



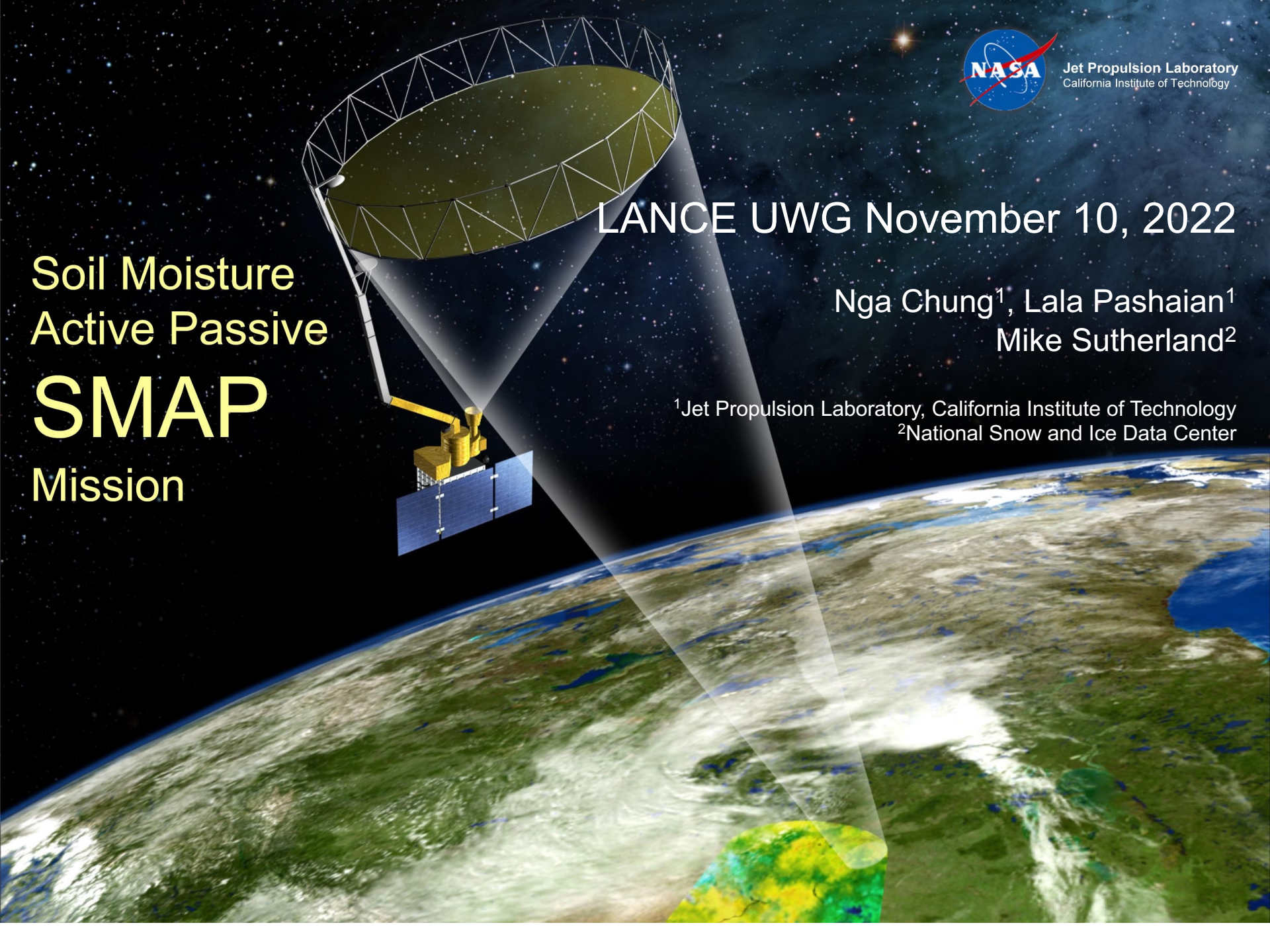
Jet Propulsion Laboratory  
California Institute of Technology

