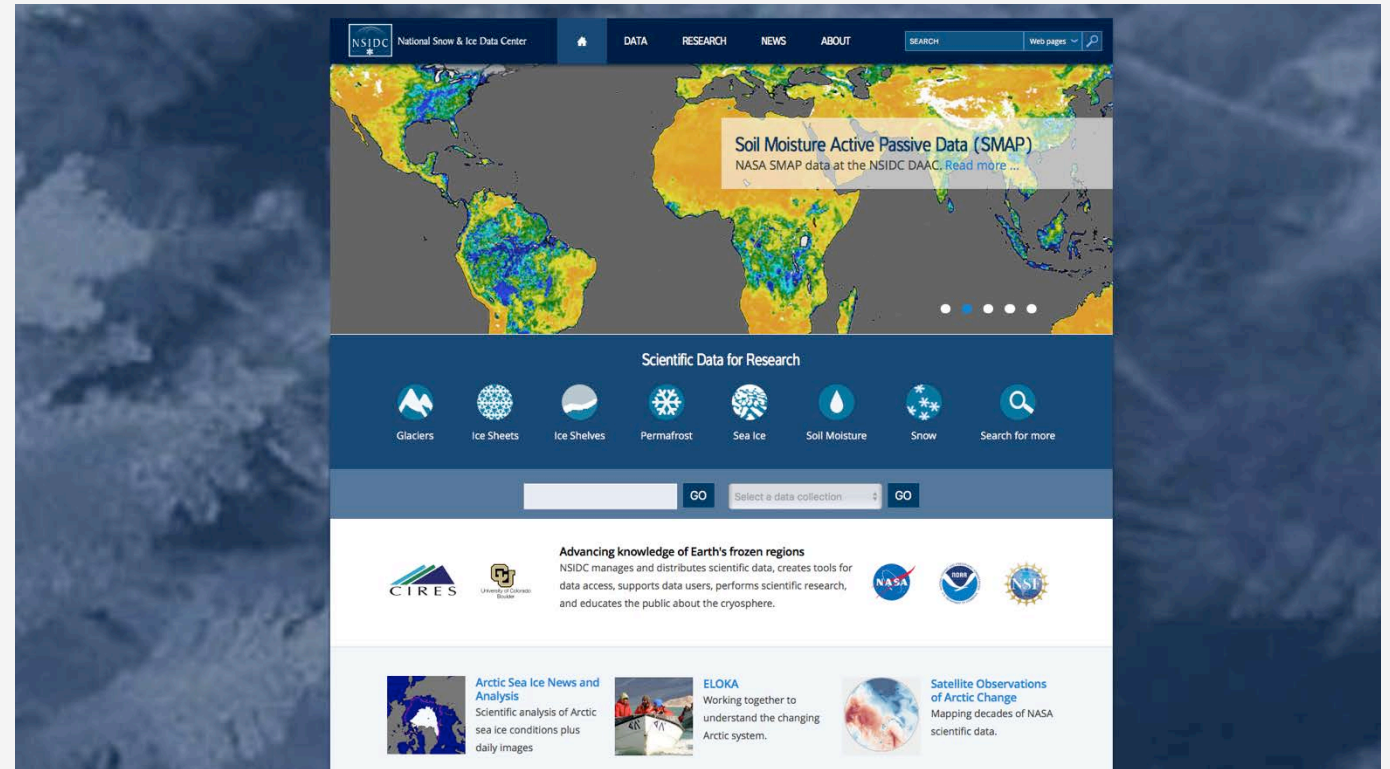
Corrected Reflectance (True Color)

<https://worldview.earthdata.nasa.gov>

# Discovering SMAP Data at NSIDC

<http://nsidc.org/>

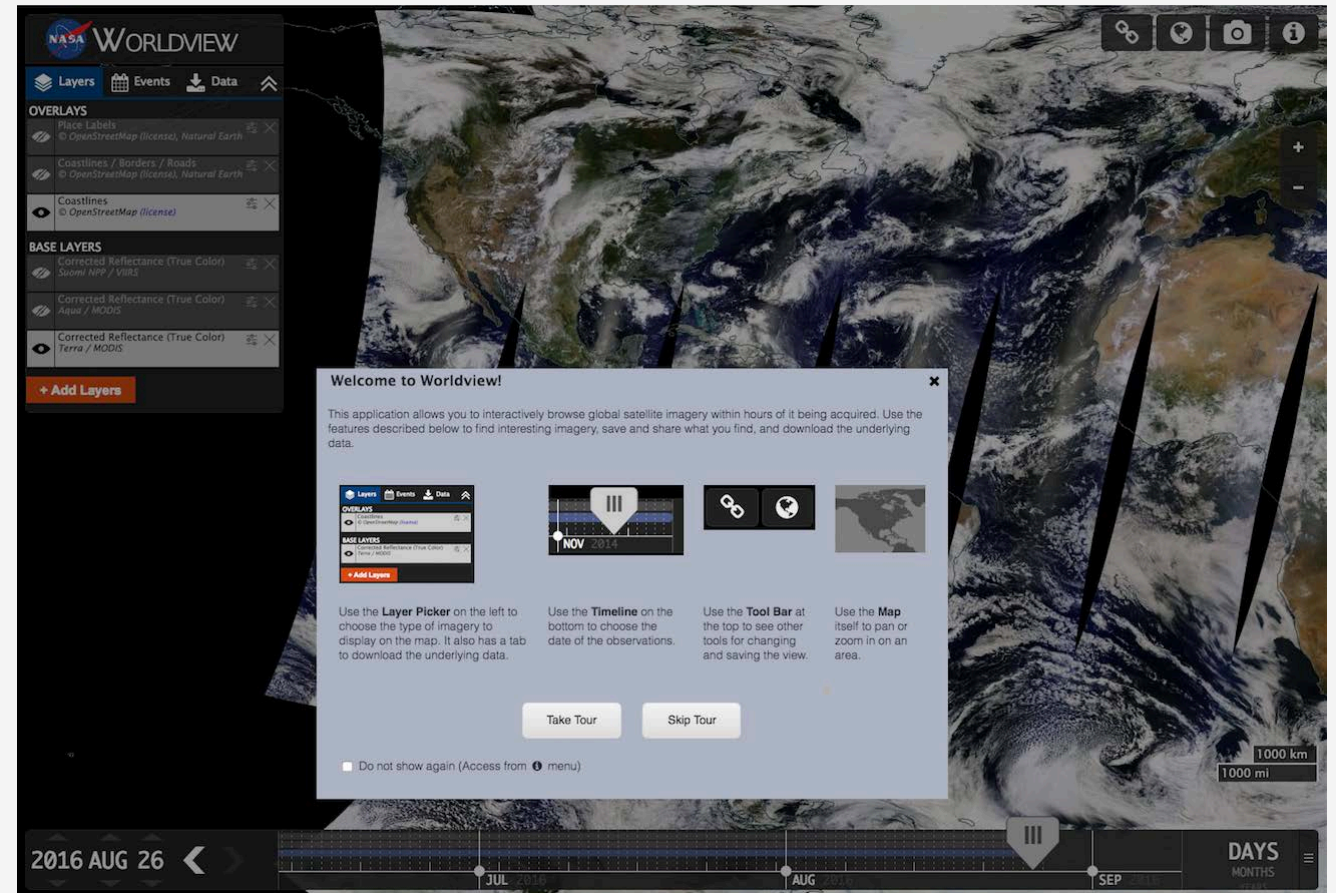
- NASA National Snow & Ice Data Center (NSIDC) is a Distributed Active Archive Center (DAAC)
- 1 of 12 NASA Earth Observing System Data and Information System (EOSDIS) DAACs
- Distributes nearly 500 NASA data sets
  - primarily focused on the cryosphere
- After the introduction, we'll take a tour of NSIDC's Scientific Data Search



# Exploring SMAP Data in NASA's Worldview

<http://worldview.earthdata.nasa.gov/>

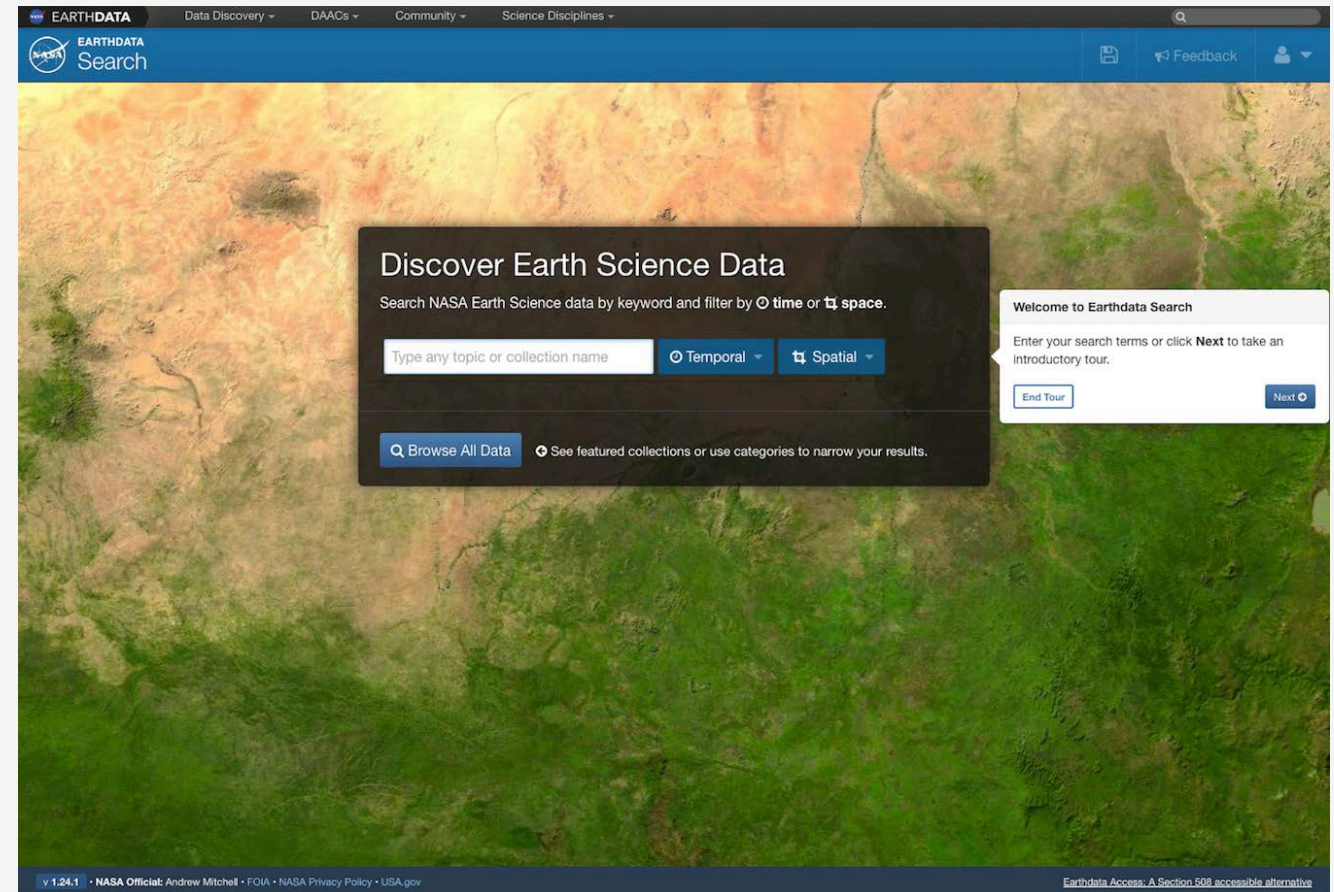
- Worldview provides you with the ability to interactively browse global, full-resolution satellite imagery and download the underlying data & image files
- Uses Global Imagery Browse Services (GIBS)
- Most of the 100+ available products are updated within 3 hrs of observation
- After the demonstration of SMAP data discovery & access at NSIDC, I'll take you through a tour of Worldview



