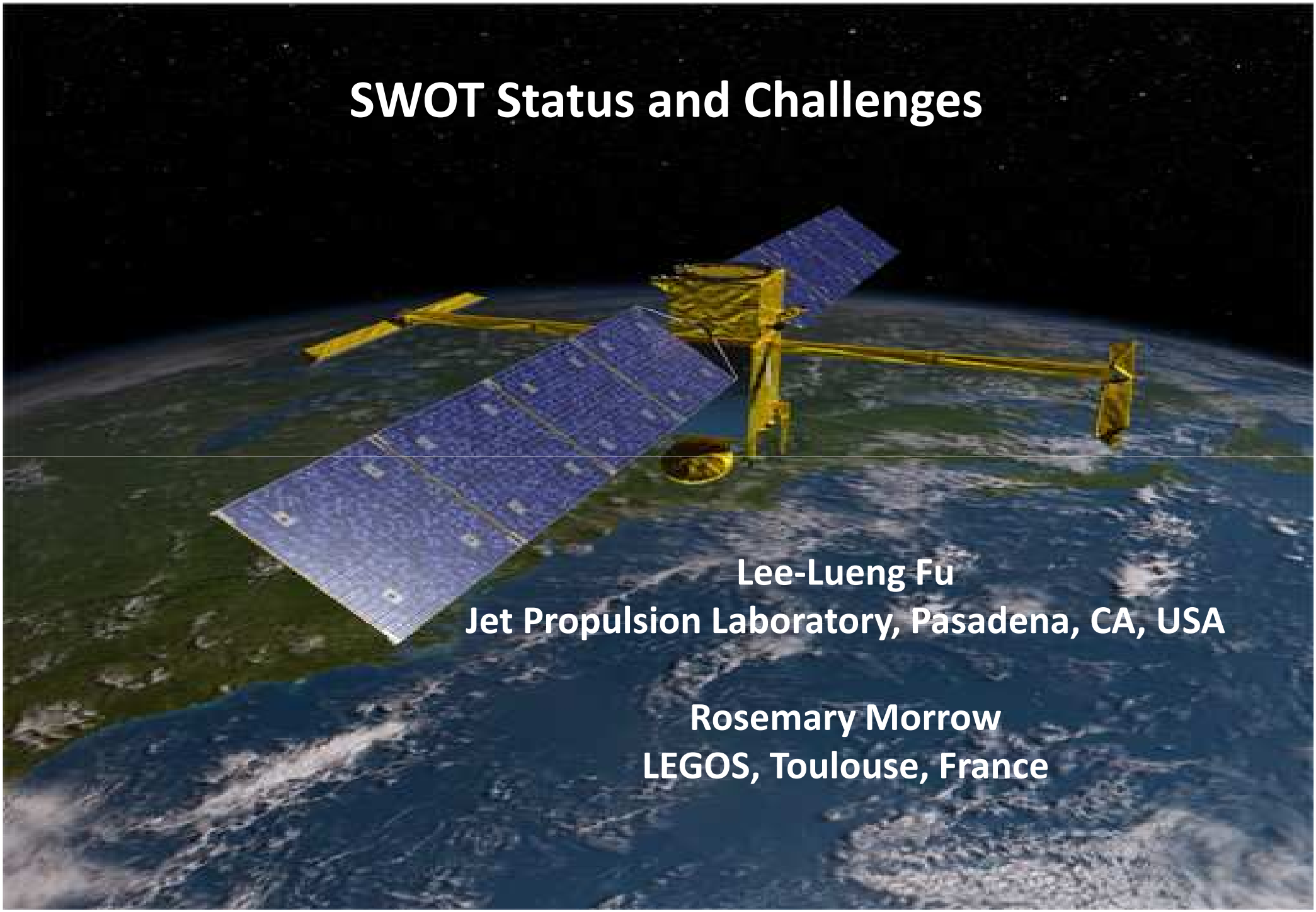
# SWOT Status and Challenges



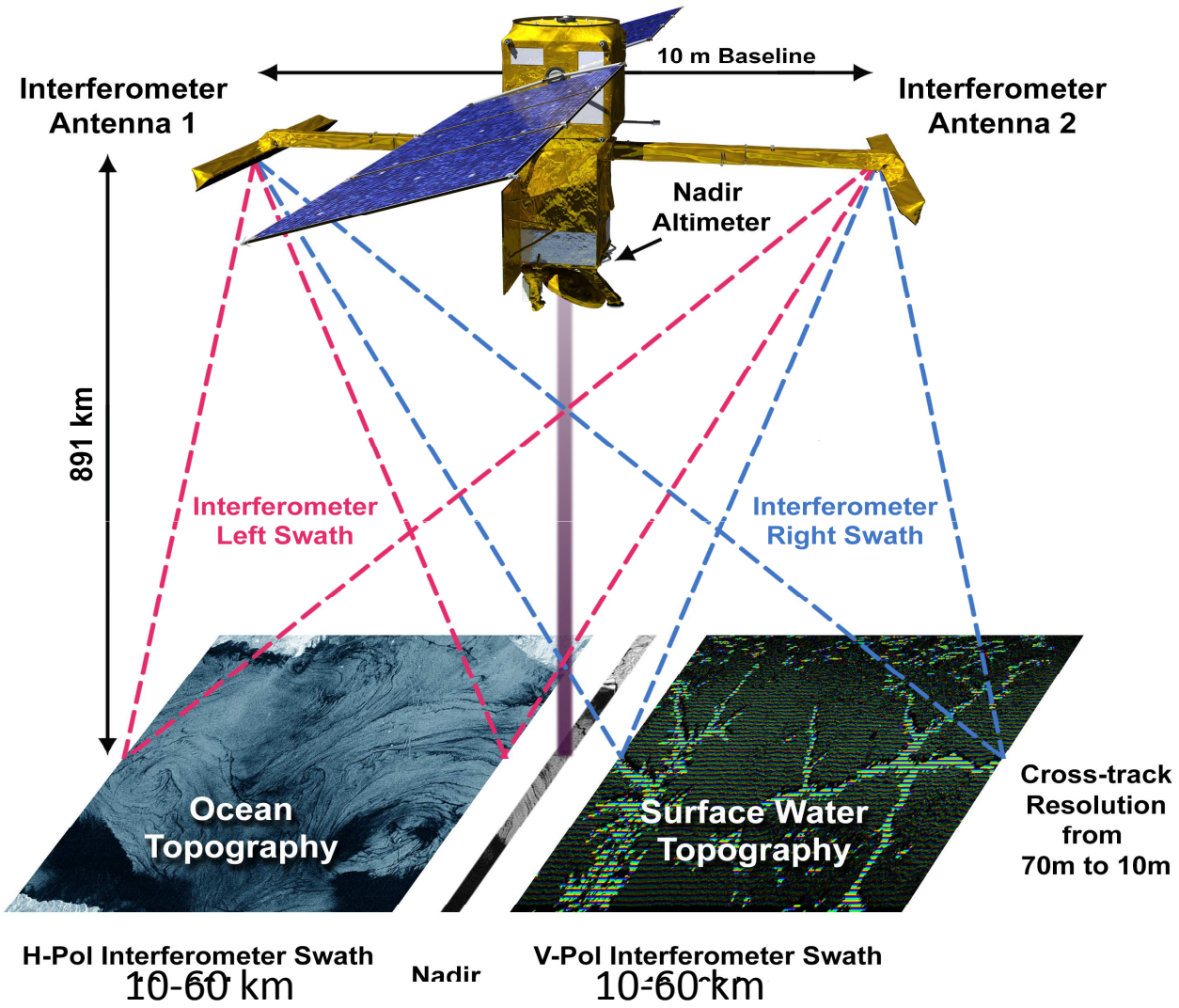

Lee-Lueng Fu
Jet Propulsion Laboratory, Pasadena, CA, USA

Rosemary Morrow
LEGOS, Toulouse, France

## Mission Development Status

- The Mission has passed Preliminary Design Review (April 2016) and been in Phase C since May 2016 (NASA) & July 2016 (CNES).
- A new Science Team (ST) has been established via a joint ROSES and TOSCA selection process.
- The first ST meeting was held in Pasadena, June 13-16, 2016.
- The ST is composed of 53 investigation teams with 25 in oceanography, 21 in Hydrology, and 7 in synergistic sciences. Approximately 40% of the new members are from the SDT.
