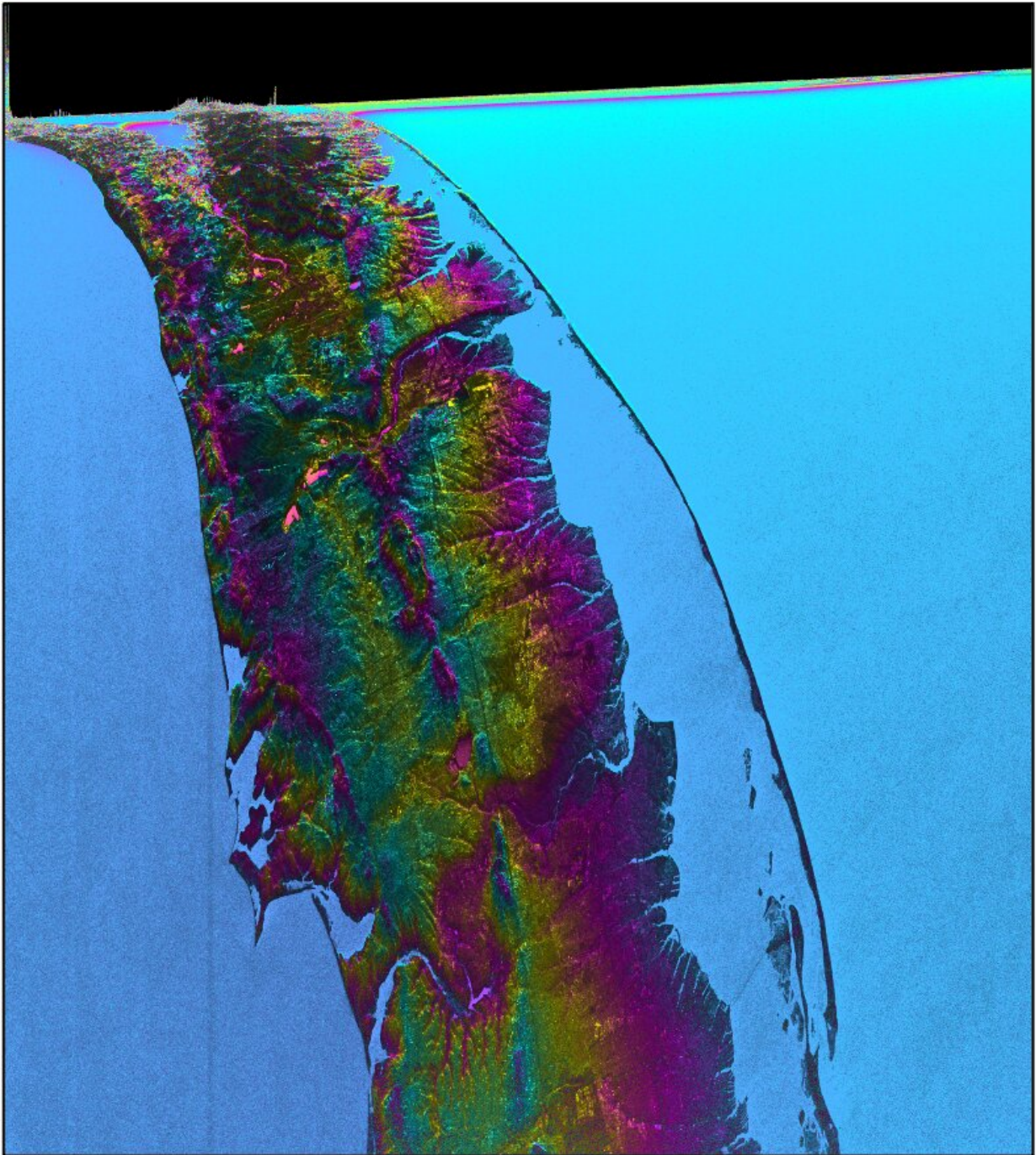


Joint NASA mission offers first stunning views of Earth's surface water

March 27 2023



This visualization shows water features on New York’s Long Island—shown as bright pink splotches. Purple, yellow, green, and dark blue shades represent different land elevations, while the surrounding ocean is a lighter blue. The data was collected on Jan. 21, 2023, by SWOT’s KaRIn instrument. Credit: NASA/JPL-Caltech