# Accessing SMAP Data with NASA's Earthdata Search

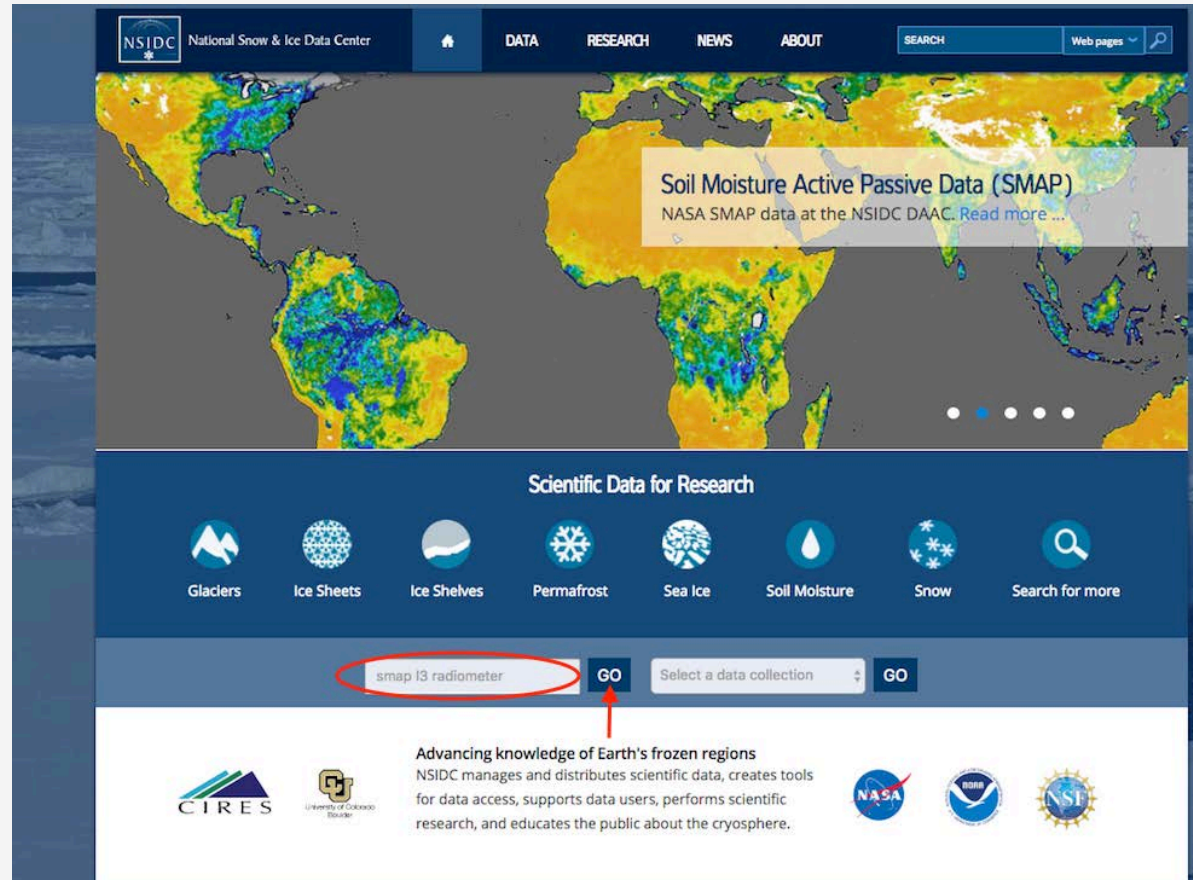
<http://search.earthdata.nasa.gov/search>

- Connects users to their data by making data search, discovery, and access available in one application
- Offers the ability to search across disciplines and DAACs
- For the last live demonstration, I'll go through
  - the interface's filtering options to hone a search for SMAP L3 Radiometer Global Daily 36 km EASE-Grid Soil Moisture (SPL3SMP)
  - available ordering and subsetting options



# Discovering SMAP Data at NSIDC

<http://nsidc.org>



The screenshot shows the NSIDC website interface. At the top, there is a navigation bar with the NSIDC logo and the text "National Snow & Ice Data Center". The main navigation menu includes "DATA", "RESEARCH", "NEWS", and "ABOUT". A search bar is located on the right side of the navigation bar. Below the navigation bar, there is a large map of the world displaying soil moisture data. A text box overlaid on the map reads "Soil Moisture Active Passive Data (SMAP) NASA SMAP data at the NSIDC DAAC. Read more ...". Below the map, there is a section titled "Scientific Data for Research" with icons for "Glaciers", "Ice Sheets", "Ice Shelves", "Permafrost", "Sea Ice", "Soil Moisture", "Snow", and "Search for more". At the bottom of the page, there is a search bar with the text "smap l3 radiometer" entered. A red circle highlights the search bar, and a red arrow points to the "GO" button next to it. Below the search bar, there is a dropdown menu labeled "Select a data collection" and another "GO" button. At the bottom of the page, there is a footer with the text "Advancing knowledge of Earth's frozen regions" and "NSIDC manages and distributes scientific data, creates tools for data access, supports data users, performs scientific research, and educates the public about the cryosphere." Logos for CIRES, University of Colorado Boulder, NASA, NOAA, and NSI are also present.

# Discovering SMAP Data at NSIDC

<http://nsidc.org>

Clicking on the data set name in the Search results will take you to the collection's catalog page

The screenshot displays the NSIDC Scientific Data Search interface. The search query is 'smap l3 radiometer'. The results are sorted by relevance and show 1-8 of 8 data sets. The first result is 'SMAP L3 Radar/Radiometer Global Daily 9 km EASE-Grid Soil Moisture'. The second result is 'SMAP L3 Radiometer Global Daily 36 km EASE-Grid Soil Moisture', which is highlighted with a red arrow. The third result is 'AMSR-E/Aqua Daily L3 Surface Soil Moisture, Interpretive Parameters, & QC EASE-Grids'. The fourth result is 'Aquarius L3 Gridded 1-Degree Weekly Soil Moisture'. A red arrow points to the 'Get Data' button for the second result, which has opened a dropdown menu with options: FTP, Reverb, Worldview, Subscription, HTTPS, and Earthdata Search. The interface includes a navigation bar with 'DATA', 'RESEARCH', 'NEWS', and 'ABOUT' tabs, and a search bar with a 'SEARCH' button and a 'Web pages' dropdown.

# Discovering SMAP Data at NSIDC

<http://nsidc.org>

From the catalog page, you can use the Get Data options to explore options to download, visualize, and customize your data order

You'll also notice that there's an overview of the data in the collection. Clicking on the different tabs will highlight how to cite this data, provide you with a user guide, and how to reach NSIDC for support

Data Set ID: SPL3SMP  
SMAP L3 Radiometer Global Daily 36 km EASE-Grid Soil Moisture, Version 3

This Level-3 (L3) soil moisture product provides a composite of daily estimates of global land surface conditions retrieved by the Soil Moisture Active Passive (SMAP) passive microwave radiometer. SMAP L-band soil moisture data are resampled to a global, cylindrical 36 km Equal-Area Scalable Earth Grid, Version 2.0 (EASE-Grid 2.0).

Version Summary: [See more](#)

Print version

Overview | Citing These Data | User Guide | Support

Spatial Coverage:	N: 85.044, S: -85.044, E: 180, W: -180
Spatial Resolution:	36 km x 36 km
Temporal Coverage:	31 March 2015 to present
Temporal Resolution:	1 day
Parameter(s):	Microwave > Brightness Temperature Soils > Soil Moisture/Water Content > Soil Moisture
Platform(s):	SMAP Observatory
Sensor(s):	SMAP L-Band Radiometer
Data Format(s):	HDF5
Version:	V3
Data Contributor(s):	O'Neill, P. E., S. Chan, E. G. Njoku, T. Jackson, and R. Bindlish.
Metadata XML:	<a href="#">View Metadata Record</a>

### How to download data

#### DOWNLOADING DATA VIA FTP

Data can be downloaded through a Web browser or command line via FTP. When using a Web browser, the FTP link first directs you to an Optional Registration Form that if filled out, will allow you to receive notifications about updates or processing changes related to that specific data set. After completing the Optional Registration Form, the FTP directory becomes available. For additional help downloading data through an FTP client, go to User Services Online Support: FTP Client Data Access Web page.

FTP

#### DOWNLOADING DATA VIA HTTPS

Downloading data via HTTPS requires registration with NASA Earthdata Login. Once you have registered and logged in, data can be downloaded via a Web browser, command line, or client. Your NASA Earthdata Login will work at other NASA Earth Observing System Data and Information System (EOSIDS) Web sites, such as NASA Earthdata and NASA Reverb.

HTTPS

#### Get Data: Visualize

**Worldview:** This application allows you to interactively browse global satellite imagery within hours of it being acquired. You can also save it, share it, and download the underlying data.

#### Get Data: Package

**Reverb:** NASA search and order tool for subsetting, reprojecting, and reformatting data.

**NOTE:** Reverb will be decommissioned in the coming months and replaced with Earthdata Search. All links to Reverb will be removed at that time.

**Subscription Service:** Subscribe to have new data automatically sent when the data become available.

**Earthdata Search:** NASA's newest search and order tool for subsetting, reprojecting, and reformatting data.



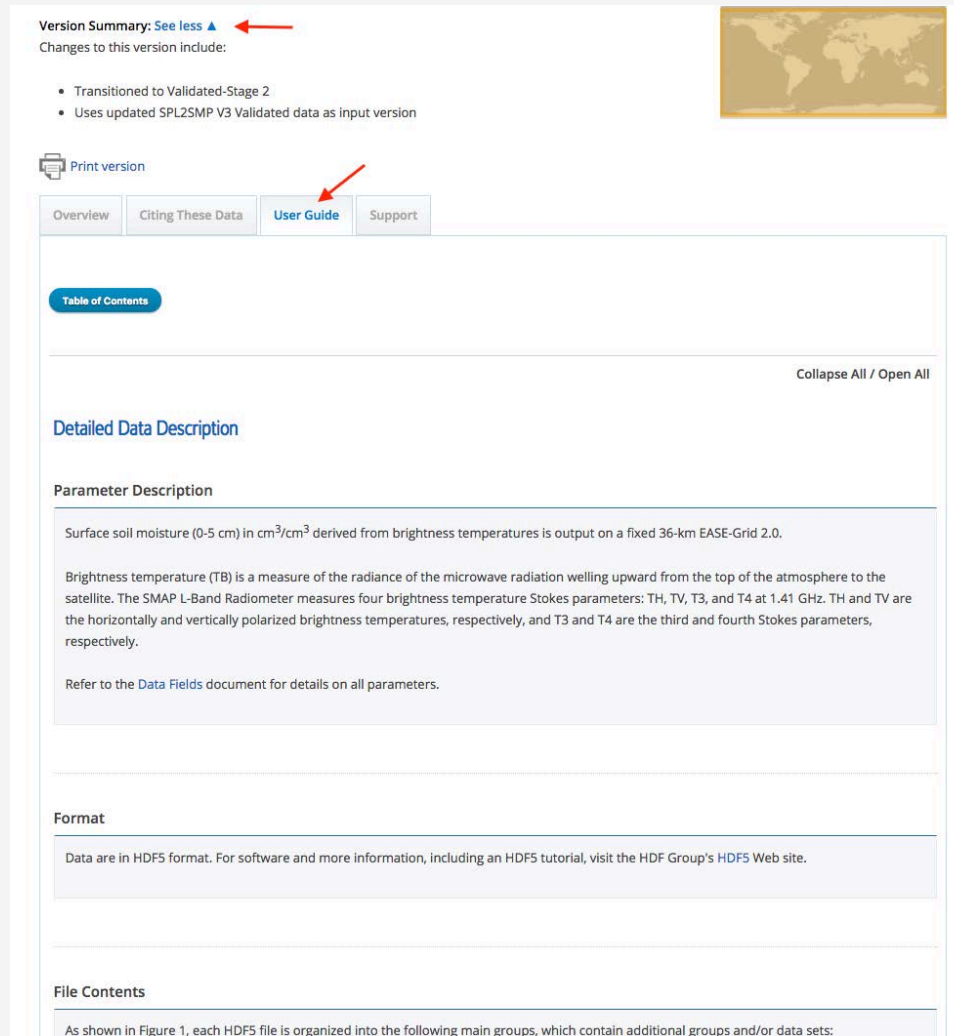
# Discovering SMAP Data at NSIDC

<http://nsidc.org>

The screenshot shows the NSIDC website interface for the SMAP L3 Radiometer Global Daily 36 km EASE-Grid Soil Moisture, Version 3 data set. The page features a navigation bar with 'DATA', 'RESEARCH', 'NEWS', and 'ABOUT' tabs. The main content area includes a 'Data Set ID: SPL3SMP' and a 'Get Data' section with 'Download', 'Visualize', and 'Package' buttons. A 'Geographic Coverage' map is also present. A 'Print version' button is highlighted with a red arrow. Below the main content, there are tabs for 'Overview', 'Citing These Data', 'User Guide', and 'Support'. The 'Data Citation' section provides the following citation: O'Neill, P. E., S. Chan, E. G. Njoku, T. Jackson, and R. Bindlish. 2016. SMAP L3 Radiometer Global Daily 36 km EASE-Grid Soil Moisture, Version 3. [Indicate subset used]. Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center. doi: <http://dx.doi.org/10.5067/7MINGFDCZTES>. [Date Accessed].