- The ST is rich in international participation: 22 in US, 18 in France, 6 in Brazil, 2 in UK, 1 in Spain, Japan, Canada, Greece, Australia, and Colombia.
- Mission launch is scheduled for April, 2021.
- The planning of calibration/validation and development of science algorithms are the main contributions from the Science Team in the next year.

# SWOT SAR-interferometry



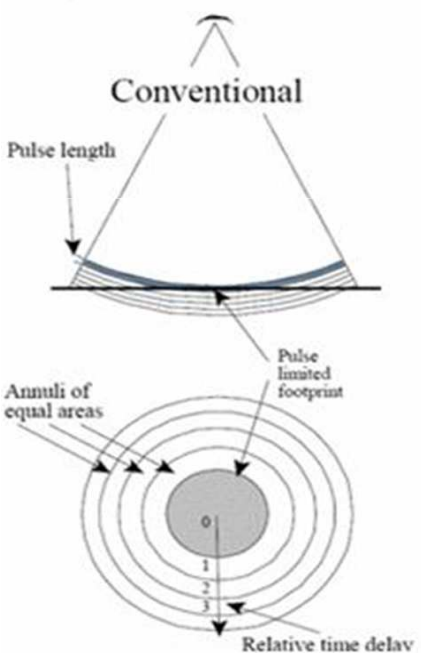

*LR ocean data :*
*250 m alongtrack*
*250 m cross-track*

- orbit: 891 km, 77.6º Incl., 21 day repeat
- Orbit determination (GPS/DORIS) & MW radiometers over each swath

