

JPL Contributions to Satellite Oceanography

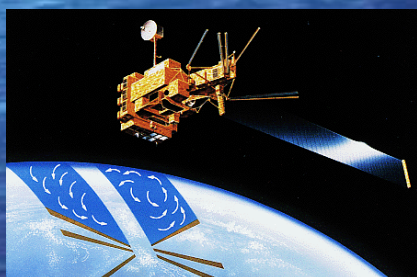
**Charles Elachi, Director
NASA Jet Propulsion Laboratory
California Institute of Technology**

October 18, 2010

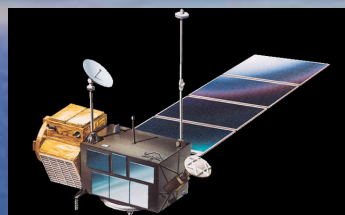
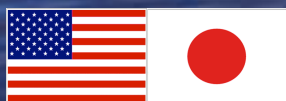
JPL Oceanographic Missions



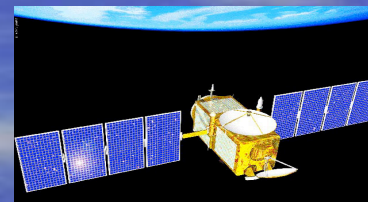
Seasat (1978)



NSCAT (1996)



Topex/Poseidon
(1992)



Jason 1 (2001)



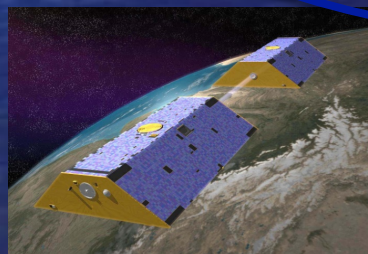
Jason 2 (2008)



SWOT (2019)



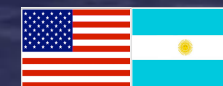
Jason 3 (2013)



GRACE (2002) &
GRACE Follow-On (2016)



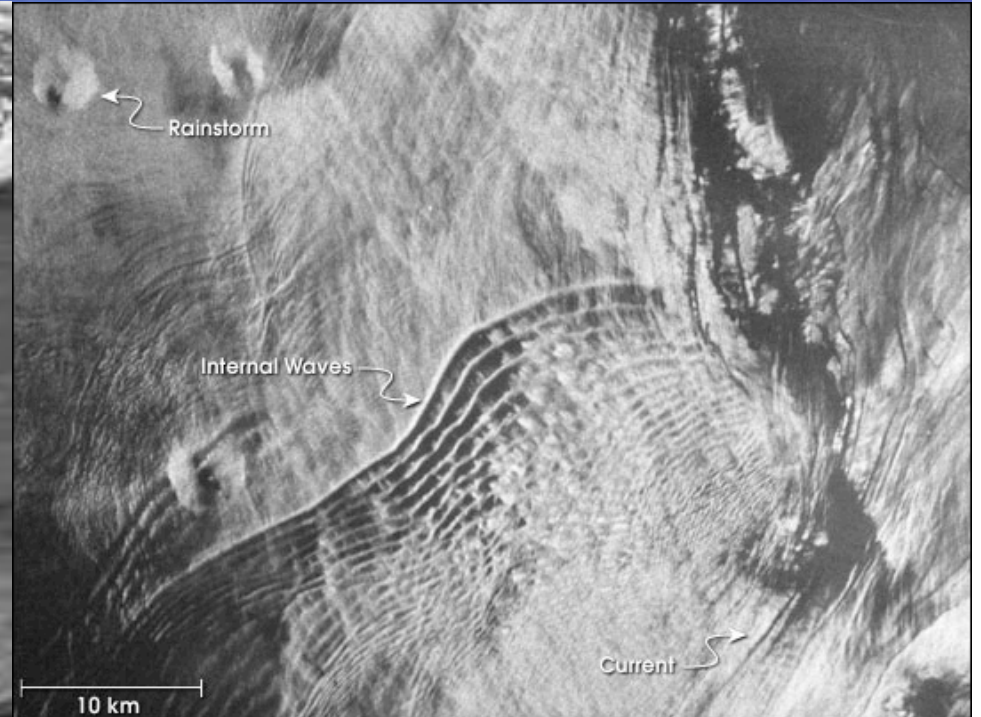
Aquarius (2012)