# Discovering SMAP Data at NSIDC


<http://nsidc.org>




Version Summary: [See less ▲](#)

Changes to this version include:

- Transitioned to Validated-Stage 2
- Uses updated SPL2SMP V3 Validated data as input version



 Print version

Overview Citing These Data **User Guide** Support

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[Collapse All / Open All](#)

### Detailed Data Description

#### Parameter Description

Surface soil moisture (0-5 cm) in  $\text{cm}^3/\text{cm}^3$  derived from brightness temperatures is output on a fixed 36-km EASE-Grid 2.0.

Brightness temperature (TB) is a measure of the radiance of the microwave radiation welling upward from the top of the atmosphere to the satellite. The SMAP L-Band Radiometer measures four brightness temperature Stokes parameters: TH, TV, T3, and T4 at 1.41 GHz. TH and TV are the horizontally and vertically polarized brightness temperatures, respectively, and T3 and T4 are the third and fourth Stokes parameters, respectively.

Refer to the [Data Fields](#) document for details on all parameters.

#### Format

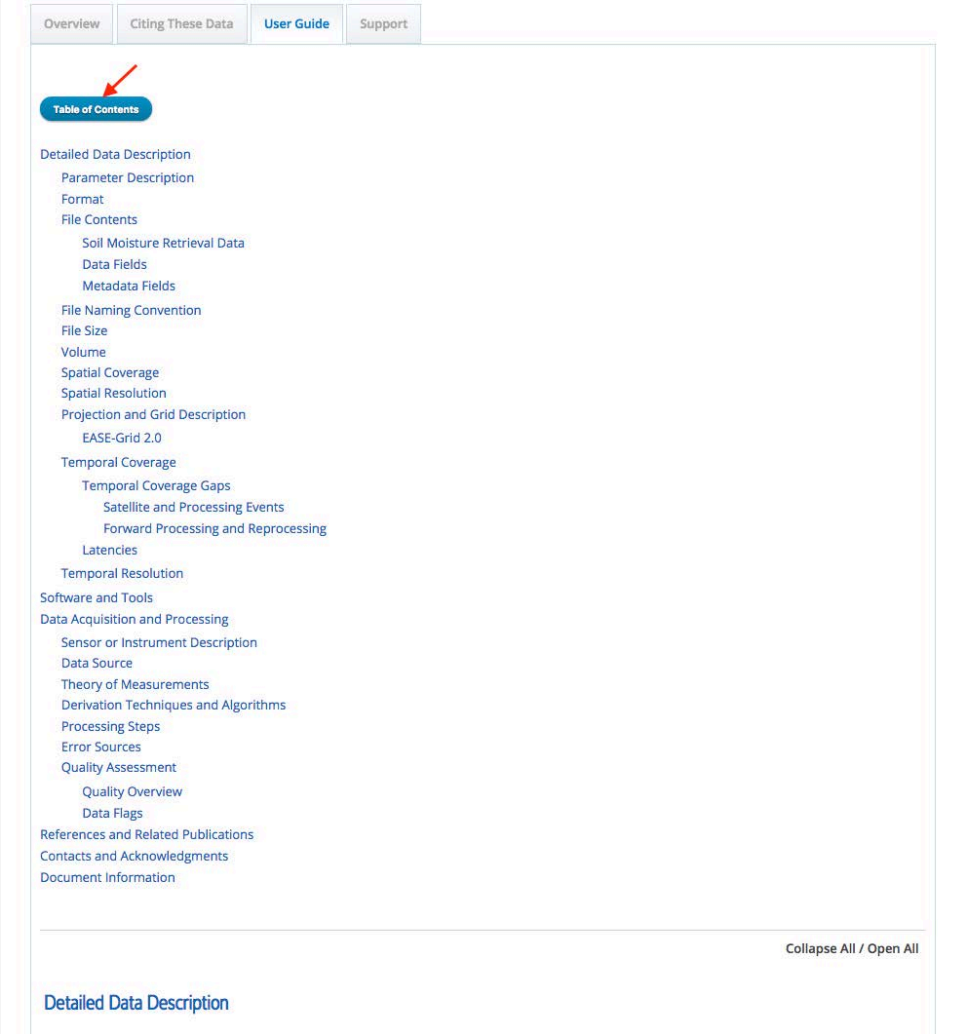
Data are in HDF5 format. For software and more information, including an HDF5 tutorial, visit the HDF Group's [HDF5 Web site](#).

#### File Contents

As shown in Figure 1, each HDF5 file is organized into the following main groups, which contain additional groups and/or data sets:

# Discovering SMAP Data at NSIDC

<http://nsidc.org>



Overview Citing These Data **User Guide** Support

**Table of Contents**

- Detailed Data Description
  - Parameter Description
  - Format
  - File Contents
    - Soil Moisture Retrieval Data
    - Data Fields
    - Metadata Fields
  - File Naming Convention
  - File Size
  - Volume
  - Spatial Coverage
  - Spatial Resolution
  - Projection and Grid Description
    - EASE-Grid 2.0
  - Temporal Coverage
    - Temporal Coverage Gaps
      - Satellite and Processing Events
      - Forward Processing and Reprocessing
    - Latencies
  - Temporal Resolution
- Software and Tools
- Data Acquisition and Processing
  - Sensor or Instrument Description
  - Data Source
  - Theory of Measurements
  - Derivation Techniques and Algorithms
  - Processing Steps
  - Error Sources
  - Quality Assessment
    - Quality Overview
    - Data Flags
- References and Related Publications
- Contacts and Acknowledgments
- Document Information

Collapse All / Open All

**Detailed Data Description**

# Discovering SMAP Data at NSIDC

<http://nsidc.org>

NSIDC National Snow & Ice Data Center

DATA RESEARCH NEWS ABOUT

SEARCH Web pages

Data Set ID: SPL3SMP

## SMAP L3 Radiometer Global Daily 36 km EASE-Grid Soil Moisture, Version 3

This Level-3 (L3) soil moisture product provides a composite of daily estimates of global land surface conditions retrieved by the Soil Moisture Active Passive (SMAP) passive microwave radiometer. SMAP L-band soil moisture data are resampled to a global, cylindrical 36 km Equal-Area Scalable Earth Grid, Version 2.0 (EASE-Grid 2.0).

Version Summary: [See more](#)

Get Data  
Download  
Visualize  
Package

Geographic Coverage

Print version

Overview Citing These Data User Guide **Support**

Questions? Please contact:  
NSIDC User Services  
Phone: 1 303 492-6199  
Email: [nsidc@nsidc.org](mailto:nsidc@nsidc.org)

Find Data	Stay Current	Learn About Snow and Ice	Get Help
<a href="#">Search NSIDC Data</a>	<a href="#">Arctic Sea Ice News and Analysis</a>	<a href="#">Icelights: Answers to Your Questions</a>	<a href="#">Knowledge Base</a>
<a href="#">Reverb (NASA)</a>	<a href="#">Sea Ice Index (Passive microwave satellite data)</a>	<a href="#">Cryosphere Quick Facts</a>	<a href="#">Ask Us</a>
<a href="#">IceBridge Portal</a>	<a href="#">MASIE (Daily sea ice extent, multi-source)</a>	<a href="#">All About Glaciers</a>	<a href="#">Etc.</a>
<a href="#">Data Pool (Direct FTP for select data)</a>	<a href="#">Greenland Today</a>	<a href="#">All About Snow</a>	<a href="#">Use &amp; Copyright</a>
<a href="#">Data Collections List</a>	<a href="#">Newsroom</a>	<a href="#">All About Sea Ice</a>	<a href="#">Web Policy</a>
		<a href="#">Arctic Climatology - A Primer</a>	<a href="#">Jobs</a>

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# Tools that work with SMAP HDF5-formatted Data

<http://nsidc.org/data/smap/tools>

The native format of SMAP Data files is HDF5. NSIDC offers a tools page with a couple of tools for easy viewing of the HDF5 files: HDFView and Panoply.

For the SPL3SMP collection, Earthdata Search service options allow for the reformatting of the native HDF5 files to:

GeoTIFF, ASCII, NetCDF-3, NetCDF4-CF, KML, and HDF-EOS5

For a detailed table of what subsetting, reformatting, and reprojection services are available for SMAP collections, please see:

<https://support.nsidc.org/entries/97456598-What-data-subsetting-reformatting-and-reprojection-services-are-available-for-SMAP-data->

NASA Distributed Active Archive Center (DAAC) at NSIDC  
SMAP Data  
Soil Moisture Active Passive Data

Overview  
Data Sets  
SMAP Data  
Validation Data  
Data Versions  
Tools  
FAQs  
How Tos  
Data Announcements  
Published Research  
SMAP Data  
Validation Data  
Technical References

Tools

The following table lists the tools that work with SMAP HDF5-formatted data.

Tool	Description
<a href="#">HDFView</a>	Visual tool for browsing and editing HDF4 and HDF5 files.
<a href="#">HDF-EOS Tools and Information Center</a>	Provides example code for accessing and visualizing SMAP data in MATLAB, Python, IDL, and NCL.
<a href="#">Worldview</a>	NASA visualization tool for browsing full-resolution imagery and downloading the underlying data.
<a href="#">Earthdata Search</a>	NASA's newest search and order tool for subsetting, reprojecting, and reformatting data.
<a href="#">Reverb   ECHO</a>	NASA search and order tool for subsetting, reprojecting, and reformatting data. Note that Reverb has been replaced by a newer tool—Earthdata Search—and will soon be decommissioned.
<a href="#">EASE-Grid Data Web Site</a>	Provides tools and documentation for working with EASE-Grid data.
<a href="#">Panoply netCDF, HDF, and GRIB Data Viewer</a>	Cross-platform application that plots geo-gridded arrays from netCDF, HDF, and GRIB data sets.
<a href="#">NASA LARC Satellite Overpass Predictor</a>	An interactive tool that allows users to estimate when the SMAP satellite has passed, or will pass, over an area of the Earth. Users specify latitude and longitude or select a location on the map for which to calculate a 5-day sequence of satellite overpasses. All overpasses are returned for which the specified location falls within the 1000 km SMAP swath centered on the nadir track. Note: Predictions beyond 15 days should not be used as they become increasingly less accurate as a function of time. In general, predictions of up to five days provide a safe margin.  ABOUT THE ORBIT OVERPASS PREDICTOR ALGORITHM The prediction algorithm models the orbit based on the known position information from the latest two-line orbital elements (TLE) records obtained from the North American Aerospace Defense Command (NORAD). The TLE records contain the position sensed during the radar scan. Normally two records are created per day, but sometimes up to three are created. The model is factoring the earth's bulge and also the weight of the continents as there are more above the equator than below. The model does not factor for the positions of continents relative to the satellite nor air resistance due to the rotational motion of the satellite in the atmosphere.
<a href="#">SMAP Overflights Tool</a>	Tool that allows users to compute a <i>simulated</i> 8-day sequence of satellite overpasses at a user's point location (latitude and longitude). All overpasses are listed for which the point location falls within the 1000 km SMAP swath centered on the nadir track. For orbit characteristics, visit the <a href="#">JPL SMAP Specifications</a> Web page.

# Discovering SMAP Data at NSIDC

<http://nsidc.org>

Revisiting the Visualize button under Get Data, let's click Worldview and explore what this application has to offer.

The screenshot shows the NSIDC website interface for the SMAP L3 Radiometer data. The main heading is "SMAP L3 Radiometer Global Daily 36 km EASE-Grid Soil Moisture, Version 3". Below this, there is a description of the Level-3 (L3) soil moisture product. On the right side, there is a "Get Data" section with three buttons: "Download", "Visualize", and "Package". Below these buttons is a "Geographic Coverage" section with a world map. At the bottom of the page, there is a "Print version" button and a "Get Data: Visualize" tooltip. The tooltip text reads: "Worldview: This application allows you to interactively browse global satellite imagery within hours of it being acquired. You can also save it, share it, and download the underlying data." The main content area contains a table of metadata for the data set.

