Ocean view on 3 main questions:

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

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Satellite Status Overview

(slide from Parag's presentation)

- S/C Platform:
  - All platform chains behavior is nominal (power, avionics, CC, thermal control…)
  - AOCS works nominally, with excellent pointing performances; PL Mass memory (SSR) behavior is as expected
- Instruments:

Req. flow	L4 Req. #	Compliance
L2-SR-133 *L3b-PL-130*	*L4-KAR-179* *Random & systematic errors PSD - SSH Short Wavelength*	**Random error compliant with ~10dB margin over rain free ocean. Systematic error appears to be compliant based on instrument based analysis and preliminary SWOT validation results.**
L2-SR-170 *L3b-PL-133*	*L4-KAR-180* *Surface water error - Hydrology Height*	
L2-SR-176 *L3b-PL-134*	*L4-KAR-181* *Total slope err* *Hydrology*	
L2-SR-77 *L3b-PL-114*		
L2-SR-166 *L3b-PL-140*		**Compliant**
L3b-PL-60	*L4-KAR-118* *KaRIn Ocean data rate*	**Compliant (<13.8 Mbps)**
L3b-PL-250	*L4-KAR-167* *KaRIn Land Data Rate*	**Compliant. (<330.4 Mbps)**

All green!

Overall: All systems are healthy and meeting/exceeding requirements

Is SWOT meeting pre-launch expectations and scientific needs?

Pre-launch expectations:

- Measure ocean tides and internal tides
- Smaller ocean eddies >10 km diameter to enhance ocean currents & fill the gap in current capabilities existing at 10-100 km.
- So is SWOT meeting expectations?

Is SWOT meeting pre-launch expectations and scientific needs?

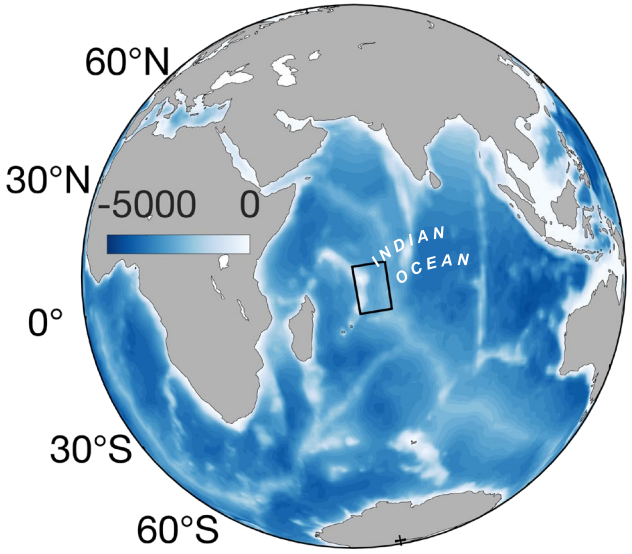
Yes! Exceeding expectations. Much of ocean validation effort has in fact been focused on improving/understanding errors in the ground truth data.

- Executed rigorous validation
- Measuring 2D structure of ocean dynamics, even at 1-km scales (blowing away the 10 km expectation)
  - Mesoscale and submesoscale ocean eddies; surface waves; wave-current interactions; tides; coastal signals

