

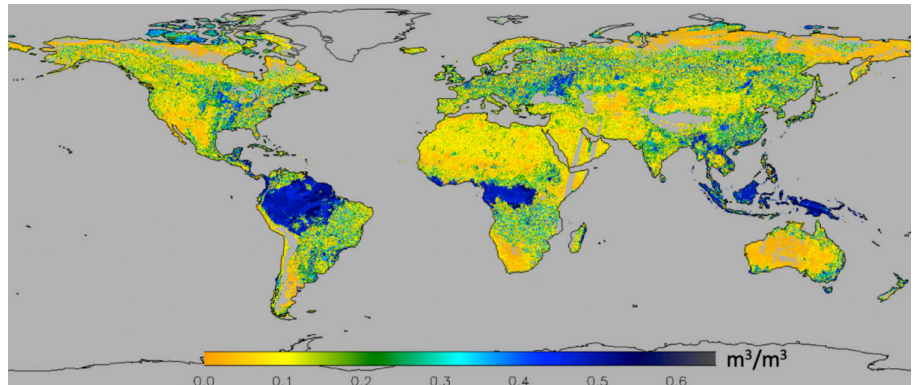


Global NISAR Soil Moisture

Satellite Needs Working Group - Solution Fact Sheet

The NASA/Indian Space Research Organization (ISRO) Synthetic Aperture Radar (NISAR) mission is the first satellite mission to collect dual-frequency SAR (L-band and S-band) to capture highly detailed measurements of changes in Earth's surface and complex processes and conditions such as soil moisture. The Satellite Needs Working Group (SNWG) enabled the production of well-calibrated and -validated soil moisture products with 200-meter resolution globally (500 m for the Sahara Desert). These soil moisture products will be provided at a minimum of two observations every 12 days, with more frequent observations at higher latitudes as the orbits converge closer to the poles. The fine-scale resolution of these products will make it possible to assess farm field scale changes in soil moisture and monitor surface water availability for applications such as agriculture, forestry, fire hazard, and water resource management. The launch of NISAR is planned for early 2025, and NISAR soil moisture products will become available around six months after launch.

Global surface soil moisture map made using measurements from NASA's Soil Moisture Active Passive satellite (SMAP) at 3-km resolution for an 8-day period in May 2015. NISAR will operate similarly to SMAP but at enhanced resolution for soil moisture mapping at the field-scale. The NISAR soil moisture product will have higher uncertainties in areas with dense vegetation such as the tropics.



Credit: Kim, S.B., et al., Surface soil moisture retrieval using the L-band synthetic aperture radar onboard the Soil Moisture Active Passive (SMAP) satellite and evaluation at core validation sites, IEEE Trans. Geosci. Remote Sens., 55, 1897 - 1914, 2017)

Societal Benefit

- Provides vital measurements of soil moisture needed by the agricultural industry for crop yield estimation, crop hazard alerts, food demand forecasts, and improved efficiency of irrigation, water use, and fertilization
- Assists in predicting flood potential through finer-spatial resolution mapping of small watersheds not adequately captured by existing soil moisture maps
- Aids in monitoring vector-borne disease activity by providing soil wetness data to estimate the extent of stagnant water that encourages disease
- Contributes to landslide hazard identification by detailed mapping of soil wetness on sloped terrain
- Supports fire hazard prediction and drought monitoring through identification of prolonged periods of dry conditions

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Platform	NASA-ISRO Synthetic Aperture Radar (NISAR)	
Instrument	24 cm wavelength L-band Synthetic Aperture Radar (L-SAR)	9 cm wavelength S-band Synthetic Aperture Radar (S-SAR)
Sensor Type	Synthetic Aperture Radar (SAR)	
Processing Level	3 (variables mapped on uniform space-time grid scales, with some completeness and consistency)	
Temporal Coverage	Based on NISAR availability (estimated NISAR launch: early 2025)	
Temporal Frequency	6-12 days	
Latency	72 hours	
Spatial Coverage	Near-global (outside polar regions)	
Spatial Resolution	200 m (500 m for the Sahara Desert)	
Data Format	HDF5	

How do I access this data?

The NISAR Soil Moisture product is not yet available. Once NISAR is launched, data will be distributed through NASA's ASF. Sample NISAR data products are available and can be downloaded through NASA's JPL.



NASA ASF



Sample NISAR Products

Where can I find more information?

More information on the NISAR Soil Moisture product is available on this solution's webpage and the official NISAR website.



NISAR Soil Moisture Webpage



NISAR Project Website

Background Image Credit: USDA