The international Surface Water and Ocean Topography (SWOT) mission—led by NASA and the French space agency Centre National d'Études Spatiales (CNES)—has sent back some of its first glimpses of water on the planet's surface, showing ocean currents like the Gulf Stream in unprecedented detail. SWOT is also capturing views of freshwater features such as lakes, rivers, and other water bodies down to about 300 feet (100 meters) wide.

The satellite will measure the elevation of nearly all the water on Earth's surface and provide one of the most comprehensive surveys yet of our planet's surface water. SWOT's measurements of freshwater bodies and the ocean will provide insights into how the ocean influences climate change and the [water cycle](#); how a warming world affects [water storage](#) in lakes, rivers, and reservoirs; and how communities can better manage their [water resources](#) and prepare for floods and other disasters.

"SWOT's advanced imagery will empower researchers and advance the way we manage fresh water and the effects of sea level rise across the globe," said NASA Administrator Bill Nelson. "Water is one of our planet's most important resources—and it's proven to be vulnerable to the impacts of [climate change](#). SWOT will provide critical information that communities can use to prepare for the impacts of a warming climate."

A whole new view

As seen in these early images, on Jan. 21, 2023, SWOT measured sea level in a part of the Gulf Stream off the coast of North Carolina and Virginia. The two antennas of SWOT's Ka-band Radar Interferometer (KaRIn) instrument acquired data that was mapped as a pair of wide, colored strips spanning a total of 75 miles (120 kilometers) across. Red

and orange areas in the images represent sea levels that are higher than the [global average](#), while the shades of blue represent sea levels that are lower than average.

For comparison, the new data is shown alongside sea surface height data taken by space-based instruments called altimeters. The instruments—widely used to measure sea level—also bounce radar signals off of Earth's surface to collect their measurements. But traditional altimeters are able to look only at a narrow beam of Earth directly beneath them, unlike KaRIn's two wide-swath strips that observe sea level as a two-dimensional map.

The spatial resolution of SWOT ocean measurements is 10 times greater than the composite of sea surface height data gathered over the same area by seven other satellites: Sentinel-6 Michael Freilich, Jason-3, Sentinel-3A and 3B, Cryosat-2, Altika, and Hai Yang 2B. The composite image was created using information from the Copernicus Marine Service of ESA (European Space Agency) and shows the same day as the SWOT data.

KaRIn also measured the elevation of water features on Long Island—shown as bright pink splotches nestled within the landscape. (Purple, yellow, green, and blue shades represent different land elevations.)

"Our ability to measure freshwater resources on a global scale through [satellite data](#) is of prime importance as we seek to adjust to a changing climate," said CNES Chairman and CEO Philippe Baptiste. "In this respect, the first views from SWOT give us a clearer picture than ever before. These data will prove highly valuable for the international scientific community in the fields of hydrology, oceanography, and coastal studies."

This initial inland image is a tantalizing indication of how SWOT can measure details of smaller lakes, ponds, and rivers in ways that satellites could not before. Such data will be used to produce an extraordinary accounting of the freshwater on Earth's surface in ways useful to researchers, policymakers, and water resource managers.

"The KaRIn instrument took years to develop and build, and it will collect information on bodies of water across the globe—data that will be freely and openly available to everybody who needs it," said Parag Vaze, SWOT project manager at NASA's Jet Propulsion Laboratory in Southern California.

Provided by Jet Propulsion Laboratory

Citation: Joint NASA mission offers first stunning views of Earth's surface water (2023, March 27) retrieved 18 May 2024 from <https://phys.org/news/2023-03-joint-nasa-mission-stunning-views.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.