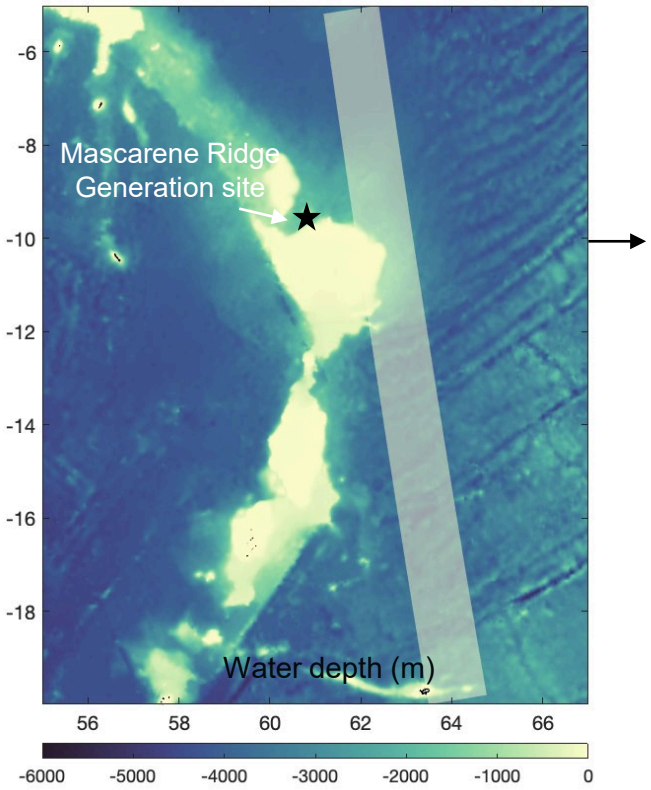
New results being revealed

- 28 AdAC campaigns including open ocean and coastal by 15 countries.
  - New means for high-resolution ocean observations to guide campaigns
- High-resolution models used to be “untestable”– they are now testable
- 1D orbit reveals new view of “rapidity” of ocean variability
- HR tidal maps in coastal regions
- New observations of waves in low wind conditions & long swell
- Sea ice, snow, land ice
- Mean sea surface– more precise abyssal hills & new seamounts
- New insights on nonlinear internal tides (eg. solitons)

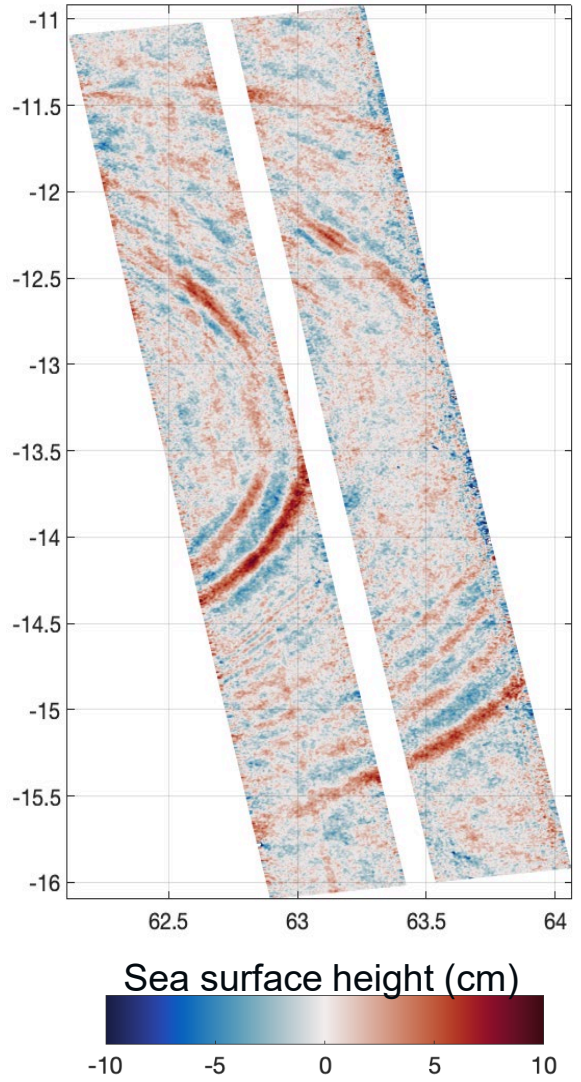
Large-amplitude internal waves driven by tides (Equatorial Indian Ocean)



SWOT CalVal pass and bathymetry



Sea surface height
(*band-passed 2–50-km*)
example from one pass



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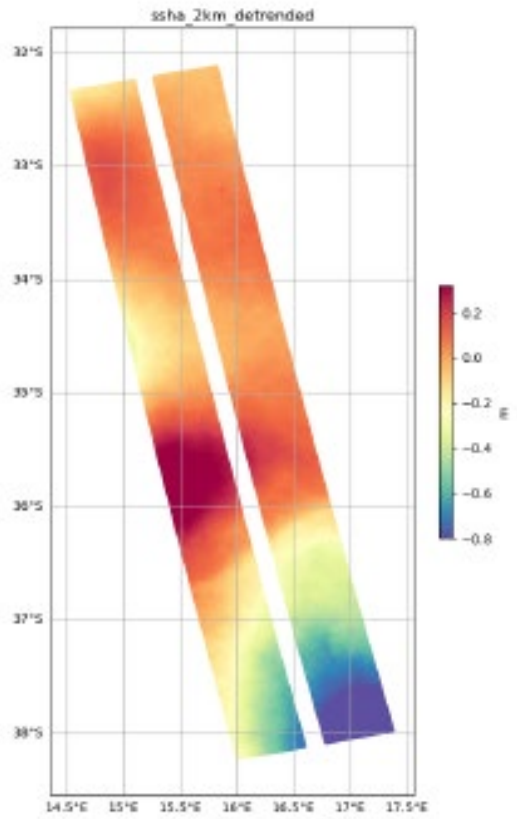
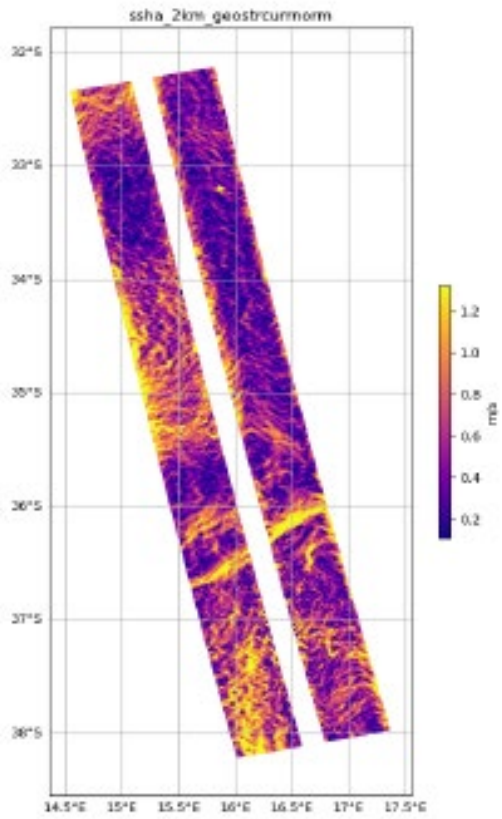
- New insights on nonlinear internal tides (eg. solitons)
- Unprecedented 2D colocated SSH-wind-wave-sigma0