# Understanding the signal & noise with SAR alongtrack then SWOT SAR-interferometry

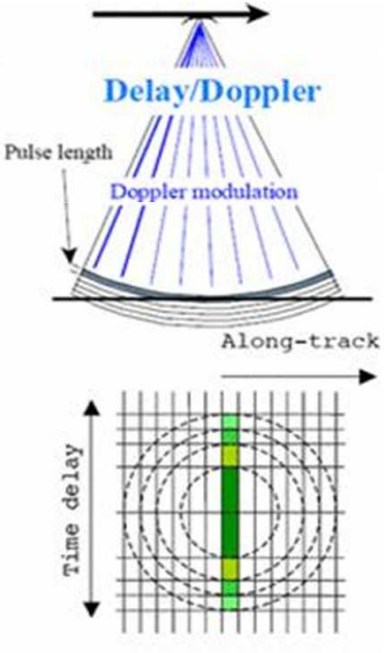
Wind-wave-swell-rain contributions to alongtrack « spectral hump » - impacts on SWOT

## Conventional : Jason - Saral



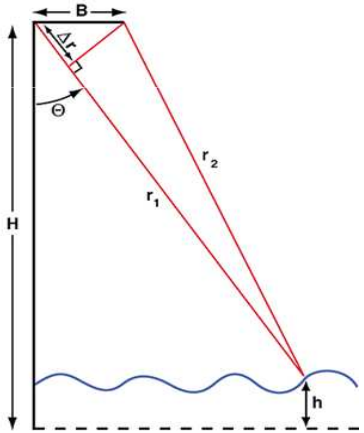

*5-7 km radius*

## SAR alongtrack – CR2, Sentinel-3

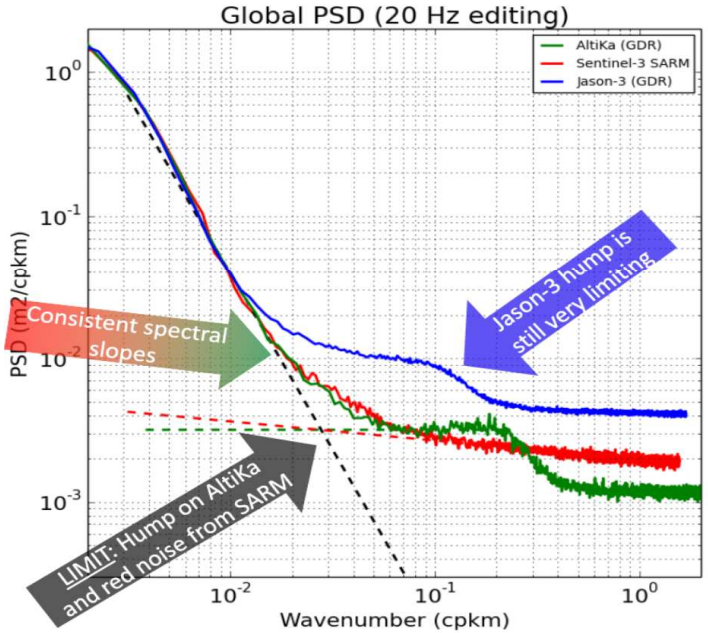



*300 m alongtrack*
*5-7 km cross-track*

## SAR interferometry – SWOT




*LR ocean data :*
*250 m alongtrack*
*250 m cross-track*

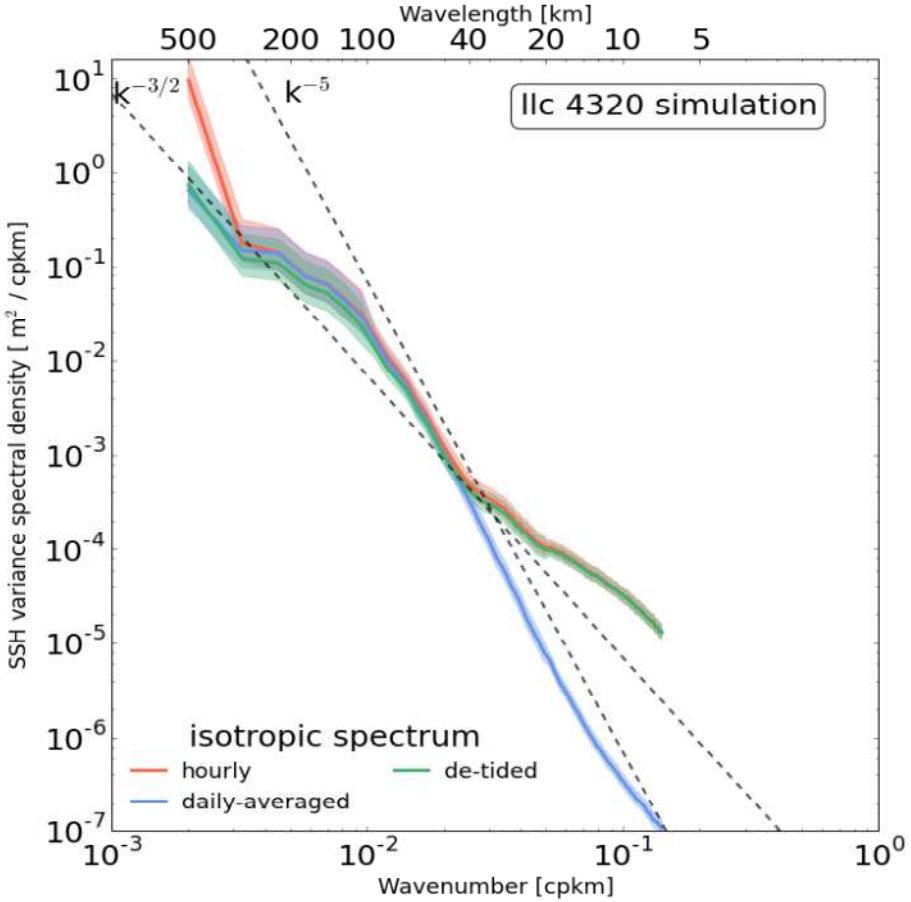



**Jason**
**Saral**
**Sentinel-3**

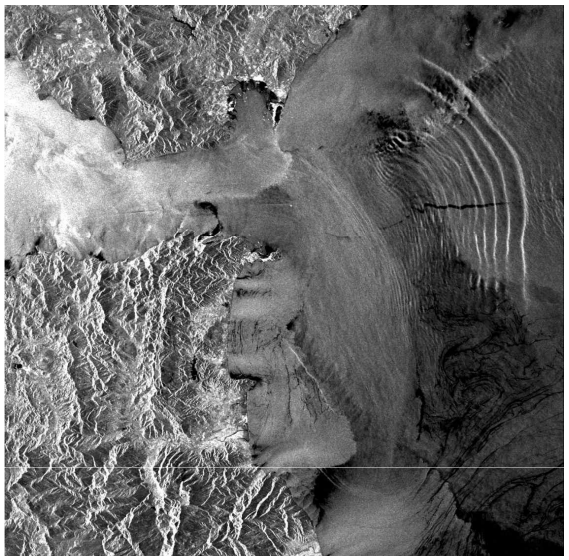
# Internal wave contributions to SSH wavenumber spectrum

