

- Is SWOT meeting pre-launch expectations and scientific needs?
- New results being revealed
- Challenges remaining : steps forward

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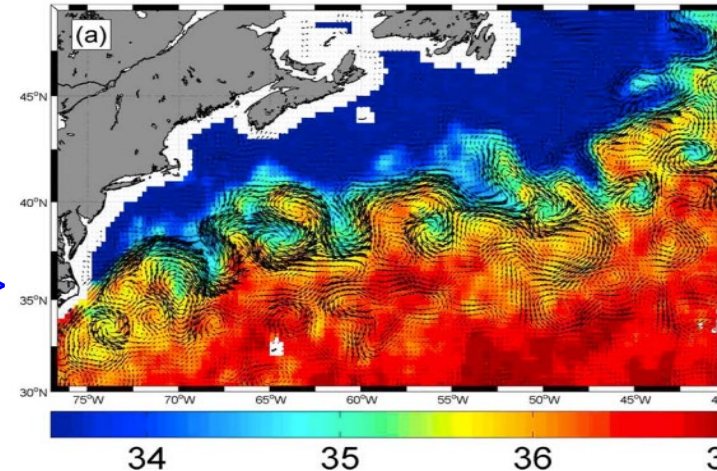
SWOT Ocean Objectives

- Is SWOT meeting pre-launch expectations and scientific needs?
 - Smaller ocean eddies > 10 km diameter to enhance ocean currents & fill the gap 10-100 km.
 - Orbit chosen to measure ocean tides, and internal tides - \rightarrow mixing and energy dissipation
 - Yes, exceeding. Much of validation effort has in fact been focused on improving/understanding errors in the ground truth data
 - Examples? 2D structure of ocean dynamics at smaller scales; surface waves; submesoscales; ocean signals at 1-km scales (exceed 15 km); product delivery ; wave-current interactions; tides
 - Executed rigorous validation

SWOT Ocean Objectives

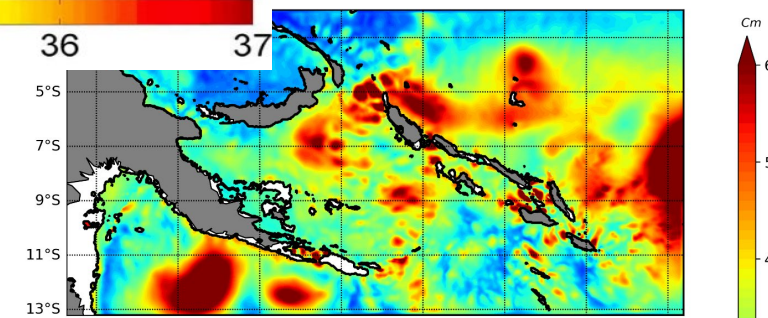
SWOT was intended to measure :

- Smaller ocean eddies > 10 km diameter to enhance ocean currents & fill the gap 10-100 km.
- Orbit chosen to measure ocean tides, and internal tides - > mixing and energy dissipation
- Global ocean observations at 250m x 250m or 2x2 km posting, up to the coast and high latitudes (78°)

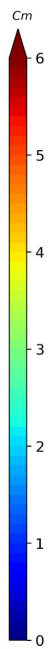
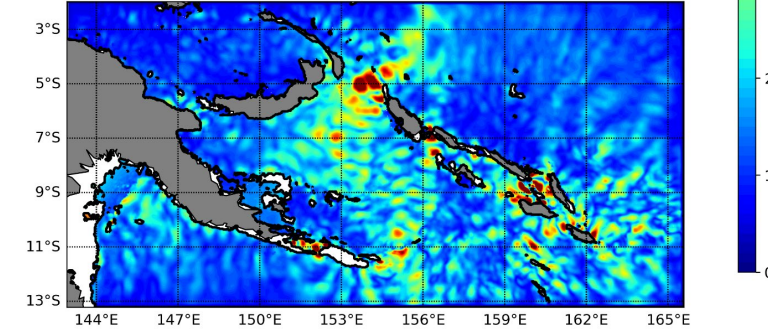


2D gridded nadir altimetry maps resolve mesoscale eddies to 100 km in diameter

10-100 km eddies



Internal tides



New results being revealed

- 28 AdAC campaigns including open ocean and coastal by 15 countries.
 - New means for HR ocean obs to guide campaigns
- HR models used to be “untestable”– they are now testable
- 1D orbit reveals new “rapidity” of ocean variability (NB: some of the large scale “signals” could be errors)
- HR tidal maps in coastal regions
- Unprecedented 2D colocated SSH-wind-wave-sigma0
- New observations of waves in low wind conditions & long swell
- Sea ice, snow, land ice
- New insights on nonlinear internal tides (eg. Solitons)
- MSS– more precise abyssal hills & new seamounts revealed under 1-day orbit

Challenges remaining: steps forward

SWOT data challenges

- Geophysical corrections needed at 250m and 2 km resolution
- SSB (and interpretation of “ k^{-2} ”)
- What are the signals below 50 km?? (What is real and what isn't?)
- MSS in coastal zones and stationary currents
- X-calibration/roll error estimates improvements in open ocean, regional and coastal zones

SWOT in relation to models & in-situ

- HR models need to catch up! (and in situ) (could show spectra)
- Improvements for in situ extended sampling at fine-scales

Interpreting ocean dynamics with SWOT

- How to estimate velocity at the new SWOT scales?
- 2D/3D Reconstruction with balanced & unbalanced motions
- How to practice open science with SWOT
- Projecting SWOT information to depth– connecting to in situ
- Exploiting SWOT information for air-sea interaction (σ_0 , waves, and SSH)

- Is SWOT meeting pre-launch expectations and scientific needs?
 - Yes, exceeding. Much of validation effort has in fact been focused on improving/understanding errors in the ground truth data
 - Other points?
 - Examples? 2D structure of ocean dynamics at smaller scales; surface waves; submesoscales; ocean signals at 1-km scales (exceed 15 km); product delivery ; wave-current interactions; tides
 - Executed rigorous validation
- New results being revealed (what you love about SWOT– feedback to CNES and NASA HQ)
 - 28 AdAC campaigns including open ocean and coastal by 15 countries.
 - New means for HR ocean obs to guide campaigns
 - HR models used to be “untestable”– they are now testable
 - 1D orbit reveals new “rapidity” of ocean variability (NB: some of the large scale “signals” could be errors)
 - HR tidal maps in coastal regions
 - SSH-wind-wave-sigma0
 - Sea ice, snow, land ice
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 - MSS– new seamounts
- Challenges remaining: steps forward
 - HR models need to catch up! (and in situ) (could show spectra)
 - Geophysical corrections
 - SSB (and interpretation of “ k^{-2} ”)
 - What are the signals below 50 km?? (What is real and what isn’t?)
 - Improvements to in situ
 - How to estimate velocity at the new SWOT scales?
 - Roll error
 - Reconstruction
 - How to practice open science with SWOT
 - Projecting SWOT information to depth– connecting to in situ
 - Exploiting SWOT information for air-sea interaction (sigma0 and SSH)
 - MSS in coastal zones and stationary currents