Seasat – Early Pioneer

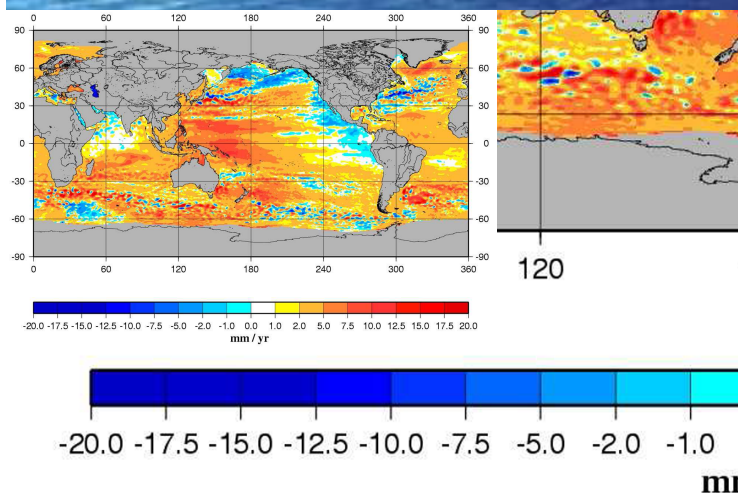
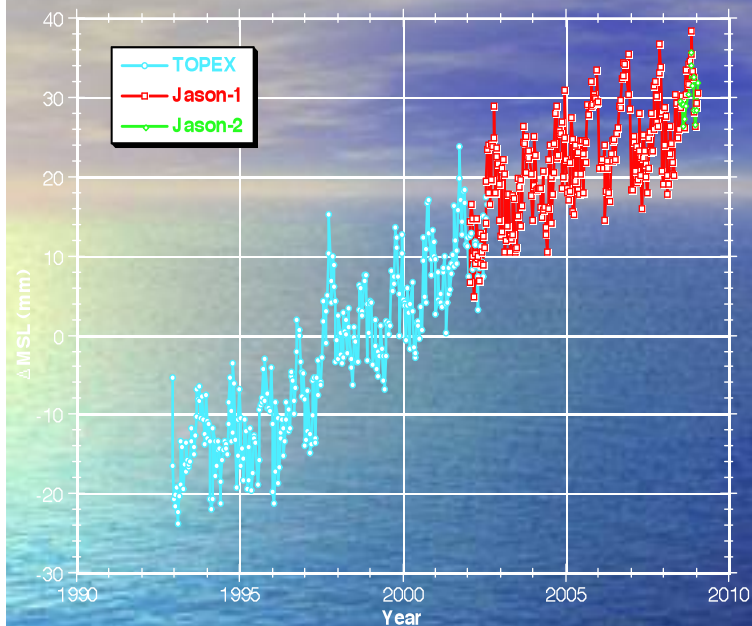