From models …

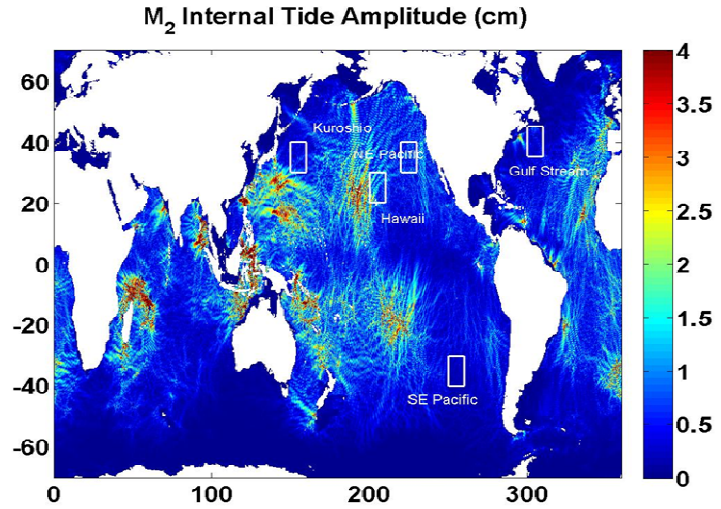
Drake Passage – daily/hourly




*(Rocha et al. 2015)*

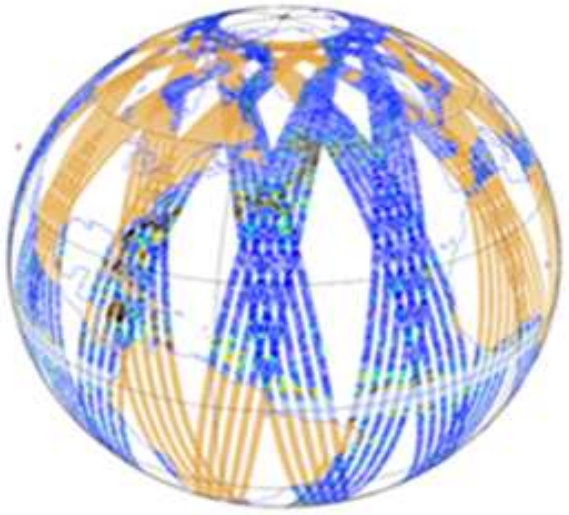


Internal waves radiating from Straits of Gibraltar, *ESA*

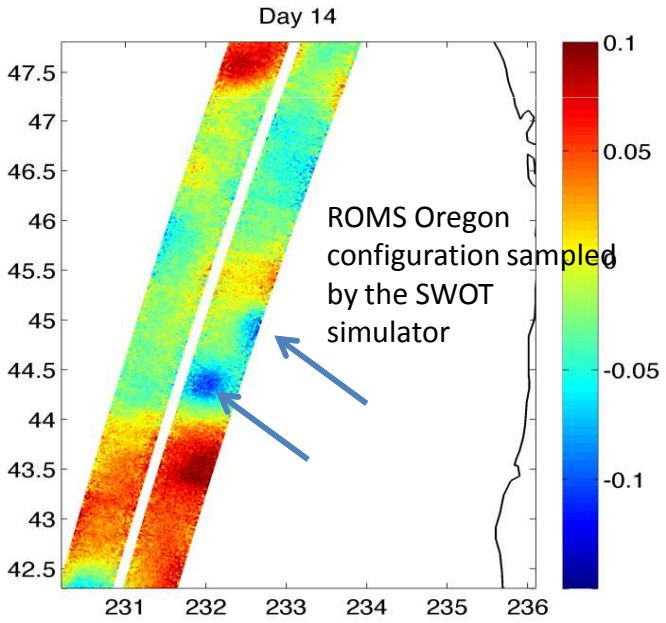



Model : HYCOM 1/12° *Arbic et al., 2012*

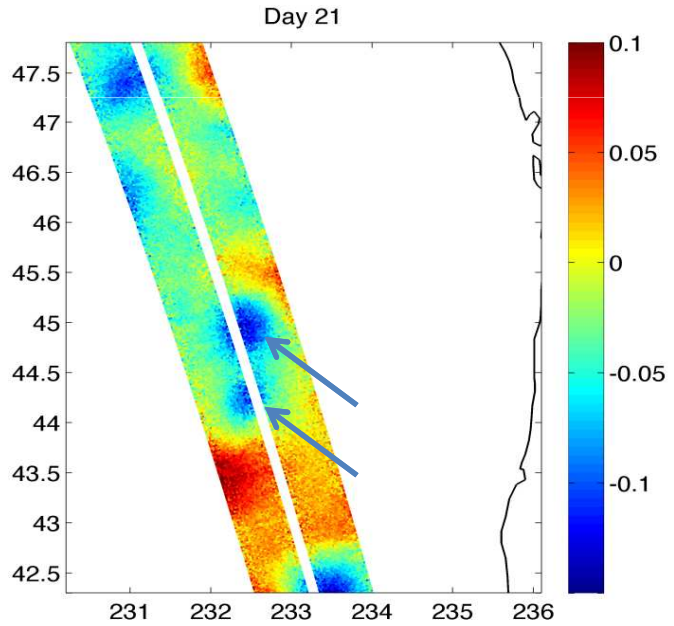
# Ocean SWOT simulator available to test 2D reconstruction techniques