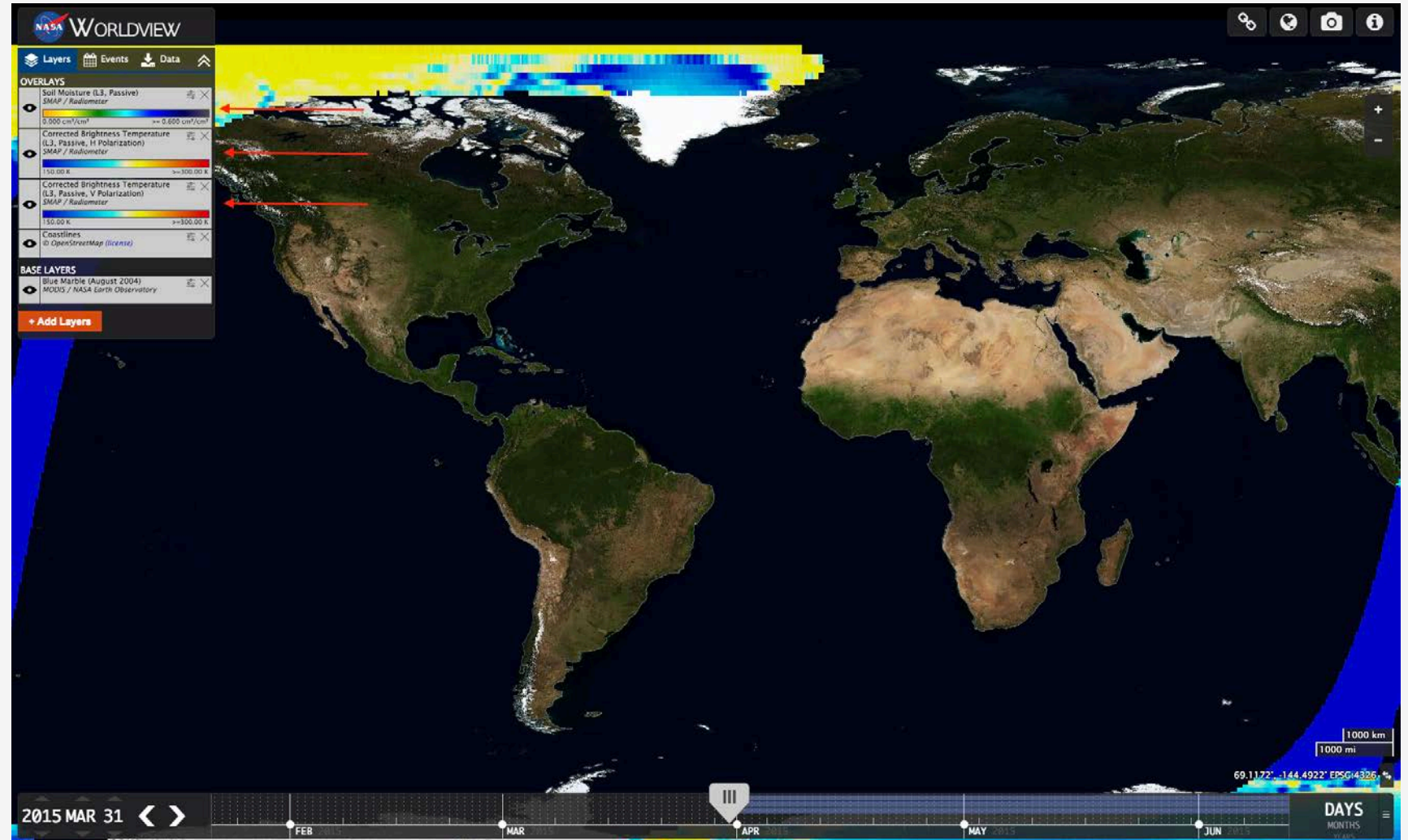
Field	Value
Spatial Coverage:	N: 85,044, ...
Spatial Resolution:	36 km x 36 km
Temporal Coverage:	31 March 2015 to present
Temporal Resolution:	1 day
Parameter(s):	Microwave > Brightness Temperature Soils > Soil Moisture/Water Content > Soil Moisture
Platform(s)	SMAP Observatory
Sensor(s):	SMAP L-Band Radiometer
Data Format(s):	HDF5
Version:	V3
Data Contributor(s):	O'Neill, P. E., S. Chan, E. G. Njoku, T. Jackson, and R. Bindlish.
Metadata XML:	<a href="#">View Metadata Record</a>

# Visualizing and Accessing SMAP Data from Worldview

Launching Worldview from the SPL3SMP product page at NSIDC, you'll notice a few of the data set's parameters are included in the Overlays section by default.

Layers can be repositioned, by dragging, to change the draw order

- The layer at the top of the list draws on top of the layers below.

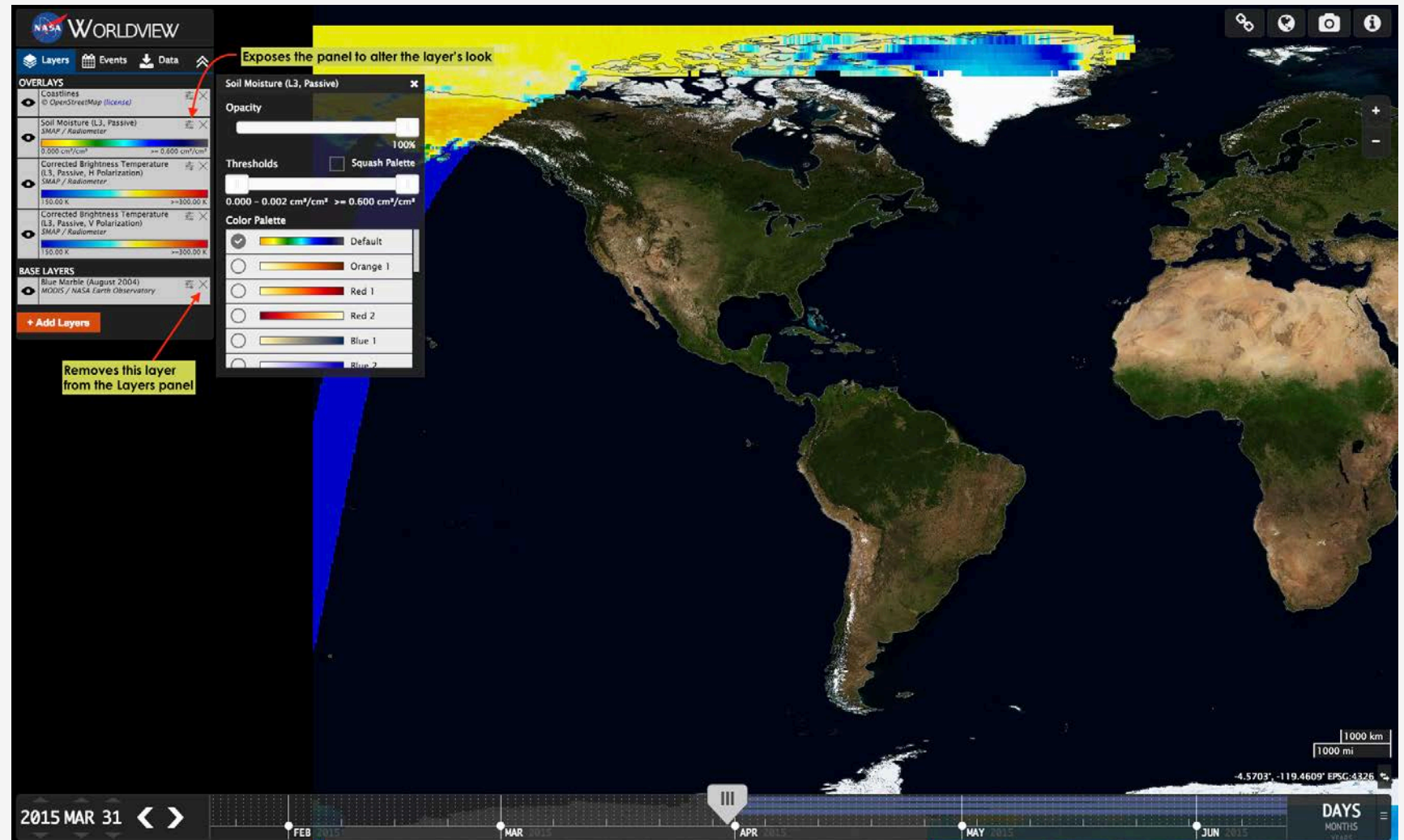


# Visualizing and accessing SMAP Data from Worldview

Here, I've repositioned the Coastlines layer above Soil Moisture – notice the outlines visible in the Arctic over the Soil Moisture data.

Also, clicking on the slider-bar symbol will open a dialogue to allow for changing the layer's opacity, thresholds and color palette.

Clicking the "X" symbol for a layer removes it from the Layers panel.



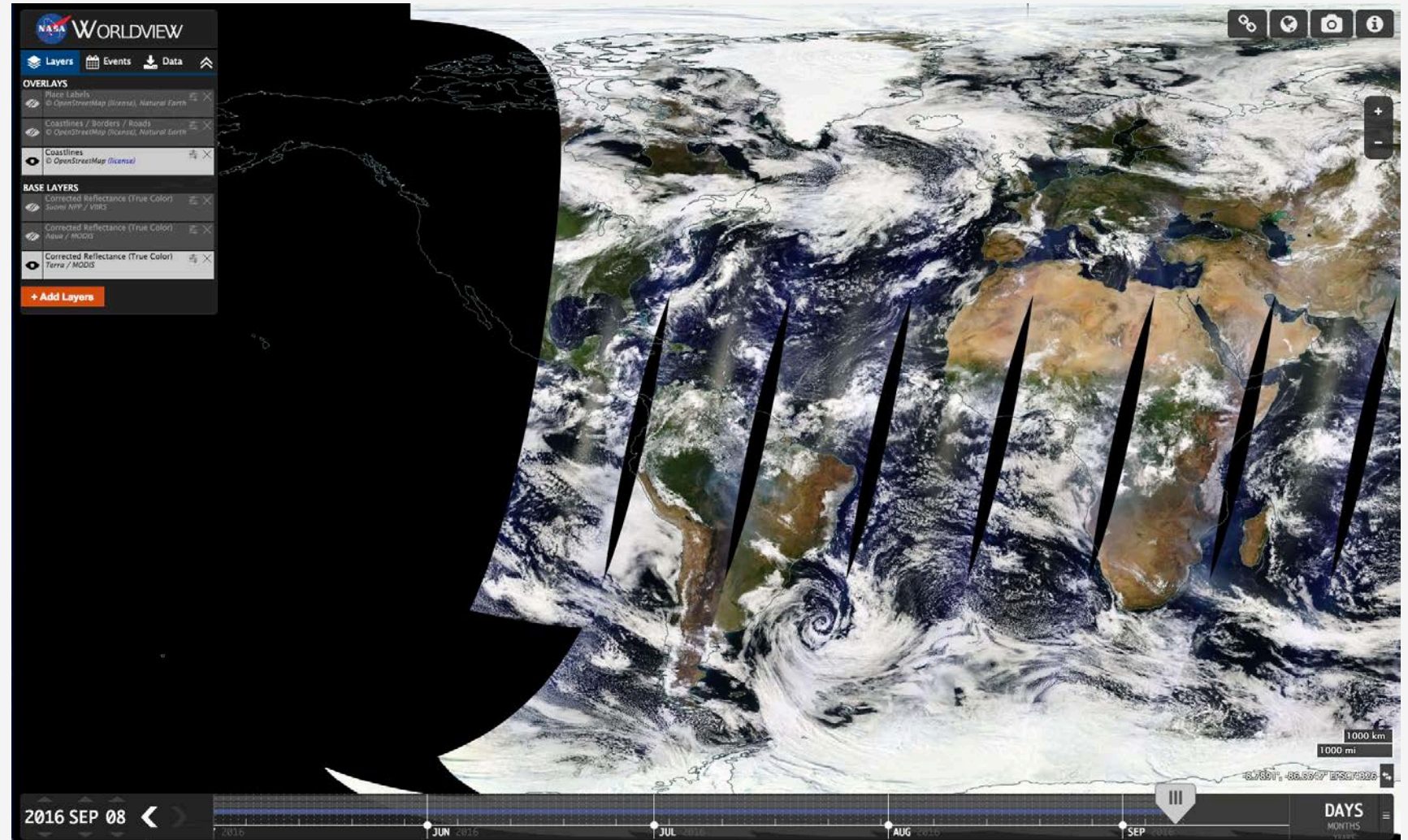


# Visualizing and Accessing SMAP Data from Worldview

<http://worldview.earthdata.nasa.gov>

If you were to enter the URL above in your browser, you would see the default Overlays and Base Layers are different from what opens at NSIDC's link to Worldview from the SMAP product page.

I'll go back to Worldview pre-loaded with SPL3SMP from the NSIDC site, and give you a tour of the interface.



