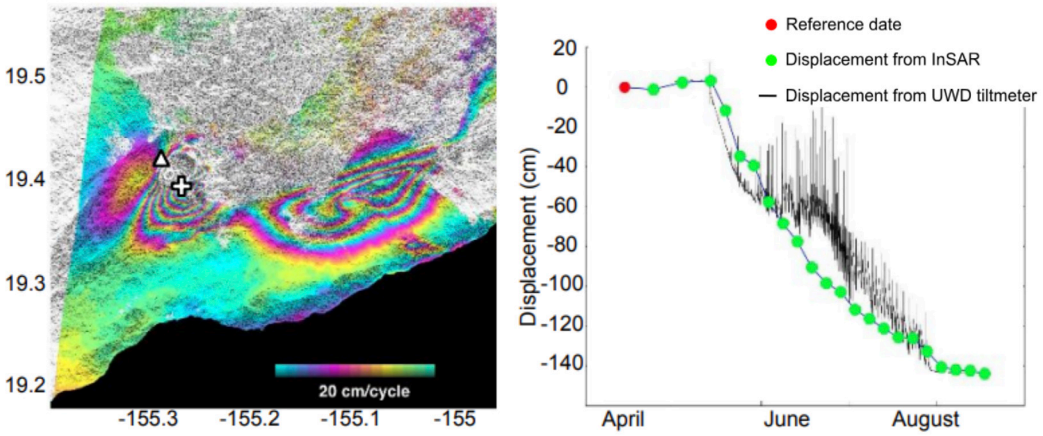
National Aeronautics and Space Administration

OPERA Land-Surface Displacement Product Suite

Satellite Needs Working Group - Product Fact Sheet

The Observational Products for End-Users from Remote Sensing Analysis (OPERA) project, managed by NASA's Jet Propulsion Laboratory (JPL), is developing a suite of Surface Displacement (DISP) products. These products utilize Sentinel-1 (S1) and NASA-ISRO Synthetic Aperture Radar (NISAR) SAR imagery to provide land-surface displacement data for North America. The DISP product will use state-of-the-art InSAR time series techniques to provide a history of surface motion at any given location. Measurements of surface displacements provided by the OPERA DISP product can be used to monitor processes such as fault slip and earthquakes, sinkholes, land subsidence, landslides, permafrost motions, volcanic unrest, and more.

This interferogram and time series graph illustrate displacement at the summit of the Kilauea volcano eruption in Hawaii in 2018. DISP products will be derived from InSAR observations and will provide data for enhanced surface displacement analysis.



Credit: JPL, Paul Lundgren

Data Benefits

- Provide observations of surface displacement at 30-m resolution for North America, including the U.S. and U.S. territories, Canada (within 200 km of the U.S. border), Mexico, and Central America
- Monitor natural changes in Earth's surface such as subsidence, tectonics, volcanic eruptions, landslides, and human-induced changes such as agriculture, mining, and construction
- Use time-series InSAR techniques to produce accurate surface change measurements in urban and rural environments
- Provide InSAR-based ground displacement products to calculate the cumulative surface displacement time series over an area by adding up consecutive DISP products

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OPERA DISP Product	DISP-S1	DISP-NI
Platform	Sentinel-1A/B	NISAR
Processing Level	3	
Temporal Coverage	Based on Sentinel-1 A/B availability (April 2014 - current)	Based on NISAR availability
Temporal Frequency	6-12 days	
Spatial Coverage	North America*	
Spatial Resolution	<= 30 m	
Data Format	HDF5	

*North America: the United States (USA) and US Territories, Canada within 200 km of the US border, and all mainland countries from the southern US border up to and including Panama

How do I access this data?

OPERA DISP products are currently in development at NASA JPL and are not yet available. The tentative release dates for these products are October 2024 for DISP-S1 and July 2025 for DISP-NI.

Where can I find more information?

NASA SNWG and community-contributed materials are available on the Stakeholder Engagement Program (SEP) webpage. The OPERA website provides further information on OPERA DISP and other OPERA products.

SEP Webpage

OPERA Webpage

Background Image Credit: USGS