LANCE UWG November 10, 2022

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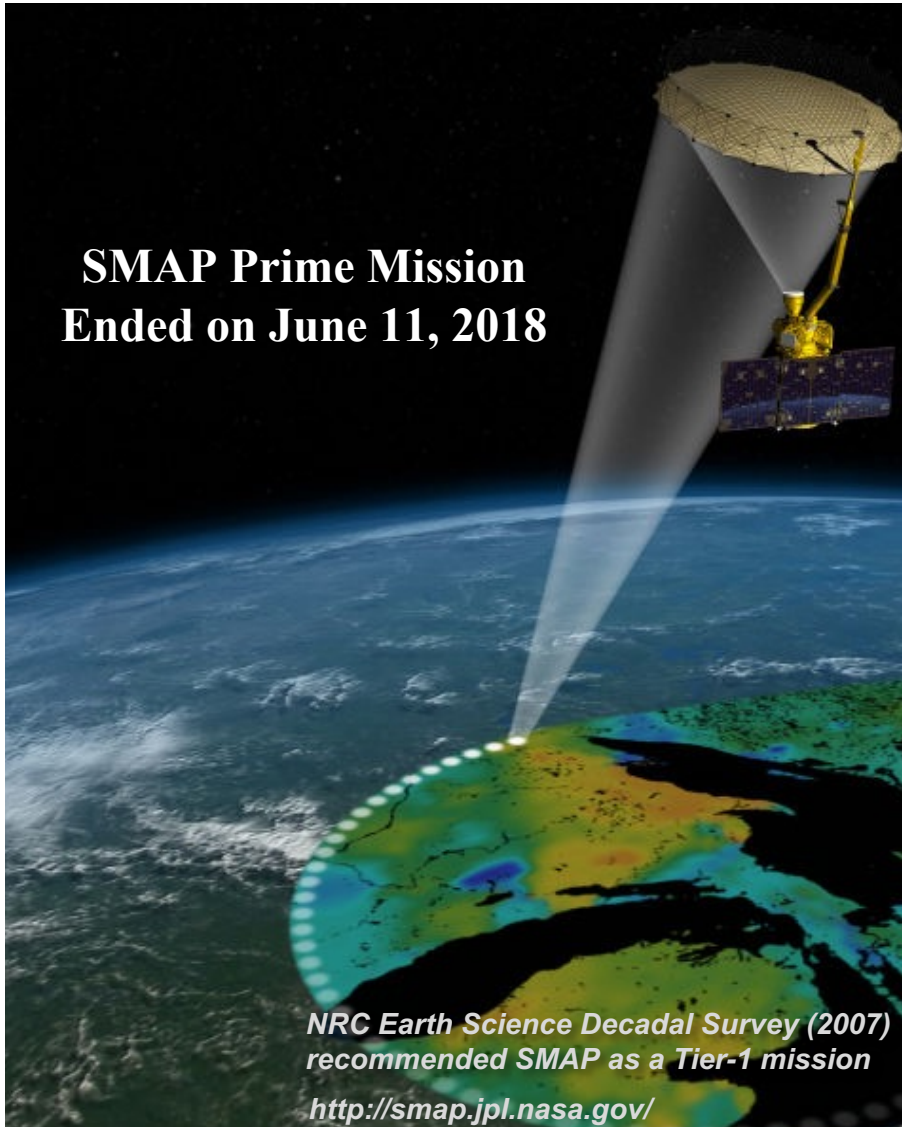
Soil Moisture  
Active Passive  
**SMAP**  
Mission





# Project Overview

## SMAP Prime Mission Ended on June 11, 2018



NRC Earth Science Decadal Survey (2007) recommended SMAP as a Tier-1 mission  
<http://smap.jpl.nasa.gov/>

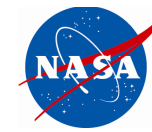
### Primary Science Objectives

- Global, high-resolution mapping of soil moisture and its freeze/thaw state to
  - Link terrestrial water, energy, and carbon-cycle processes
  - Estimate global water and energy fluxes at the land surface
  - Quantify net carbon flux in boreal landscapes
  - Extend weather and climate forecast skill
  - Develop improved flood and drought prediction capability