*5-day SWOT coverage*
*Nominal orbit*



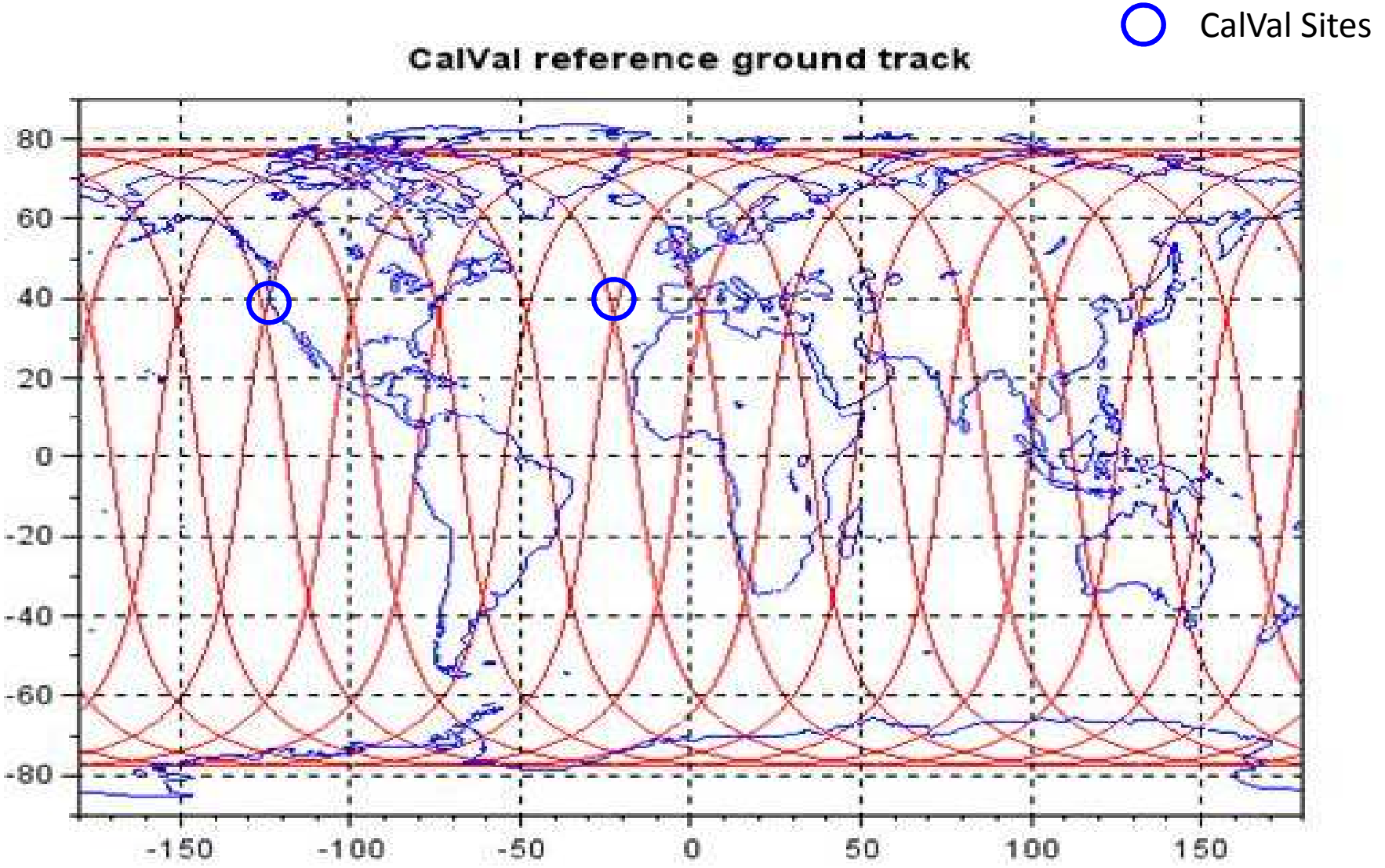

Small rapid structures – 2D mapping may need more dynamical contraints, combination with other data, or assimilation