# Exploring the Worldview Interface Further:

The image shows the NASA Worldview web application interface. The main display is a global map with various data overlays. On the left, there is a 'Layers' pane with 'OVERLAYS' and 'BASE LAYERS' sections. At the top right, there are icons for sharing, projection, snapshot, and information. At the bottom, there is a timeline for the year 2016, showing months from February to June. The interface is annotated with several callouts:

- Tabs for displaying current layers, current world events or downloading underlying data**: Points to the 'Layers', 'Events', and 'Data' tabs at the top left.
- Collapse the layer pane**: Points to the upward-pointing arrow icon in the top left.
- Turn overlay on or off**: Points to the eye icon next to a layer in the 'OVERLAYS' section.
- Copy a URL of this map to share**: Points to the link icon in the top right.
- Change the projection of the display**: Points to the globe icon in the top right.
- Take a snapshot of the interface**: Points to the camera icon in the top right.
- Information about Worldview**: Points to the 'i' icon in the top right.
- Zoom in or out - can also use your mouse's scroll wheel, double-click on the map, or shift+drag to zoom to an area.**: Points to the zoom in (+) and zoom out (-) icons on the right side of the map.
- Click to browse through other layers to add**: Points to the '+ Add Layers' button at the bottom of the 'BASE LAYERS' section.
- Change the month, day and year of the data displayed**: Points to the date selector '2016 MAY 24' and navigation arrows at the bottom left.
- Advance forward or back a day at a time**: Points to the left and right arrows at the bottom left.
- Blue line indicates the layer is on and available during this time range**: Points to a blue line on the timeline.
- Gray lines indicate the layers are off, but available during this time range**: Points to gray lines on the timeline.
- Slider control to change the date of the layer displayed**: Points to the vertical slider on the timeline.
- Collapse the timeline**: Points to the '|||' icon at the bottom right.
- Change the timeline's finest increment shown**: Points to the 'DAYS MONTHS YEARS' selector at the bottom right.

# Exploring Layer options:

Search ← Click and type here for a keyword search

Hazards And Disasters Science Disciplines

**All**  
 Aerosol Optical Depth  
 Areas of No Data (mask)  
 Blue Marble  
 Brightness Temperature  
 Carbon Monoxide  
 Chlorophyll a  
 ...

**Atmosphere**  
 Aerosol Optical Depth  
 Carbon Monoxide  
 Cloud Effective Radius  
 Cloud Fraction  
 Cloud Multi Layer Flag  
 Cloud Optical Thickness  
 ...

**Biosphere**  
 Fires and Thermal Anomalies  
 Soil Moisture  
 Forests, Mangrove

**Cryosphere**  
 Freeze / Thaw  
 Sea Ice  
 Sea Surface Temperature  
 Snow Cover  
 Snow Depth Over Ice  
 Snow Mass  
 ...

**Human Dimensions**  
 Cyclone Hazard  
 Dams  
 Drought Hazard  
 Earth at Night 2012  
 Population Density  
 Power Plants, Nuclear  
 ...

**Land Surface**  
 Blue Marble  
 Corrected Reflectance  
 Global Digital Elevation Map  
 Land Surface Reflectance  
 Land Surface Temperature  
 Fires and Thermal Anomalies

**Oceans**  
 Chlorophyll a  
 Sea Ice  
 Sea Surface Temperature  
 Snow Depth Over Ice  
 Wind Speed

**Spectral/Engineering**  
 Brightness Temperature  
 Sigma0  
 Faraday Rotation Angle

**Terrestrial Hydrosphere**  
 Flood Hazard  
 Freeze / Thaw  
 Sea Ice  
 Snow Cover  
 Snow Mass  
 Snow Water Equivalent  
 ...

**Other**  
 Areas of No Data (mask)  
 Global 250m Water Map  
 Global Digital Elevation Map  
 Latitude-Longitude Lines  
 Orbital Track  
 Reference Map

Click this category to expand and reveal SMAP data

Clicking the Add Layers button opens this dialogue where you can search by topic on the "Hazards And Disasters" tab or under the "Science Disciplines" tab where we are now. SMAP can be found under the Terrestrial Hydrosphere category.

You may also search by keywords at the top of this dialogue by clicking on the "Search" text.

2016 JUN 20 <> APR MAY JUN JUL AUG DAYS MONTHS

# SMAP Layer options:

**NASA WORLDVIEW**

Layers Events Data

**OVERLAYS**

- Soil Moisture (L3, Passive) SMAP / Radiometer
- Discrete Brightness Temperature (L3, Passive, V Polarization) SMAP / Radiometer
- Discrete Brightness Temperature (L3, Passive, H Polarization) SMAP / Radiometer
- Coastlines © OpenStreetMap (license)

**BASE LAYERS**

- Blue Marble (August 2004) MODIS / NASA Earth Observatory

+ Add Layers

Search

Categories / Terrestrial Hydrosphere

- Flood Hazard SEDAC
- Freeze / Thaw Aqua / AMSR-E, SMAP / Radar, DMS / SSMI
- Sea Ice Aqua / MODIS, Aqua / AMSR-E, GCOM-W1 / AMSR2, Terra / MODIS
- Snow Cover Aqua/MODIS, Terra/MODIS
- Snow Mass SMAP / Model Value-Added
- Snow Water Equivalent GCOM-W1 / AMSR2
- Soil Moisture SMAP / Radar, SMAP / Radiometer, SMAP / Model Value-Added
  - SMAP / Radar
    - Soil Moisture (L2, Passive, Single Channel Algorithm, H-pol)
    - Soil Moisture (L2, Passive, Single Channel Algorithm, V-pol)
  - SMAP / Radar/Radiometer
    - Soil Moisture (L2, Passive, Dual Channel Algorithm)
    - Soil Moisture (L3, Passive)
  - SMAP / Model Value-Add

**Orbital Tracks:**

- Ascending/Night
- Descending/Day

**Soil Moisture (L2, Passive, Single Channel Algorithm, H Polarization)**  
Temporal coverage: March 31, 2015 - present

The Soil Moisture Active Passive (SMAP) "Soil Moisture (L2, Passive, Single Channel Algorithm, H Polarization)" layer displays surface soil moisture in  $\text{cm}^3/\text{cm}^3$  derived from the Single Channel Algorithm H-Pol (SCA-H), one of four optional soil moisture algorithms, for the 6:00 a.m. descending half orbit passes of the SMAP radiometer. The SMAP radiometer measures natural thermal emission emanating from the soil surface. The variation in the intensity of this radiation

Click to reveal more details about the SMAP Radiometer collections

2016 JUN 20 < >

MAY 2016 JUN JUL AUG

DAYS MONTHS

1000 km  
1000 mi

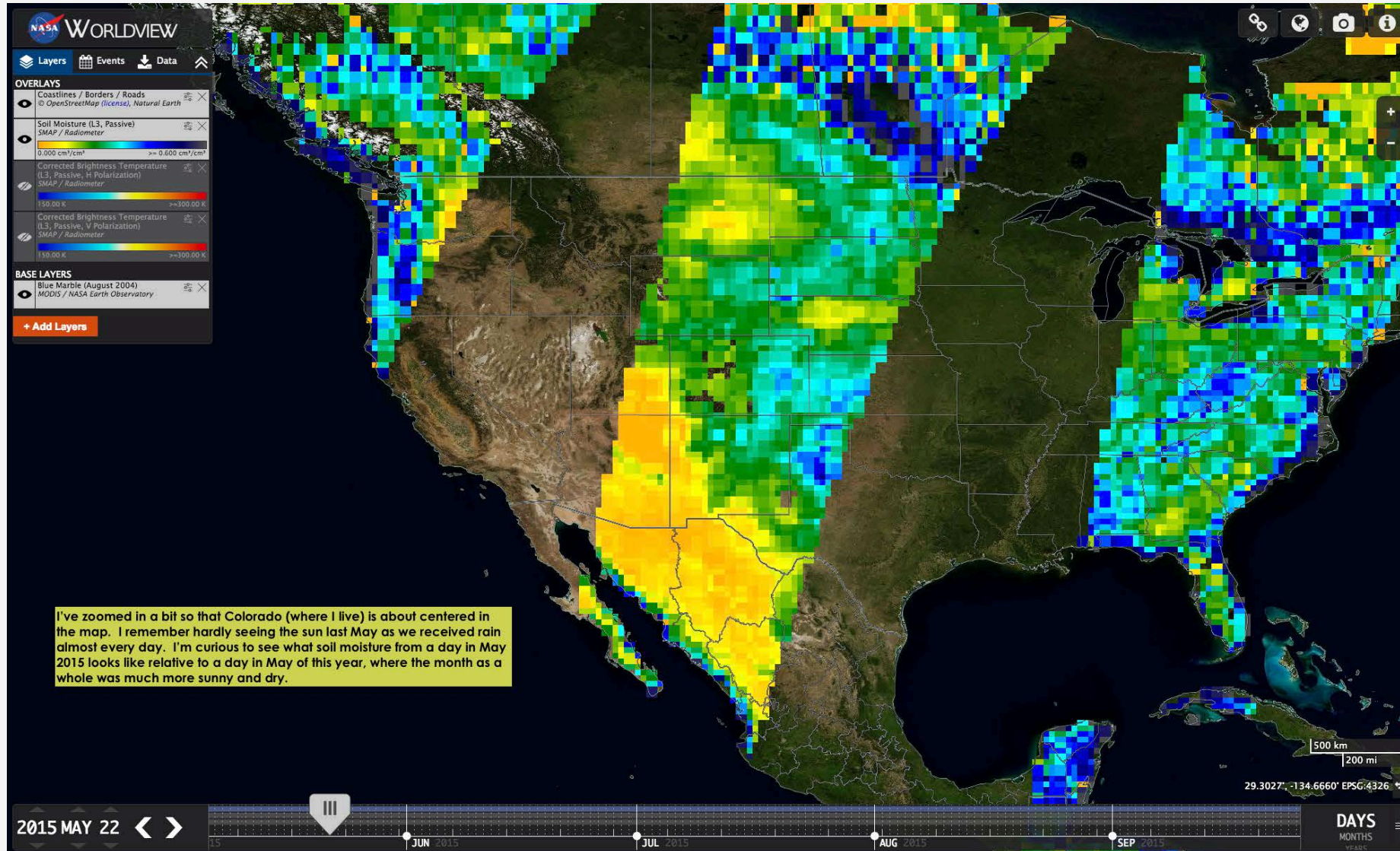
# Adding an overlay: Coastlines / Borders / Roads

The screenshot shows the NASA WorldView interface with a search panel open. The search panel is set to the 'Other' category, and the 'Coastlines / Borders / Roads' layer is selected and checked. A yellow callout box at the bottom of the search panel contains the following text:

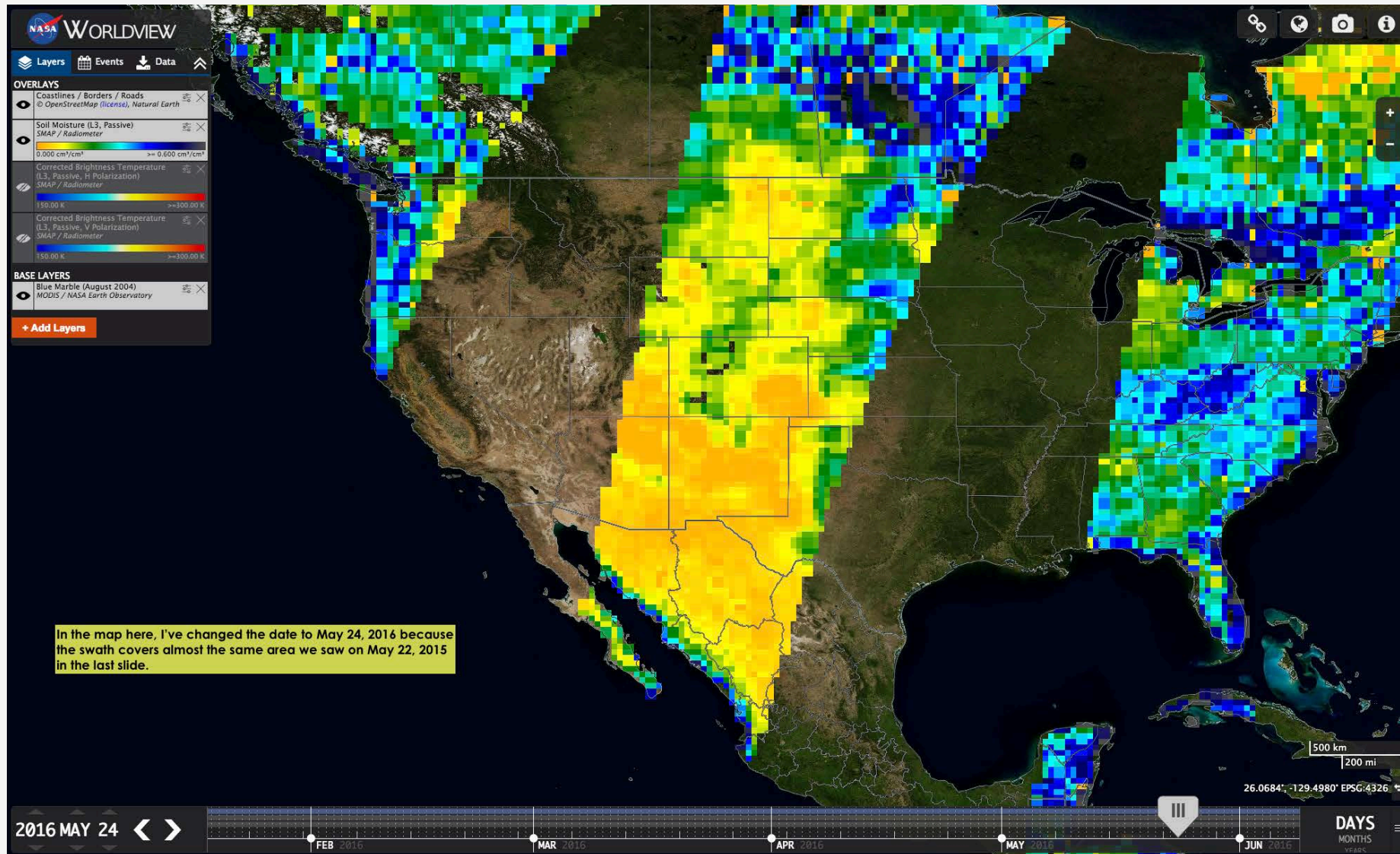
Here, I've clicked on the "Other" category from the "Science Disciplines" tab and changed the default "Coastlines" layer to be "Coastlines/Borders/Roads" to add more detail to the map.

The interface also shows a list of layers on the left, including 'Coastlines / Borders / Roads', 'Soil Moisture (L3, Passive)', 'Corrected Brightness Temperature (L3, Passive, H Polarization)', and 'Corrected Brightness Temperature (L3, Passive, V Polarization)'. The 'Reference Map' section includes options for 'OpenStreetMap.org', 'Coastlines / Borders / Roads', 'Place Labels', 'Coastlines', 'Land Mask', and 'Land / Water Map'. The 'Coastlines / Borders / Roads' layer is currently selected and checked. The map shows a satellite view of Africa with a color-coded overlay representing soil moisture or temperature. The date is 2016 JUN 20, and the time is 10:00 AM. The map includes a scale bar for 1000 km and 1000 mi, and a 'DAYS MONTHS' navigation control.

# A Quick Comparison of Soil Moisture Across Time...

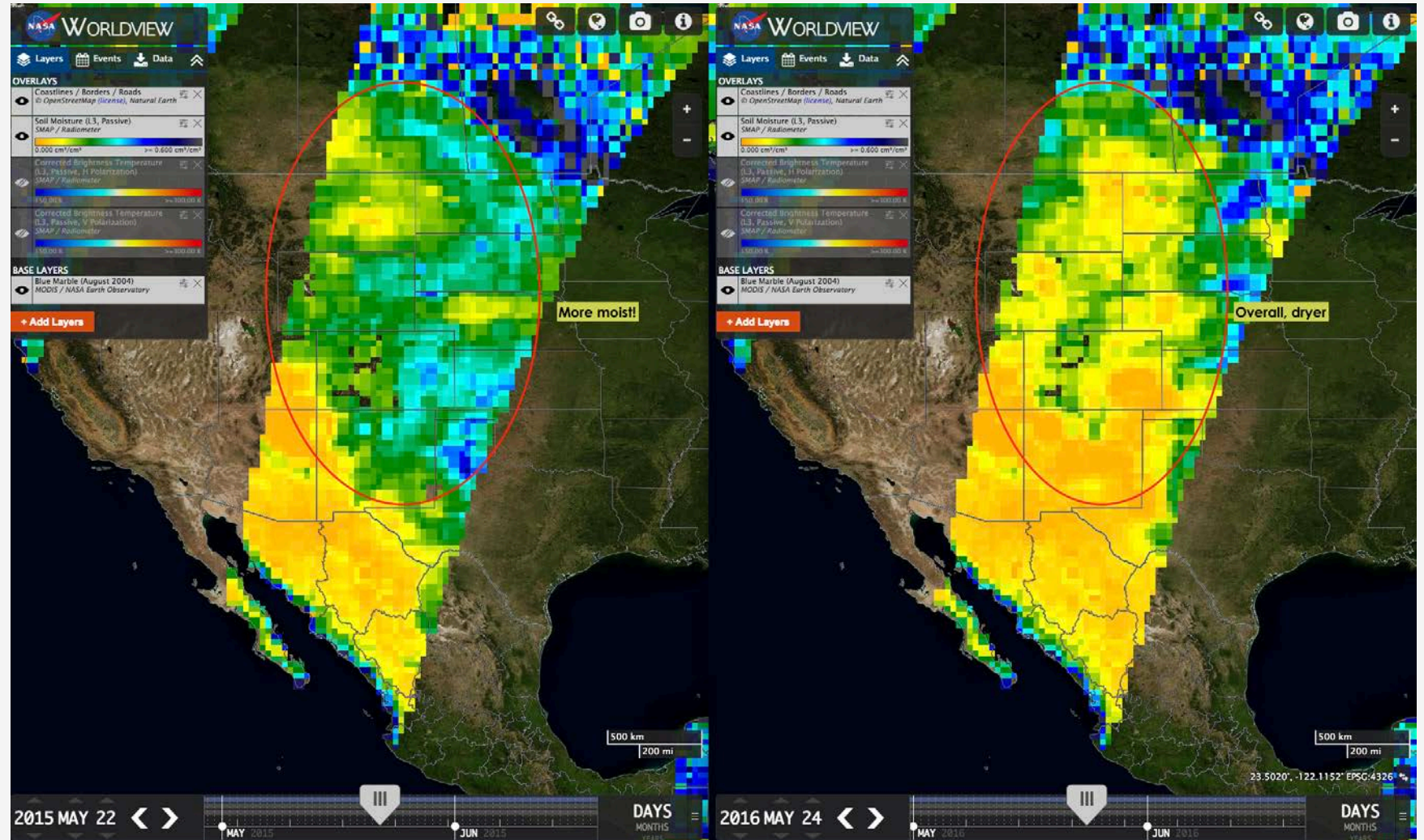


# A Quick Comparison of Soil Moisture Across Time...



# A Quick Comparison of Soil Moisture Across Time...

I can use the “Share this Map” option to copy links for the two days that I’d like to compare and view them in browser windows placed side by side for a quick visualization of the soil moisture differences between the two dates.





# Downloading from Worldview:

The screenshot displays the NASA Worldview web application. On the left, a sidebar contains the 'Data' tab, which is highlighted with a red arrow and a yellow callout box that reads 'Switch to the Data tab'. Below the 'Data' tab, a list of layers is shown, with 'SMAP L3 RADIOMETER GLOBAL DAILY 36 KM EASE-GRID SOIL MOISTURE' selected. A 'Download Selected Data' button is visible at the bottom of the sidebar. The main map area shows a color-coded overlay of soil moisture data over North America, with a 'Select data' dialog box overlaid on the map. This dialog box has a checked checkbox next to the date '2015-05-22: 00:00-23:59 UTC' and a yellow callout box that says 'Tick this box to select this day's data'. The bottom of the interface features a timeline for the month of May 2015, with a date selector set to '2015 MAY 22'. A scale bar in the bottom right corner indicates 500 km and 200 mi.

# Downloading from Worldview:

The screenshot shows the NASA Worldview interface with a map of North America displaying soil moisture data. The data is represented by a color-coded grid where blue indicates low moisture and yellow/green indicates higher moisture. A 'Select data' dialog box is open over the central US, showing a date selection of '2016-05-24: 00:00-23:59 UTC' with a checked checkbox. In the top-left 'Layers' panel, the 'SMAP L3 RADIOMETER GLOBAL DAILY 36 KM EASE-GRID SOIL MOISTURE' layer is selected, and the 'Data' section shows '2 SELECTED'. A 'Download Selected Data' button is visible below the layers panel. A yellow text box with a red arrow pointing to the 'Data' section contains the instruction: 'Advance to the next day of Soil Moisture data and tick the box - notice that the Data panel indicates "2 SELECTED"'. The bottom of the interface features a timeline for the month of May 2016, with the date '2016 MAY 24' highlighted. A scale bar at the bottom right shows 500 km and 200 mi, and the coordinates 42.9434° -131.5020° EPSG:4326 are displayed.

# Downloading from Worldview:

The screenshot shows the NASA Worldview interface with a global soil moisture map. The left sidebar contains the following information:

- Layers:** SMAP L3 RADIOMETER GLOBAL DAILY 36 KM EASE-GRID SOIL MOISTURE (2 SELECTED)
- Soil Moisture (L3, Passive):** SMAP / Radiometer
- NOT AVAILABLE FOR DOWNLOAD:** Blue Marble (August 2004), MODIS / NASA Earth Observatory, Coastlines / Borders / Roads
- Download Selected Data** (button)

The 'Download Links' dialog box is open, displaying the following content:

**Download Links**

**SMAP L3 Radiometer Global Daily 36 km EASE-Grid Soil Moisture**

Selected Data

Date	File List
2015-05-22: 00:00-23:59 UTC	<ul style="list-style-type: none"><li>SMAP_L3_SM_P_20150522_R13080_001.h5</li><li>SMAP_L3_SM_P_20150522_R13080_001.qa</li><li>SMAP_L3_SM_P_20150522_R13080_001.h5.iso.xml</li></ul>
2016-05-24: 00:00-23:59 UTC	<ul style="list-style-type: none"><li>SMAP_L3_SM_P_20160524_R13080_001.h5</li><li>SMAP_L3_SM_P_20160524_R13080_001.qa</li><li>SMAP_L3_SM_P_20160524_R13080_001.h5.iso.xml</li></ul>

**Bulk Download**

- List of Links: for wget or download managers that accept a list of URLs
- List of cURL Commands: can be copied and pasted to a terminal window to download using cURL

At the bottom of the interface, a timeline shows the date **2016 MAY 24** selected, with a 'DAYS' control set to 1.

Click the "Download Selected Data" button and this dialogue pops up. Here you can remove files from your order and explore your download options.

Clicking on individual file names (in blue) in the top part of the box will download just that file to your machine. Depending on your browser, you may need to hover and right-click on the .qa and .xml files and choose the "Save link as" option to save them to your machine rather than have them just open in a separate window or tab.

Clicking in the bottom of the box on either "List of Links" or "List of cURL Commands" will open a new tab or window in your browser with instructions on how to use these options (see next slide).

# Downloading from Worldview:

## Download Links

```
ftp://n5e101u.ecs.nsidc.org/DP4/SMAP/SPL3SMP.003/2015.05.22/SMAP_L3_SM_P_20150522_R13080_001.h5  
ftp://n5e101u.ecs.nsidc.org/DP4/SMAP/SPL3SMP.003/2016.05.24/SMAP_L3_SM_P_20160524_R13080_001.h5
```

## Using [wget](#) to Bulk Download Your Data

- 1) Copy the links above and paste into a text document. Save it as "links.txt"
- 2) Execute the following command to download all of your requested files:

```
wget --input-file=links.txt
```

## Using [Free Download Manager](#) for Windows to Bulk Download Your Data

- 1) Copy the Download Links above to your clipboard
- 2) In Free Download Manager, go to File | Import | Import list of URLs from clipboard

## Download Commands

```
curl --remote-name ftp://n5e101u.ecs.nsidc.org/DP4/SMAP/SPL3SMP.003/2015.05.22/SMAP_L3_SM_P_20150522_R13080_001.h5  
curl --remote-name ftp://n5e101u.ecs.nsidc.org/DP4/SMAP/SPL3SMP.003/2016.05.24/SMAP_L3_SM_P_20160524_R13080_001.h5
```

## Using [curl](#) to Bulk Download Your Data

### Mac OS X / Linux

- 1) Copy the Download Commands above and paste into a text document. Save it as "download.sh"
- 2) Execute the following command to download all of your requested files:

```
sh ./download.sh
```

### Windows

- 1) Copy the Download Commands above and paste into a text document. Save it as "download.bat"
- 2) Execute the following command to download all of your requested files:

```
download.bat
```

# Search and Access SMAP Data from Earthdata Search

Launching Earthdata Search from the SPL3SMP product page at NSIDC, you'll see that the interface is pre-populated with the data set's short name by default and the collection is shown in the Collection's pane.