Waves off Alaskan coastline

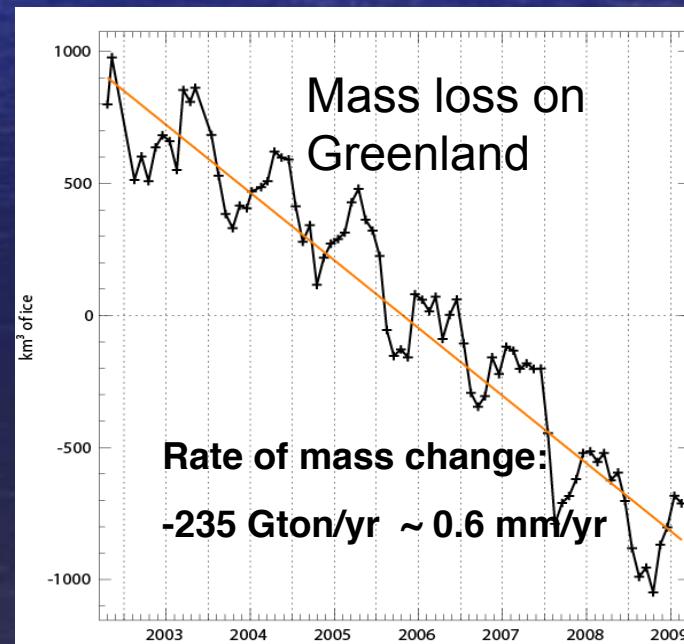
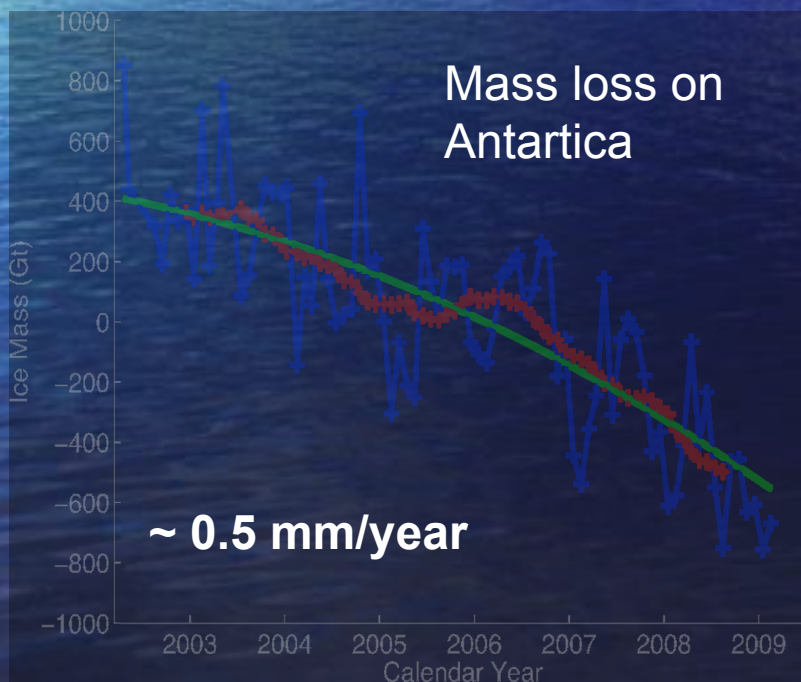
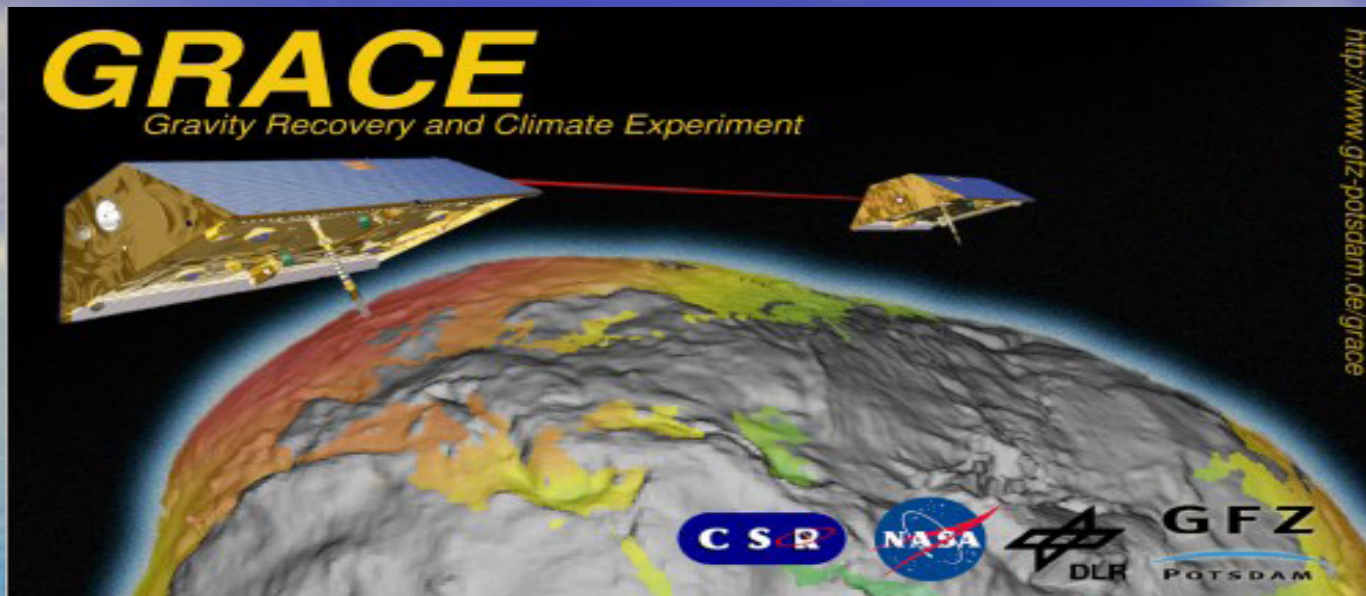