SWOT : a new window on ocean dynamics at km scales

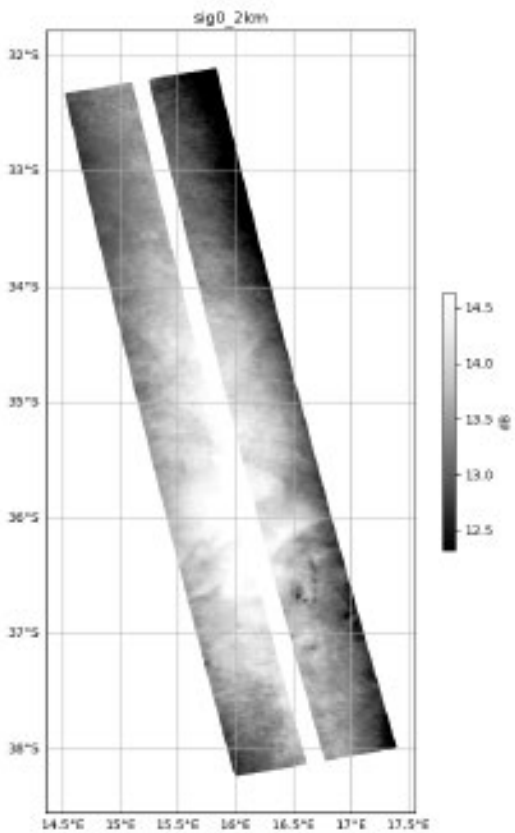
(A. Bohe et al)



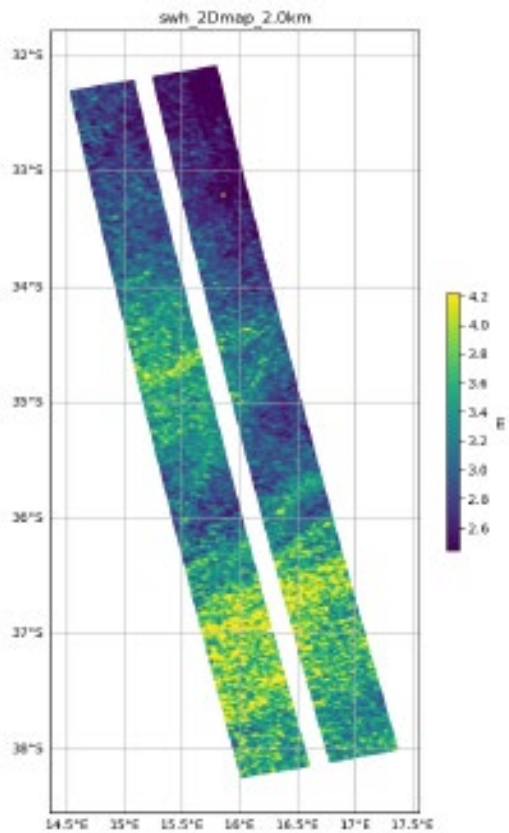
(a) ssha



(b) geostrophic current



(c) σ_0



(d) SWH

SWOT provides simultaneous 2D maps at kilometric scales of surface topography (->geostrophic part of the currents), backscatter (wind dominated, with other physical signatures) and Significant Wave Height fields.

Challenges remaining: steps forward

SWOT data challenges

- Geophysical corrections needed at 250m and 2 km resolution
- Sea State Bias (waves modified by small scale currents– creates errors correlated with signal)
- What are the signals below 50 km?? (What is real and what isn't?)
- Mean sea surface in coastal zones and stationary currents
- crossover-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!
- 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 (sigma0, waves, and SSH)