The screenshot shows the Earthdata Search interface. The search bar contains 'SPL3SMP'. The search results pane shows '1 Matching Collections' with the following details:

- SMAP L3 Radiometer Global Daily 36 km EASE-Grid Soil Moisture V003
- SPL3SMP v003 - NSIDC
- 2015-03-31 ongoing | 520 Granules

A 'Get Data: Package' pop-up window is visible in the bottom left corner, containing the following text:

Reverb: NASA search and order tool for subsetting, reprojecting, and reformatting data.

**NOTE: Reverb will be decommissioned in the coming months and replaced with Earthdata Search. All links to Reverb will be removed at that time.**

Subscription Service: Subscribe to have new data automatically sent when the data become available.

**Earthdata Search:** NASA's newest search and order tool for subsetting, reprojecting, and reformatting data.

# Exploring the Earthdata Search Interface:

The screenshot displays the Earthdata Search interface with several key components highlighted by yellow callouts:

- Keyword search and filter options:** Located at the top, it includes the search bar (containing 'SPL3SMP'), 'Temporal' and 'Spatial' filter dropdowns, and a 'Clear Filters' button.
- Click to submit help request or feedback:** A button labeled 'Feedback' with a speech bubble icon.
- Earthdata Login:** A button for user authentication.
- Faceted filter pane:** A vertical sidebar on the left containing categories like 'Features', 'Map Imagery', 'Near Real Time', 'Subsetting Services', 'Keywords', 'Platforms', 'Instruments', and 'Organizations'.
- Collections pane:** A central panel showing '1 Matching Collections' with details for 'SMAP L3 Radiometer Global Daily 36 km EASE-Grid Soil Moisture V003', including a 'Learn More' link and a 'Report a metadata problem' button.
- Add this collection to a project:** A callout pointing to a plus sign icon in the collection details pane.
- Map's base layer options:** A callout pointing to the map layer selection icons on the right side of the map.
- Spatial filter buttons - search by point, rectangle or polygon:** A callout pointing to the spatial search tool icons on the right side of the map.
- Edit or delete spatial filter bounds:** A callout pointing to the edit/delete icons for the spatial filter.
- Zoom in, out or to a "home" extents:** A callout pointing to the zoom controls on the right side of the map.
- Change projection to North Polar Stereographic, WGS84, or South Polar Stereographic:** A callout pointing to the projection selection icons on the right side of the map.
- Click to login to Earthdata:** A callout pointing to the 'Earthdata Login' button.
- Display temporal and spatial filters once set:** A callout pointing to the 'Temporal' and 'Spatial' filter dropdowns.

The main map area shows a satellite-style view of the Earth with various geographical labels and a scale bar at the bottom right.

# Exploring the Earthdata Search Interface – after logging in:

If you don't already have an Earthdata Login, you will have to register for one before ordering data.

Once you've logged in, you'll see that the interface looks slightly different. You can now save projects, view other projects you've saved, and look through your order history.

The screenshot displays the Earthdata Search interface after a user has logged in. The top navigation bar includes the NASA Earthdata Search logo, a search bar containing 'SPL3SMP', and filters for 'Temporal' and 'Spatial'. A 'Click to save this setup as a project' button is highlighted with a red arrow and a callout box. The left sidebar shows a 'Browse Collections' section with various categories like 'Features', 'Keywords', and 'Platforms'. The main content area shows '1 Matching Collections' and a 'Recent and Featured' section. A collection titled 'SMAP L3 Radiometer Global Daily 36 km EASE-Grid Soil Moisture V003' is displayed, with a red arrow pointing to a minus sign icon in the collection details, accompanied by a callout box stating 'Clicking the - symbol will remove this collection from your project.' Another red arrow points to the 'Click to save this setup as a project' button, and a third red arrow points to a user profile menu in the top right corner, with a callout box stating 'Review contact information, recent orders, saved projects or Logout of your account'. The interface also includes a map of the world and a footer with version information and NASA links.

# Search for, and Download, SMAP Data:

Now I'm going to walk through how you can use Earthdata Search to find, customize, and download the files we visualized and downloaded in Worldview.

I'm going to set temporal and spatial search filters and add the SPL3SMP to a project. From there I'll go through customizing the data prior to download.

The screenshot displays the Earthdata Search web application. At the top, the search bar contains 'SPL3SMP'. The interface is divided into several sections:

- Left Panel:** A sidebar with 'Browse Collections' and various filters categorized under 'Features', 'Map Imagery', 'Near Real Time', 'Subsetting Services', 'Keywords', 'Platforms', 'Instruments', and 'Organizations'.
- Search Results:** A central panel titled '1 Matching Collections' showing a single result: 'SMAP L3 Radiometer Global Daily 36 km EASE-Grid Soil Moisture V003'. Below the title, it lists 'SPL3SMP v003 - NSIDC' and '2015-03-31 ongoing | 520 Granules'. A 'No image available' placeholder is shown on the left of the result card.
- Map:** A large satellite-style map of the Americas and surrounding regions, with a dark blue overlay indicating the search area. Labels for 'Canada', 'United States of America', 'Mexico', and various bodies of water are visible.
- Footer:** A dark blue footer containing version information 'v 1.26.3', NASA Official: Andrew Mitchell, FOIA, NASA Privacy Policy, USA.gov, and Earthdata Access: A Section 508 accessible alternative.



# Set Temporal Search Filter:

I'm using the "Recurring?" option to limit the granules (files) returned to the dates between May 22 and May 25, 2015 and 2016.

The screenshot displays the Earthdata Search interface. The search query is 'SPL3SMP'. A temporal filter is applied, showing a start date of '05-22 00:00:00' and an end date of '05-25 23:59:59'. The 'Recurring?' checkbox is checked, and the 'Year Range' is set to '2015 - 2016'. The search results show '1 Matching Collection' for 'SMAP L3 Moisture' with '520 Granules'. A map of the United States and surrounding regions is visible on the right side of the interface.

# Set Spatial Search Filter:

Notice the granule count has dropped from 520 to 8 granules.

Now I'll set my spatial search filter over Colorado, using the rectangle option.

The screenshot displays the NASA Earthdata Search interface. At the top, the search bar contains 'SPL3SMP'. Below the search bar, there are filters for 'Temporal', 'Rectangle', and 'Clear Filters'. The left sidebar shows 'Browse Collections' with various categories like 'Features', 'Map Imagery', 'Near Real Time', 'Subsetting Services', 'Keywords', 'Platforms', 'Instruments', and 'Organizations'. The main content area shows '1 Matching Collections' with a list of results. The first result is 'SMAP L3 Radiometer Global Daily 36 km EASE-Grid Soil Moisture V003' with a granule count of '8 Granules'. A red arrow points to the granule count. The right side of the interface shows a map of North America with a red rectangle drawn over Colorado. A tooltip above the rectangle says 'Click and drag to draw rectangle. (45.07031, -111.09375)'. A yellow callout box with a red arrow points to the temporal search details, which show 'Start 05-22 00:00:00 Stop 05-25 23:59:59 Range 2015 - 2016'. The bottom of the interface shows the version 'v 1.26.3' and NASA contact information.

# Add Collection to a Project:

With the spatial search set, the coordinates are displayed along with the details of my temporal search criteria.

I'm going to add my collection to the current project and view it. This is optional – you don't have to use the project feature to order data.

The screenshot displays the Earthdata Search interface. At the top, the search bar contains 'SPL3SMP' and filters for 'Temporal' and 'Spatial' are active. The left sidebar shows 'Browse Collections' with various categories like Features, Map Imagery, and Keywords. The main panel shows '1 Matching Collections' with details for 'SMAP L3 Radiometer Global Daily 36 km EASE-Grid Soil Moisture V003'. A red arrow points to a '+' icon in the collection details. On the right, a map of North America is shown with a red rectangle highlighting a search area. A text box above the map states 'Now my spatial search coordinates are displayed as well' with an arrow pointing to the map. A sidebar on the right shows the search coordinates: Southwest Point (36.984375, -109.0546875) and Northeast Point (40.9921875, -102.08375). The bottom of the interface includes version information and NASA contact details.

# Expand to Reveal the Granule List:

When I click on the text that says “8 Granules” the pane changes to a new view displaying all eight granules.

The screenshot displays the Earthdata Search interface. At the top, there is a search bar containing 'SPL3SMP' and navigation options for Temporal and Spatial filters. The main map shows the Arctic region with a red rectangle indicating a search area. The sidebar on the left shows 'Project Collections' with a 'Retrieve Project Data' button. Below this, a collection is listed: 'SMAP L3 Radiometer Global Daily 36 km EASE-Grid Soil Moisture V003' with a status of '2015-03-31 ongoing | 8 Granules'. Four red arrows point to icons: a magnifying glass (labeled 'View collection details'), a download icon (labeled 'Download all granules'), a document icon (labeled 'Granule filters - like search by a specific granule id and other criteria'), and a minus sign (labeled 'Remove collection from the current project'). The bottom of the interface features a timeline for the month of May 2016.

# Granules Listed:

Here I can click the download icon to download individual files or the X symbol to delete a file from the list. I'm going to do the latter to leave just the two files I'm interested in listed.

Notice that clicking on a granule name displays the extents of the file on the map.

The screenshot shows the Earthdata Search interface for the collection 'SMAP L3 Radiometer Global Daily 36 km EASE-Grid Soil Moisture V003'. The interface includes a search bar with 'SPL3SMP', filters for Temporal and Spatial, and a 'Clear Filters' button. A list of 8 granules is displayed, each with a name, date range, and icons for information and download. A red rectangle highlights the first granule in the list, with a red arrow pointing to its 'Remove from list' icon (an X) and another red arrow pointing to its 'Download individual file' icon (a download symbol). The map on the right shows the United States with a red rectangle indicating the spatial extent of the selected granule. The map includes labels for various geographical features and a color scale for soil moisture. The bottom of the interface shows a monthly timeline for the year 2016.

# Granules Culled and Ready to Customize and Order:

The screenshot displays the NASA Earthdata Search interface. At the top, the search bar contains 'SPL3SMP'. Below the search bar, there are filters for 'Temporal' and 'Spatial', and a 'Clear Filters' button. The main content area shows search results for 'SMAP L3 Radiometer Global Daily 36 km EASE-Grid Soil Moisture V003'. A yellow callout box with a red arrow points to the 'Retrieve Collection Data' button, with the text 'Click to download all listed granules'. The results list shows two granules:

- SMAP\_L3\_SM\_P\_20160524\_R13080\_001.h5 (2016-05-24T00:00:00Z to 2016-05-24T23:59:59Z)
- SMAP\_L3\_SM\_P\_20150522\_R13080\_001.h5 (2015-05-22T00:00:00Z to 2015-05-22T23:59:59Z)

The interface also features a world map showing the selected granule's location, a timeline for the month of May 2016, and a color scale for soil moisture (150.00 - 150.59 K to >= 300.00 K). The bottom of the interface includes the version number 'v 1.26.3', NASA Official information, and a link to the Earthdata Access: A Section 508 accessible alternative.

# Download Options:

**Data Access**  
Review and select service options for your data prior to download

1 SMAP L3 Radiometer Global Daily 36 km EASE-Grid Soil Moisture V003

Review & Select Service Options

Review

2 Granules

Granule List

Expand List

Service Options

Select Data Access Method:  Download  FTP order w/QA  SPL3SMP3 ESI Service

Add access method Access these granules again with different options

Submit

Choosing the "Download" option and clicking the "Submit" button will return a choice of FTP links which, when clicked, download the files to your machine, or a download script that can be run to automatically download the files to your computer.

**Success!**  
Your request has been processed. See below for information on accessing your data.

The following collections are available for immediate download

Click the "View Download Links" button to view a page containing links to your data. You may bookmark this page for later access. A browser download manager plugin such as Firefox's [DownThemAll!](#) can assist you in managing a large number of download links.

- SMAP L3 Radiometer Global Daily 36 km EASE-Grid Soil Moisture V003
  - View Download Links
  - Download Access Script

Next Steps

- Back to Earthdata Search Results
- Start a New Earthdata Search Session

**Data Access**  
Review and select service options for your data prior to download

1 SMAP L3 Radiometer Global Daily 36 km EASE-Grid Soil Moisture V003

Review & Select Service Options

Review

2 Granules

Granule List

Expand List

Service Options

Select Data Access Method:  Download  FTP order w/QA  SPL3SMP3 ESI Service

Media Options

Media Type: FTP Pull

Media Format: File

Check here for Ancillary data options

Include associated Quality Assurance file in order?