Ocean features of the Gulf of Mexico,
Northeast of the Yucatan Peninsula

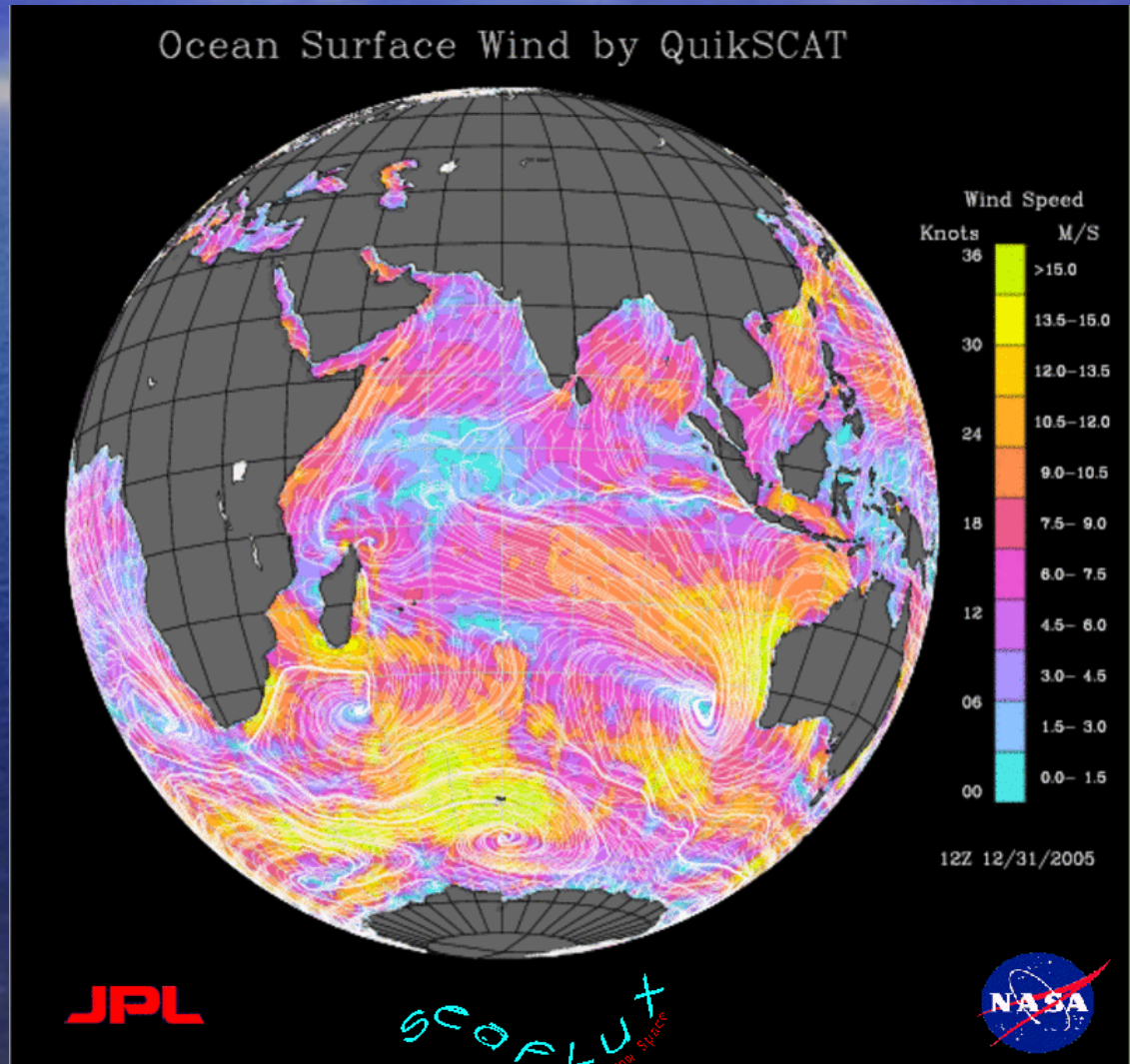
Near Two Decades of Global Sea Level Record from Altimetry