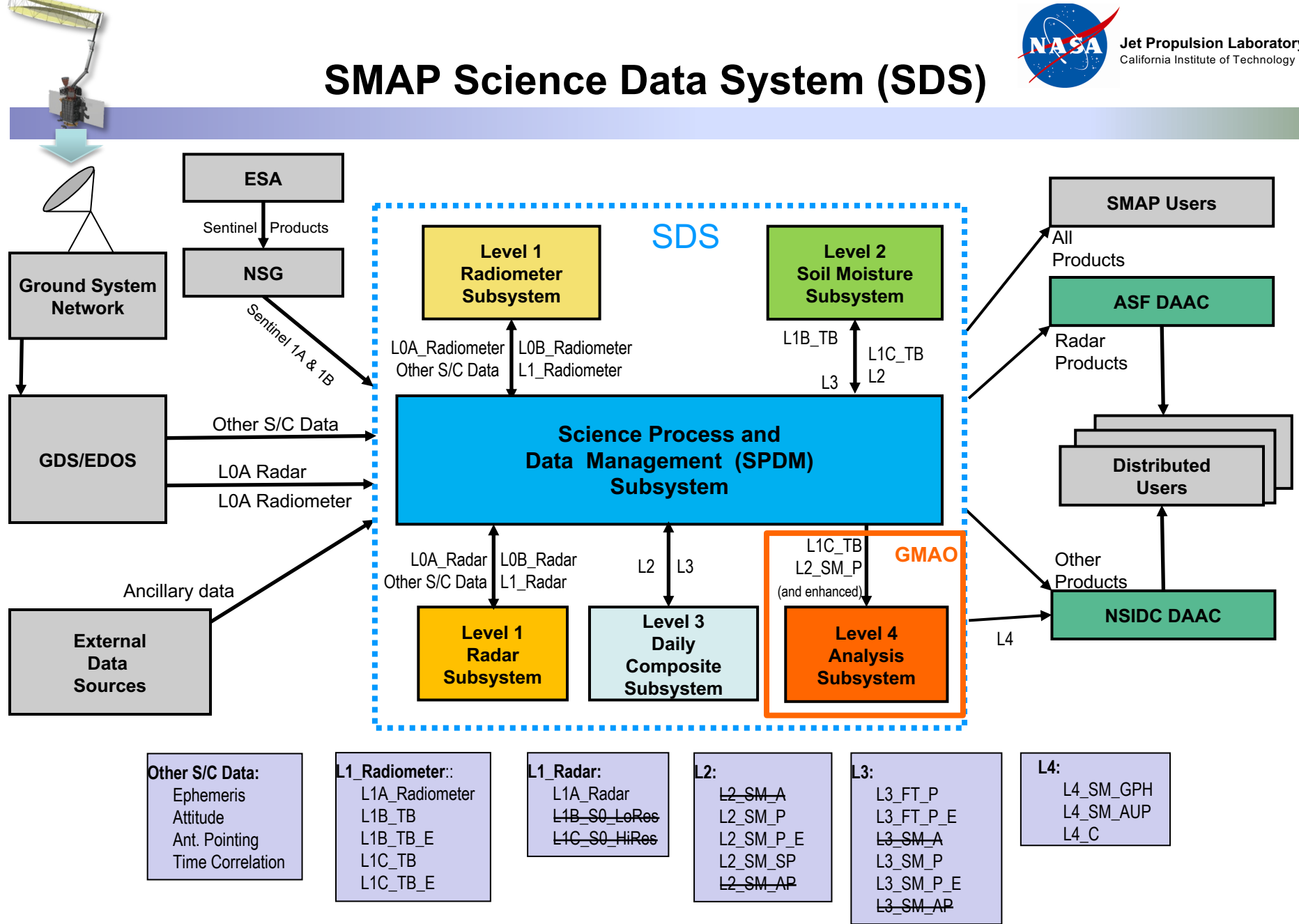
### Mission Implementation

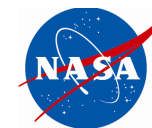
<b>Partners</b>	<ul style="list-style-type: none"> <li>• JPL (project &amp; payload management, science, spacecraft, radar, mission operations, science processing)</li> <li>• GSFC (science, radiometer, science processing)</li> </ul>
<b>Risk</b>	<ul style="list-style-type: none"> <li>• NPR 7120.5E Category 2; NPR 8705.4 Payload Risk Class C</li> </ul>
<b>Launch</b>	<ul style="list-style-type: none"> <li>• January 31, 2015 on Delta II 7320-10C Launch System</li> </ul>
<b>Orbit</b>	<ul style="list-style-type: none"> <li>• Polar Sun-synchronous; 685 km altitude</li> </ul>
<b>Duration</b>	<ul style="list-style-type: none"> <li>• 3-year Primary Mission (May'15 - Jun'18)</li> <li>• w/ 3-year extended mission (Jun'18 – Sep'20) approved</li> <li>• w/ 6-year extended mission (Oct'20 – Sep'26) approved</li> </ul>
<b>Payload</b>	<ul style="list-style-type: none"> <li>• L-band radar (JPL) – ceased operation since July'15</li> <li>• L-band radiometer (GSFC)</li> <li>• Shared 6-m rotating (13 to 14.6 rpm) antenna (JPL)</li> </ul>



