U.S. NAVAL RESEARCH LABORATORY

Precision Assessment of Remotely Sensed data with Error Correlations (PARSEC)

AT A GLANCE

What is it?

Advanced algorithms are developed to efficiently process and assimilate new types of satellite observations into the numerical models of oceanic circulation.

How does it work?

Observations of the dynamic sea surface height (SSH) variability by on-board interferometers deliver data at several times better accuracy and resolution compared to previous missions. This improvement comes at the expense of the necessity to develop numerically efficient methods of precision assessment in order take into the account long-range spatial correlations in the error fields.

What will it accomplish?

New methods of statistically consistent weighting of the spatially correlated data will be developed and implemented in the operational data assimilation systems run by the Navy. This will improve the accuracy of forecasting surface currents and sound speed variations at depth.

R&D Sponsor(s)

Office of Naval Research

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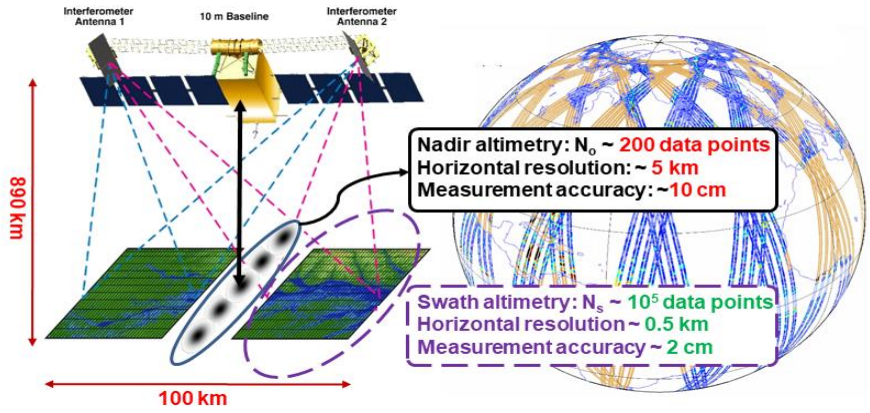
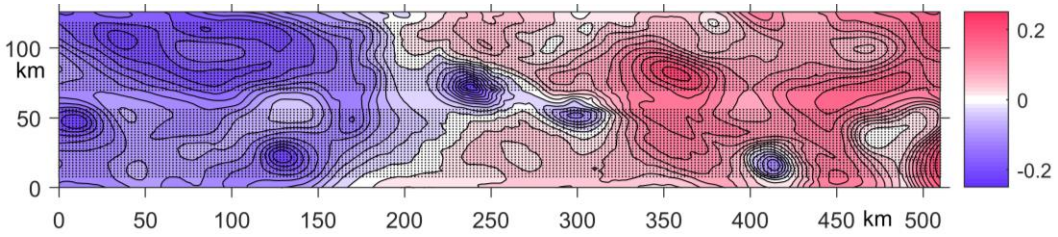


Interferometric observations of the ocean surface by the Surface Water Ocean Topography (SWOT) mission along the global swaths shown on the right.

Satellite interferometry provides a chance to directly observe submesoscale SSH variations that have a typical magnitude of a few centimeters. Taking the full advantage of this opportunity requires correct treatment of the correlated SSH errors caused by the uncertainties in environmental conditions beneath the satellite and in the geometry and orientation of the on-board interferometer. Being highly correlated along and across the satellite swath, these errors present a certain challenge for accurate assessment of the SWOT precision matrix parameters that are too numerous for numerically efficient data processing in operations.



ast of Greenland. SWOT observations are shown by dots. Nadir obse
ken along the central gap in between the swaths at 5 times coarser resolution.

In this project, we find efficient ways to parameterize the precision matrix of the wide-swath altimeter observations using the error correlation model developed at the Jet Propulsion Laboratory. The algorithms are extensively tested using the Navy Coastal Ocean Model (NCOM) in the framework of variational data assimilation.

A Postdoctoral Position is available. If you are a U.S. citizen and have experience in applied math and/or variational data assimilation, you are eligible to apply for a 2-year fully funded position at NRL South in Stennis Space Center. For further information, visit our website (https://www7320.nrlssc.navy.mil/jobs.php) and/or contact Dr Max Yaremchuk using the information at left.