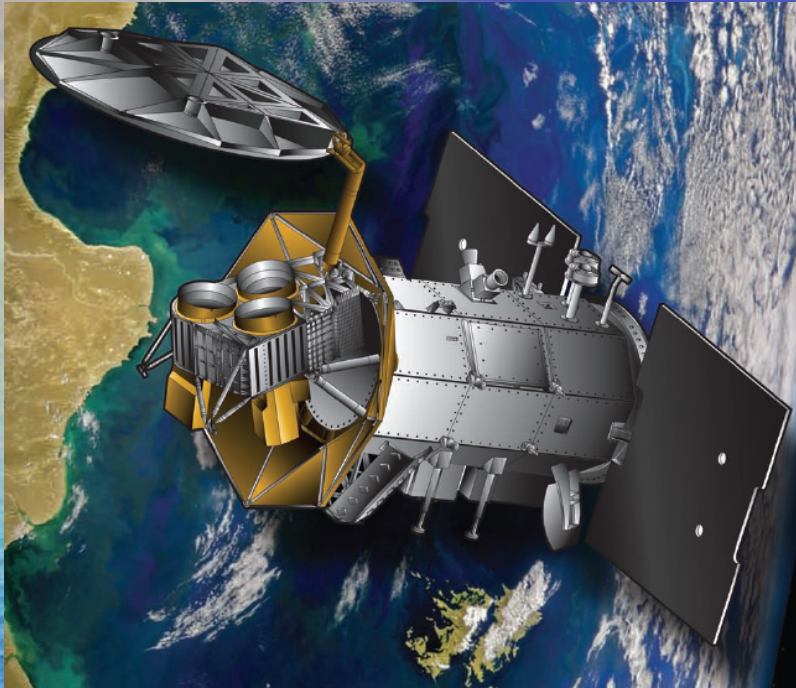
Monitoring Polar Ice Melt since 2002



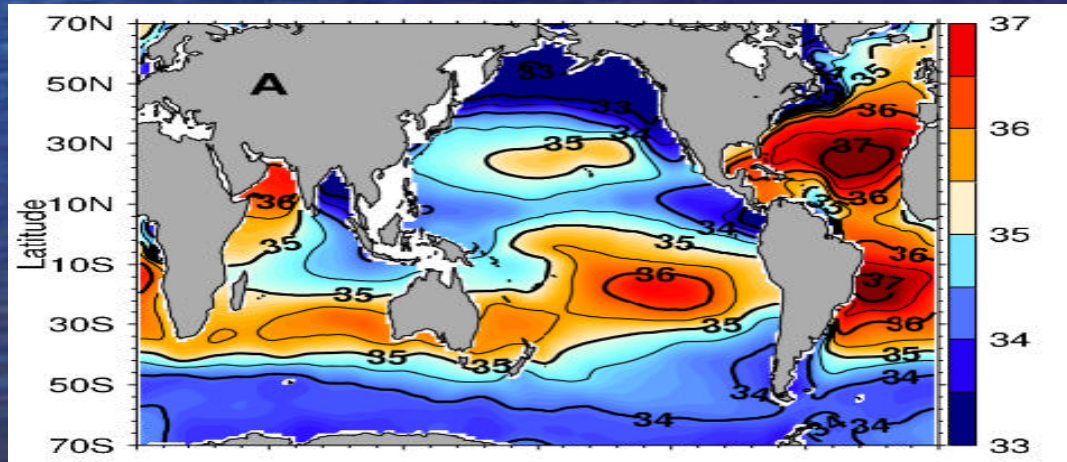
Mapping Global Winds Since 1999



Aquarius: Mapping Global Ocean Salinity



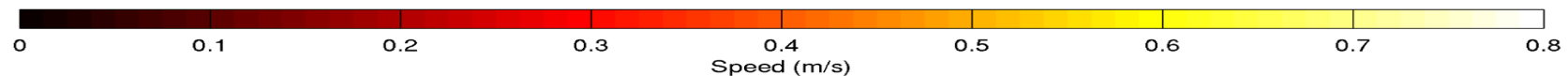