Add access method Access these granules again with different options

Continue

Choosing the "FTP order w/QA" option lets you choose whether the files are "pushed" to you, or you "pull" the files from our server using a link that will be emailed to you when the order has completed.

**Success!**  
Your request has been processed. See below for information on accessing your data.

The following collections are being processed

When the data becomes available, an email containing download links will be sent to the address you provided.

- SMAP L3 Radiometer Global Daily 36 km EASE-Grid Soil Moisture V003 Creating

Next Steps

- Back to Earthdata Search Results
- Start a New Earthdata Search Session

**Data Access**  
Review and select service options for your data prior to download

1 SMAP L3 Radiometer Global Daily 36 km EASE-Grid Soil Moisture V003

Review & Select Service Options

Review

2 Granules

Granule List

Expand List

Service Options

Select Data Access Method:  Download  FTP order w/QA  SPL3SMP3 ESI Service

Email Address:   
A valid email address is required.

Include Metadata and Processing History

Reformat Output (Optional)

Output File Format: No Reformatting

Spatial Subsetting (Optional)

Enter bounding box

Projection Options

Re-projection Options: No Change

Band Subsetting (Optional)

Continue

Choosing the service option allows for customization: reformatting, spatial subsetting, reprojecting and parameter subsetting.

# Customizing my Download:

**Service Options**

Select Data Access Method:  Download  FTP order w/QA  SPL3SMP.3 ESI Service

Email Address

Include Metadata and Processing History

**Reformat Output (Optional)**

Output File Format  ←

**Spatial Subsetting (Optional)**

←  Enter bounding box

North

West

East

South

**Projection Options**

Re-projection Options  ←

**Band Subsetting (Optional)**

Choose Bands

- ✓ SPL3SMP
  - ✓ Soil\_Moisture\_Retrieval\_Data
    - ✓ albedo
    - ✓ boresight\_incidence
    - ✓ EASE\_column\_index
    - ✓ EASE\_row\_index
    - ✓ freeze\_thaw\_fraction
  - ✓ landcover\_class
    - ✓ Bands[1]
    - ✓ Bands[2]
    - ✓ Bands[3]
  - ✓ landcover\_class\_fraction
    - ✓ Bands[1]
    - ✓ Bands[2]

Click here to deselect all options. Next, I'll choose just the parameters I want

Spatial bounds populate with the coordinates used in your spatial search criteria



# Customizing my Download:

**Band Subsetting (Optional)**

Choose Bands

- SPL3SMP
  - Soil\_Moisture\_Retrieval\_Data
    - albedo
    - boresight\_incidence
    - EASE\_column\_index
    - EASE\_row\_index
    - freeze\_thaw\_fraction
    - landcover\_class
      - Bands[1]
      - Bands[2]
      - Bands[3]
    - landcover\_class\_fraction
      - Bands[1]
      - Bands[2]
      - Bands[3]
    - latitude
    - latitude\_centroid
    - longitude
    - longitude\_centroid
    - radar\_water\_body\_fraction
    - retrieval\_qual\_flag
    - roughness\_coefficient
    - soil\_moisture
    - soil\_moisture\_error
    - static\_water\_body\_fraction
    - surface\_flag
    - surface\_temperature
    - tb\_3\_corrected
    - tb\_4\_corrected
    - tb\_h\_corrected
    - tb\_qual\_flag\_3
    - tb\_qual\_flag\_4
    - tb\_qual\_flag\_h
    - tb\_qual\_flag\_v
    - tb\_time\_seconds
    - tb\_time\_utc
    - tb\_v\_corrected
    - vegetation\_opacity
    - vegetation\_water\_content

[Add access method](#) [Access these granules again with different options](#)

[Continue](#)

# Submitting my SMAP Request:

The screenshot shows the 'Data Access' page on the Earthdata Search website. The page has a dark blue header with the NASA Earthdata Search logo and a 'Feedback' link. Below the header, there is a 'Back to Search Session' link. The main content area is titled 'Data Access' and includes a sub-header 'Review and select service options for your data prior to download'. The process is divided into two steps:

- 1 SMAP L3 Radiometer Global Daily 36 km EASE-Grid Soil Moisture V003**
- 2 Contact Information & Submit**

The second step, 'Contact Information & Submit', contains the following details:

- Amy FitzGerrell
- Organization:** NSIDC
- Country:** United States
- Affiliation:** EDUCATION
- Study Area:** Cryospheric Studies
- User Type:** Data Provider Internal User

Below the details is a button labeled 'Edit Profile in Earthdata Login'. At the bottom right of the form area are two buttons: 'Back' and 'Submit'. A red arrow points to the 'Submit' button.

At the bottom of the page, there is a footer with the text: 'v 1.26.3 • NASA Official: Andrew Mitchell • FOIA • NASA Privacy Policy • USA.gov' and 'Earthdata Access: A Section 508 accessible alternative'.

# Retrieving my SMAP Output:

I can click the html link to view request details (which I'll go through next) or I can click the zip file to download everything to my machine at once.

The screenshot shows the Earthdata Search interface with a 'Success!' message. The main content area is a white box with a green border. It contains the following text:

**Success!**  
Your request has been processed. See below for information on accessing your data.

**The following collections are being processed**  
When the data becomes available, an email containing download links will be sent to the address you provided.

- SMAP L3 Radiometer Global Daily 36 km EASE-Grid Soil Moisture V003 **Complete**

Your request is complete and can be downloaded using the following urls:  
<http://n5ell01u.ecs.nsidc.org/ops/esir/5000000009276.html>  
<http://n5ell01u.ecs.nsidc.org/ops/esir/5000000009276.zip>

Annotations on the screenshot include a yellow box with the text 'Request status - when complete, URLs are presented' and a red arrow pointing to the 'Complete' status. Another red arrow points from the same yellow box to the HTML download link.

**Next Steps**

- [Back to Earthdata Search Results](#)
- [Start a New Earthdata Search Session](#)

At the bottom of the page, there is a footer with the text: 'v 1.26.3 - NASA Official: Andrew Mitchell - FOIA - NASA Privacy Policy - USA.gov' and 'Earthdata Access: A Section 508 accessible alternative'.

# Retrieving my SMAP Output:

Notice that when you choose to reformat output to GeoTIFF, you will receive one tif per band selected for each granule in your request.

I'll download the soil moisture tif images.

**Output files for request id: 5000000009276**

**Click on the following link for a Request Summary:**

[requestSummary.txt](#)

**Retrieve list of files as a text listing (no html):**

[5000000009276.txt](#)

**Download all files in a single Zip file:**

[5000000009276.zip](#)

**Click on the following links for generated output files:**

**For Input Granule: 79189537**

[SMAP\\_L3\\_SM\\_P\\_20150522\\_R13080\\_001\\_soil\\_moisture\\_3a69a061.tif](#) (<1 MB, SCIENCE, image/tiff)

[SMAP\\_L3\\_SM\\_P\\_20150522\\_R13080\\_001\\_vegetation\\_water\\_content\\_3a69a061.tif](#) (<1 MB, SCIENCE, image/tiff)

**For Input Granule: 80748296**

[SMAP\\_L3\\_SM\\_P\\_20160524\\_R13080\\_001\\_soil\\_moisture\\_d036ee4.tif](#) (<1 MB, SCIENCE, image/tiff)

[SMAP\\_L3\\_SM\\_P\\_20160524\\_R13080\\_001\\_vegetation\\_water\\_content\\_d036ee4.tif](#) (<1 MB, SCIENCE, image/tiff)

Note: Data transfer tools like wget or cURL can be used to retrieve all the data with one command using the above text listing as input. Or, simply paste any of the above output file URLs into your browser's location bar to download a file.

In a UNIX-like environment, use the following commands to download data to the current working directory:

Using wget

```
> wget -i <url text file>
```

Using cURL

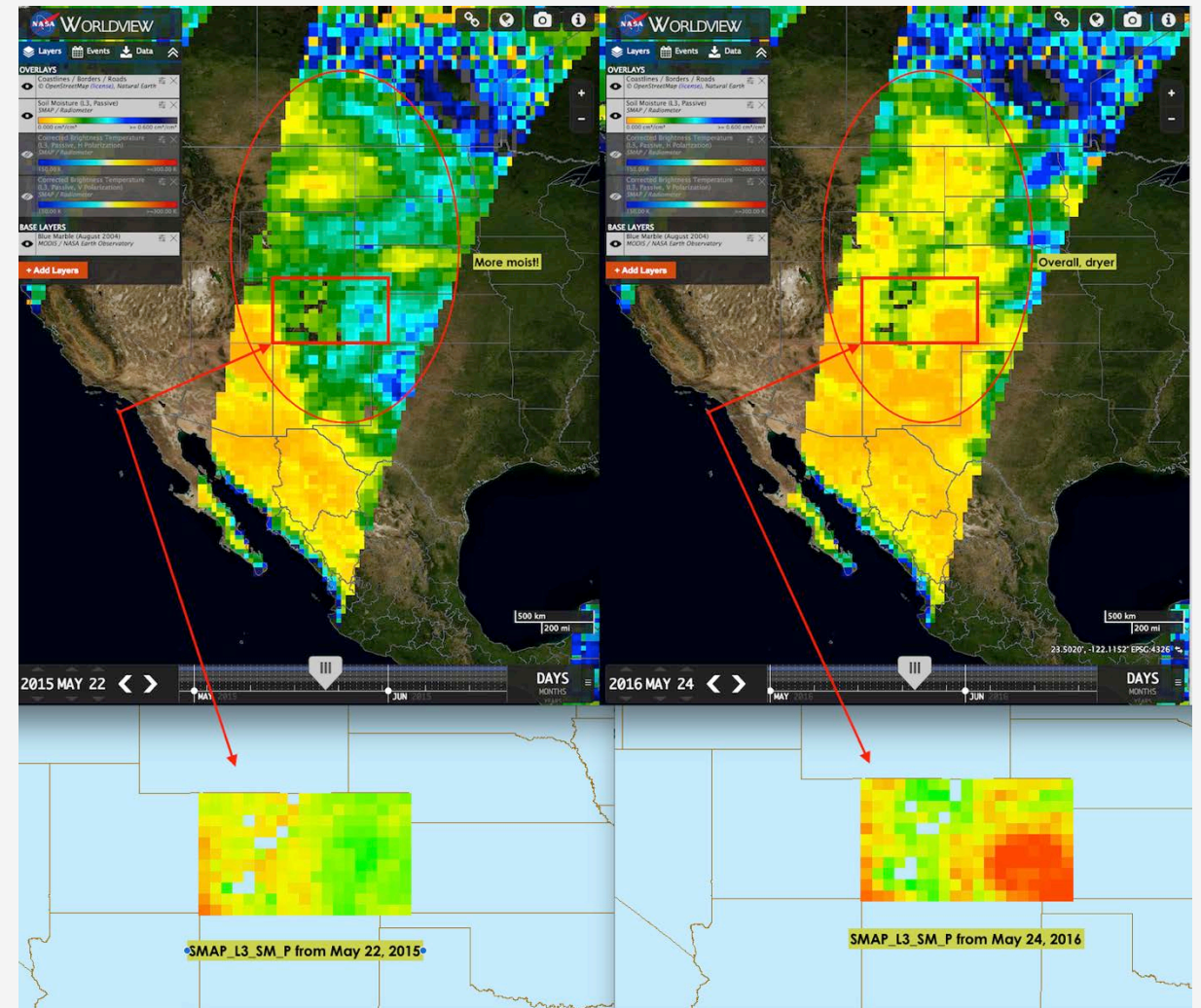
```
> for i in `cat <url text file>`; do curl $i -OL -s; done
```

# The SMAP Data Final Output – Compared to Worldview:

With the subsetting services I chose, my output soil moisture GeoTIFFs include data just for the state of Colorado.

I've tweaked my GeoTIFFs downloaded from Earthdata Search in ArcMap a bit to apply a similar (but not exact) color palette, and I'm showing them here against the initial Worldview visualization I put together.

I hope this has been helpful and you enjoy your exploration of the NSIDC, Worldview, and Earthdata Search websites!



This concludes today's session – Are there any questions?

If you have questions in the future and need assistance, we're happy to help! Contact NSIDC User Services via email to [nsidc@nsidc.org](mailto:nsidc@nsidc.org) or call (303) 492-6199