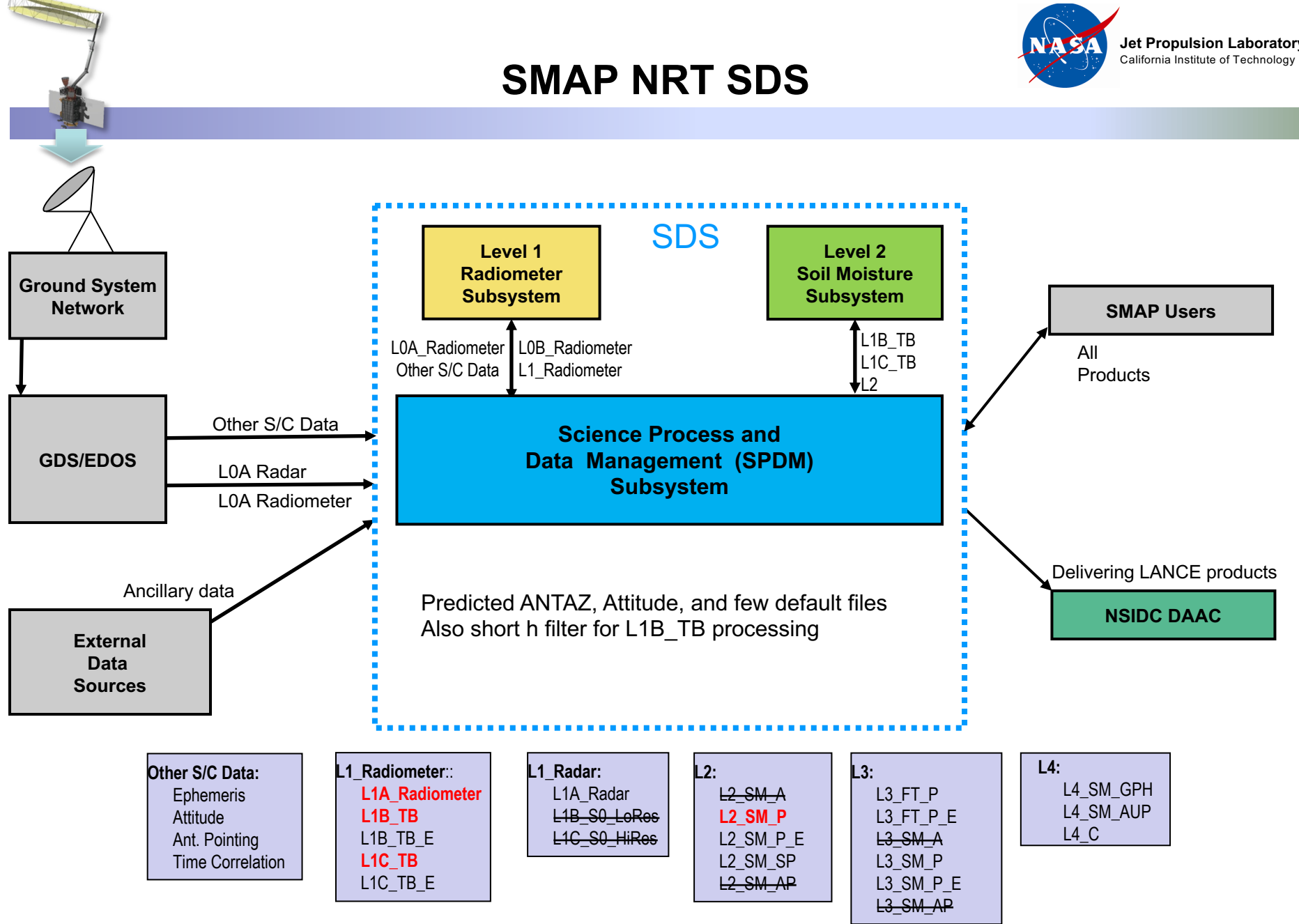


# SMAP Science Data System (SDS)





# SMAP NRT SDS



SDS

Level 1 Radiometer Subsystem

Level 2 Soil Moisture Subsystem

Science Process and Data Management (SPDM) Subsystem

SMAP Users

All Products

Ground System Network

GDS/EDOS

External Data Sources

NSIDC DAAC

Predicted ANTAZ, Attitude, and few default files  
Also short h filter for L1B\_TB processing

**Other S/C Data:**  
Ephemeris  
Attitude  
Ant. Pointing  
Time Correlation

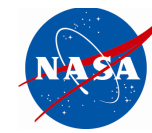
**L1\_Radiometer::**  
L1A\_Radiometer  
L1B\_TB  
L1B\_TB\_E  
L1C\_TB  
L1C\_TB\_E

**L1\_Radar:**  
L1A\_Radar  
L1B\_S0\_LoRes  
L1C\_S0\_HiRes

**L2:**  
L2\_SM\_A  
L2\_SM\_P  
L2\_SM\_P\_E  
L2\_SM\_SP  
L2\_SM\_AP

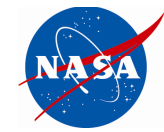
**L3:**  
L3\_FT\_P  
L3\_FT\_P\_E  
L3\_SM\_A  
L3\_SM\_P  
L3\_SM\_P\_E  
L3\_SM\_AP

**L4:**  
L4\_SM\_GPH  
L4\_SM\_AUP  
L4\_C



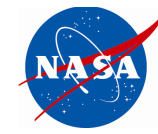
# SMAP Product Use Cases

- Monitor drought
  - Predict floods
  - Assist crop productivity
  - Weather forecasting
  - Linking water, energy and carbon cycles
  
  - Existing NRT customers
    - NOAA
    - REMSS