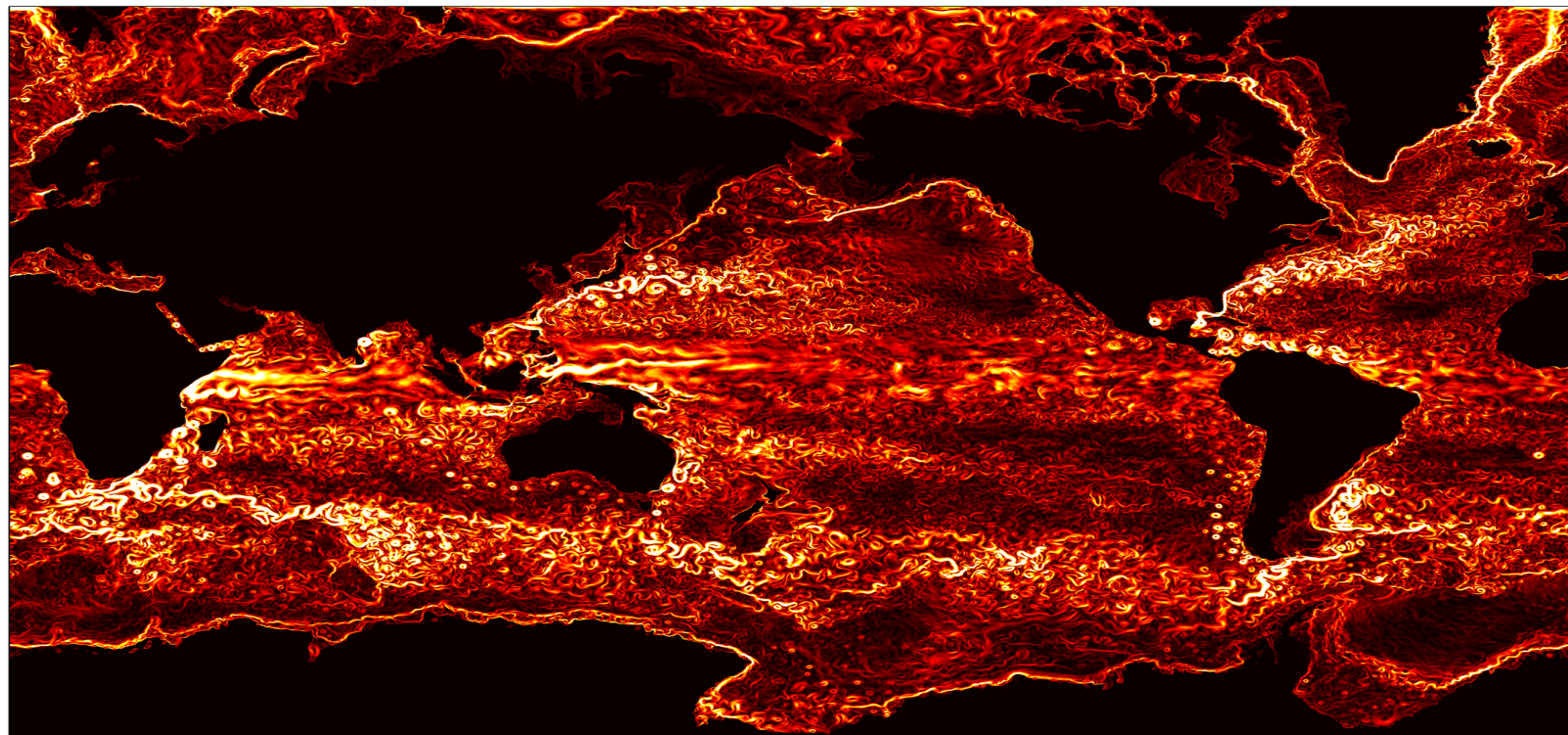
- NASA-CONAE
- 2011 launch
- Measure SSS to 0.2 psu on monthly, 150km, averages
- Salinity is the key tracer for the marine branch of the global hydrologic cycle