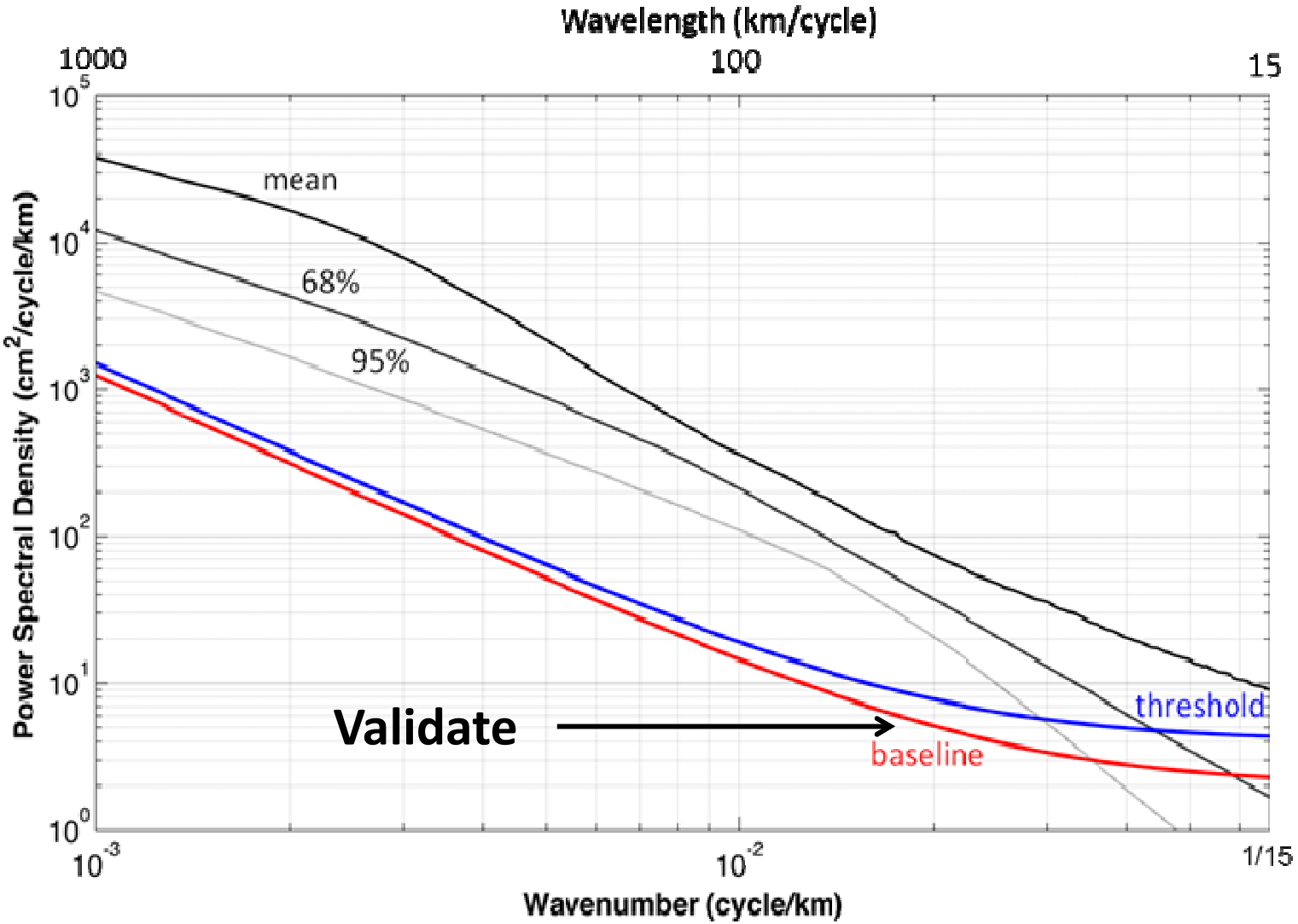

*Ubelmann et al., 2014*

Ocean LR simulator : https://swot.jpl.nasa.gov/science
Hydro HR simulator : Contact JF Cretaux, LEGOS