    - Canadian government shared services
      - SMAP data being used for soil moisture and sea ice thickness monitoring
    - Air Force
    - Navy
-



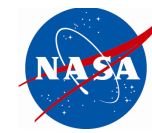
## SMAP LANCE Current Status

- NRT data products from primary stream is being delivered to NSIDC
  - Imagery from NRT data products is being generated by SDS and delivered to GIBS
-



# SMAP LANCE Remaining Work

- SDS: NRT imagery release in coordination with GIBS
  - SDS/NSIDC: Set up and test redundant NRT processing stream
  - SDS: Migrate NRT data processing to AWS
  - NSIDC: Documentation Improvements
-



# SMAP NRT Data Products at NSIDC

## Data Discovery: Dataset Landing Pages

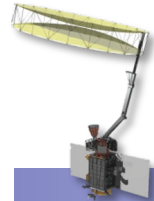
The screenshot shows the top portion of the NSIDC website. The header includes the NSIDC logo and navigation links: NEWS & ANALYSES, DATA, OUR RESEARCH, LEARN, and ABOUT. The main content area features a dark blue banner with the title "Near Real-time SMAP L1B Radiometer Time-Ordered Brightness Temperatures (SPL1BTB\_NRT)" and the data set ID "DATA SET: SPL1BTB\_NRT". Below the banner, there is a "CITATION" button and the start of an "Overview" section.