A new challenge is high-resolution measurement of the elevation of water both on land and in the ocean

Ocean surface currents simulated by the JPL/MIT high-resolution

Ocean current speed at 15 m depth from 1/16th ECCO2 integration



The storage and discharge of freshwater on land is poorly known

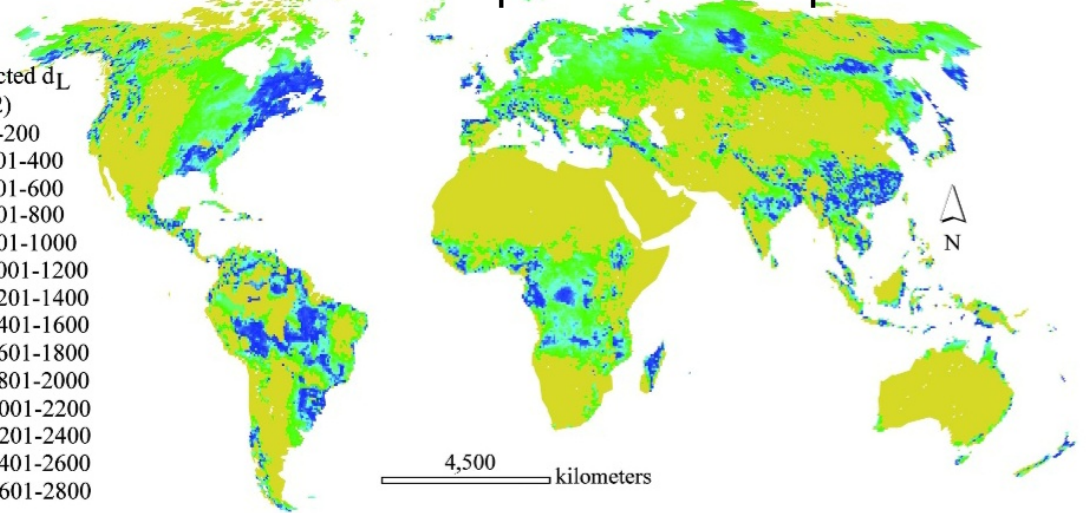
Amazon



Number of lakes per 1 million square km

Predicted d_L
(Eq. 2)

- 0-200
- 201-400
- 401-600
- 601-800
- 801-1000
- 1001-1200
- 1201-1400
- 1401-1600
- 1601-1800
- 1801-2000
- 2001-2200
- 2201-2400
- 2401-2600
- 2601-2800