# 1-day fast sampling orbit for the 90 day CalVal phase

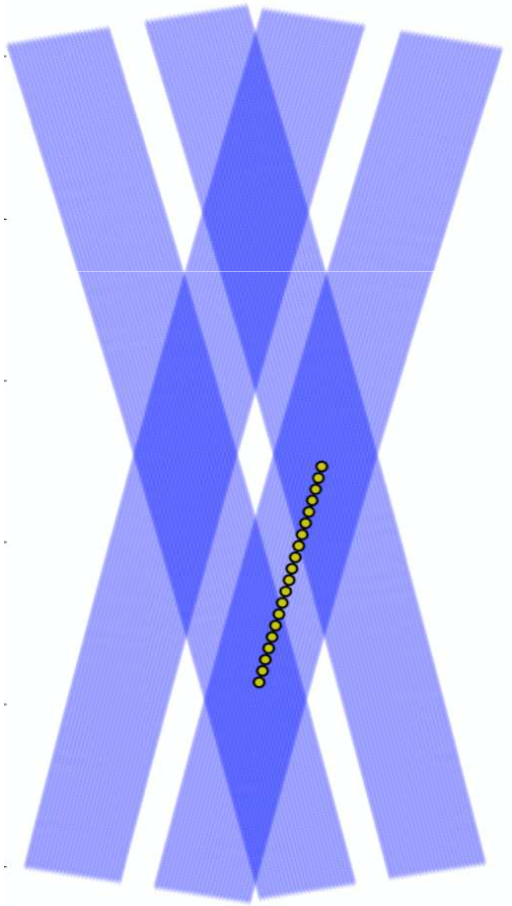


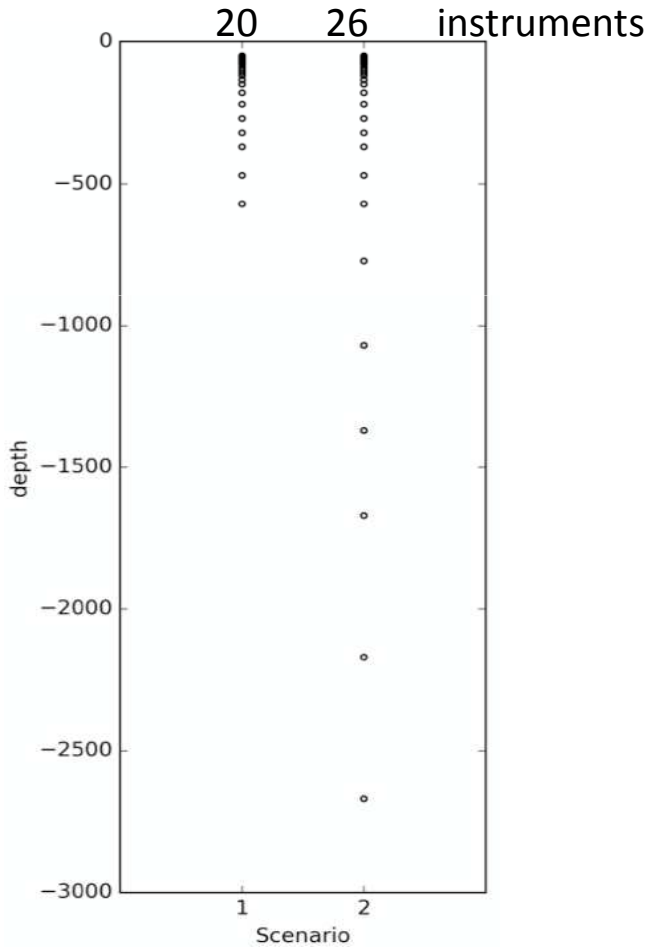
# CalVal Objectives



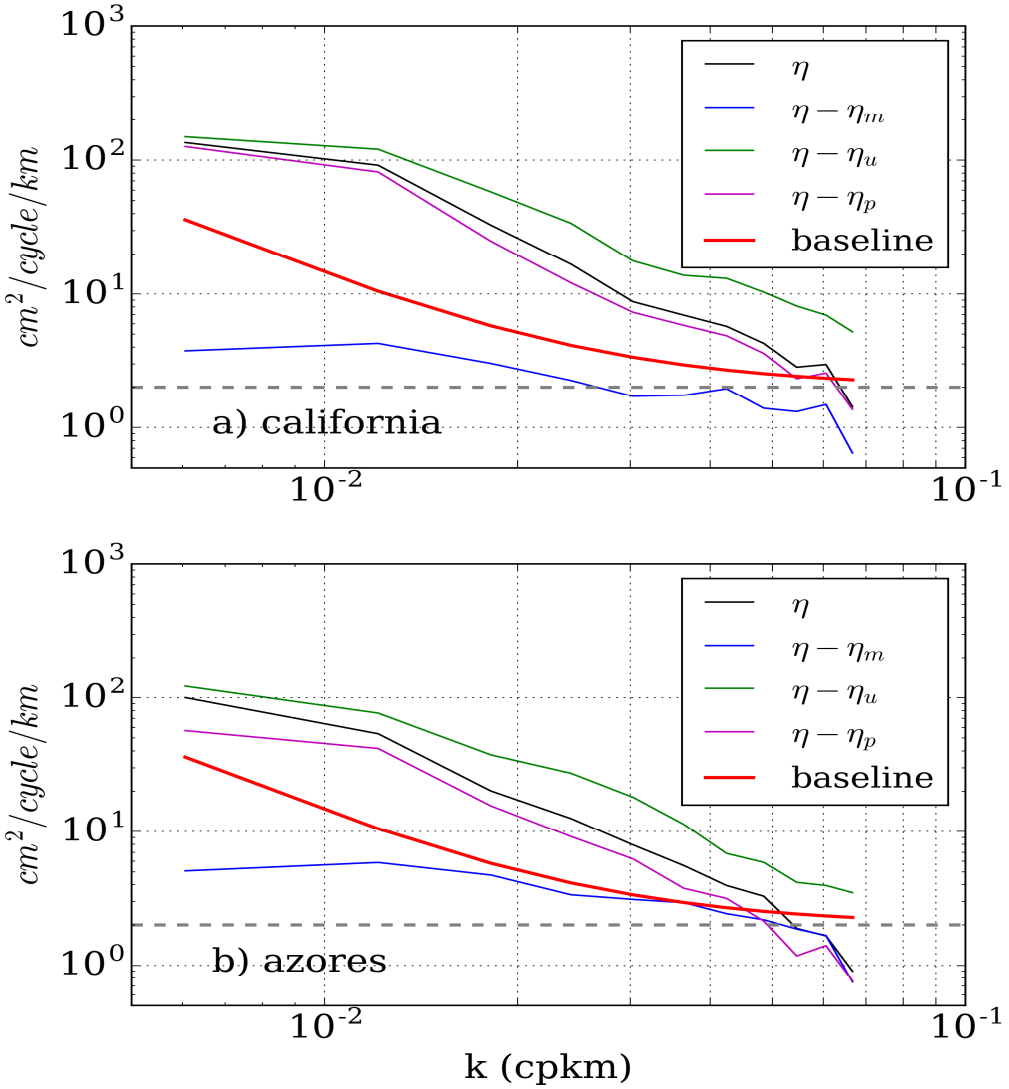
# An ocean observing system for the ocean CalVal

Deploy an array of 20 moored temperature and salinity sensors in the ocean 7.5 km apart to sample the upper ocean to resolve wavelengths from 15-150 km. The nadir altimeter will be the CalVal approach at wavelengths longer than 150 km.





# Comparison of the in-situ observation errors to the SWOT SSH error requirement




**See Poster TID007 on Thursday**