The screenshot shows the top portion of the NSIDC website for a different dataset. The header is identical to the previous screenshot. The main content area features a dark blue banner with the title "Near Real-time SMAP L2 Radiometer Half-Orbit 36 km EASE-Grid Soil Moisture, Version 107 (SPL2SMP\_NRT)" and the data set ID "DATA SET: SPL2SMP\_NRT". Below the banner, there are three buttons: CITATION, SUBSCRIBE, and SERVICE. A "Version Summary" link is visible, along with a "Data Access & Tools" button and a "Support" button.

[https://nsidc.org/data/spl1btb\\_nrt/versions/105](https://nsidc.org/data/spl1btb_nrt/versions/105)

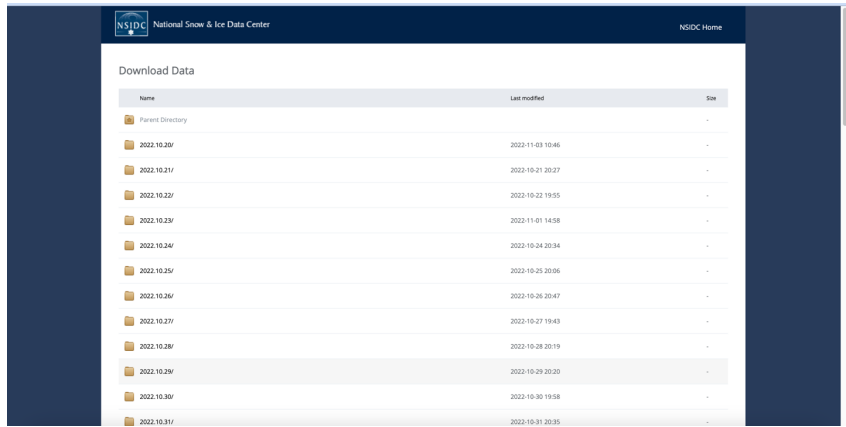
[https://nsidc.org/data/spl2smp\\_nrt/versions/107](https://nsidc.org/data/spl2smp_nrt/versions/107)





# SMAP NRT Data Products at NSIDC

## NRT Data Access

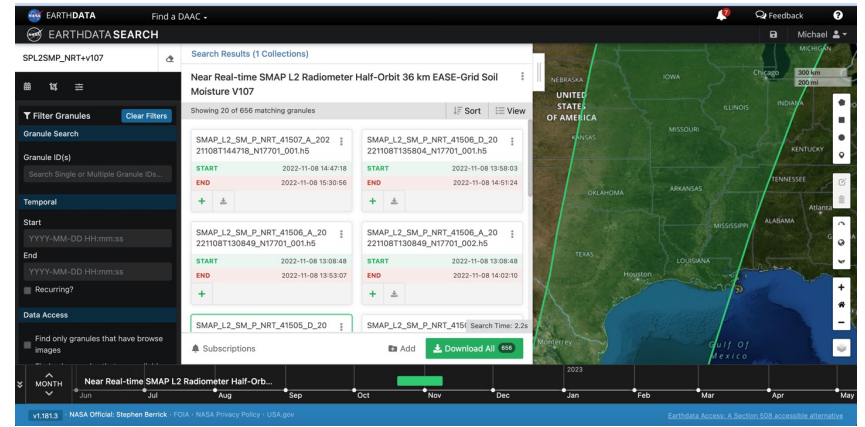


NSIDC National Snow and Ice Data Center

Download Data

Name	Last modified	Size
Parent Directory		
2022.10.20	2022-11-03 10:46	-
2022.10.21	2022-10-21 20:27	-
2022.10.22	2022-10-22 19:55	-
2022.10.23	2022-11-01 14:58	-
2022.10.24	2022-10-24 20:34	-
2022.10.25	2022-10-25 20:06	-
2022.10.26	2022-10-26 20:47	-
2022.10.27	2022-10-27 19:43	-
2022.10.28	2022-10-28 20:19	-
2022.10.29	2022-10-29 20:20	-
2022.10.30	2022-10-30 19:58	-
2022.10.31	2022-10-31 20:35	-