Ohio

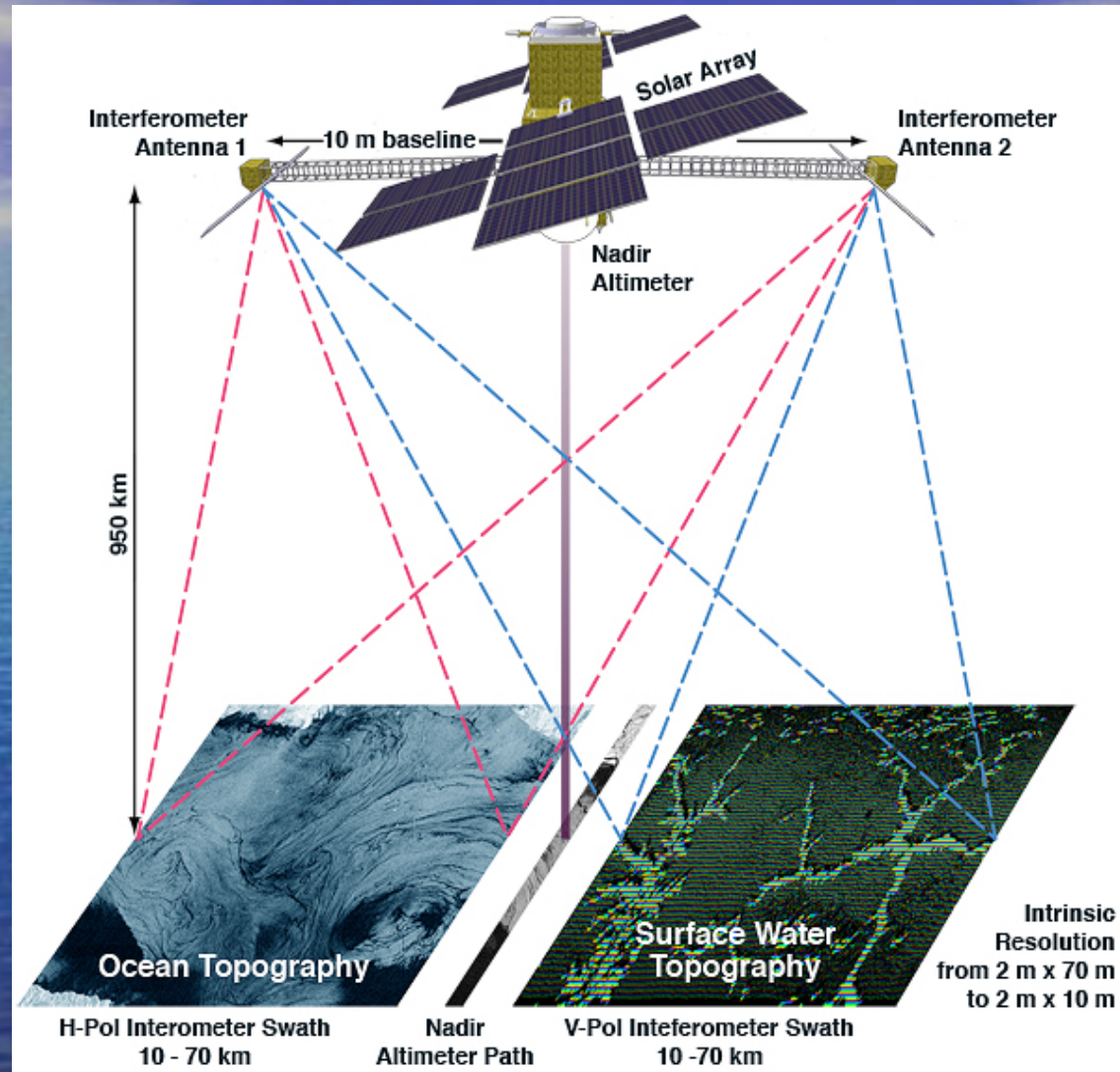


Siberia



Photos: K. Frey, B. Kiel, L. Mertes

The SWOT (Surface Water & Ocean Topography) Mission



A joint mission of NASA and CNES (with contribution from CSA) to set the standard of future altimetry

Summary

- JPL and NASA are proud and honored to have been at the forefront of Satellite Oceanography, both technically and organizationally
- We recognize the large and increasing contributions from the international space agencies: CNES, DLR, ESA, EUMETSAT, JAXA, ISRO, CSA
- Our efforts in Aquarius, SWOT, and the follow-on missions in scatterometry and gravity show that we intend to continue making key contributions to observing the oceans from space