HTTPS file system



EARTHDATA EARTHDATA SEARCH

Search Results (1 Collections)

SPL2SMP\_NRT+v107

Near Real-time SMAP L2 Radiometer Half-Orbit 36 km EASE-Grid Soil Moisture V107

Showing 20 of 656 matching granules

Filter Granules Clear Filters

Granule Search

Granule ID(s)

Temporal

Start

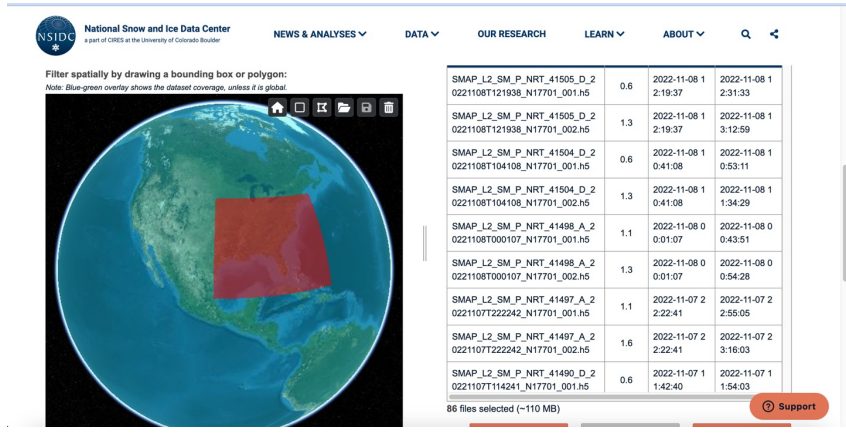
End

Recurring?

Data Access

Download All 656

NASA Earth Data Search



NSIDC National Snow and Ice Data Center

Filter spatially by drawing a bounding box or polygon:

86 files selected (~110 MB)

SMAP_L2_SM_P_NRT_41505_D_2 0221108T121938_N17701_001.h5	0.6	2022-11-08 1 2:19:37	2022-11-08 1 2:31:33
SMAP_L2_SM_P_NRT_41505_D_2 0221108T121938_N17701_002.h5	1.3	2022-11-08 1 2:19:37	2022-11-08 1 3:12:59
SMAP_L2_SM_P_NRT_41504_D_2 0221108T104108_N17701_001.h5	0.6	2022-11-08 1 0:41:08	2022-11-08 1 0:53:11
SMAP_L2_SM_P_NRT_41504_D_2 0221108T104108_N17701_002.h5	1.3	2022-11-08 1 0:41:08	2022-11-08 1 1:34:29
SMAP_L2_SM_P_NRT_41498_A_2 0221108T000107_N17701_001.h5	1.1	2022-11-08 0 0:01:07	2022-11-08 0 0:43:51
SMAP_L2_SM_P_NRT_41498_A_2 0221108T000107_N17701_002.h5	1.3	2022-11-08 0 0:01:07	2022-11-08 0 0:54:28
SMAP_L2_SM_P_NRT_41497_A_2 0221107T222242_N17701_001.h5	1.1	2022-11-07 2 2:22:41	2022-11-07 2 2:55:05
SMAP_L2_SM_P_NRT_41497_A_2 0221107T222242_N17701_002.h5	1.6	2022-11-07 2 2:22:41	2022-11-07 2 3:16:03
SMAP_L2_SM_P_NRT_41490_D_2 0221107T114241_N17701_001.h5	0.6	2022-11-07 1 1:42:40	2022-11-07 1 1:54:03

NSIDC Data Access Tool

Note: NSIDC DAAC system maintenance typically occurs every Wednesday, during which access to SMAP data may not be available. Dataset landing pages have the most relevant information regarding impacts