Participation in the SDT for SWOT

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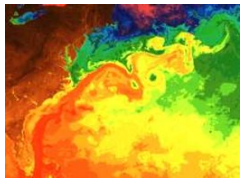
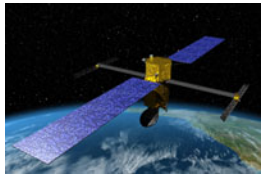
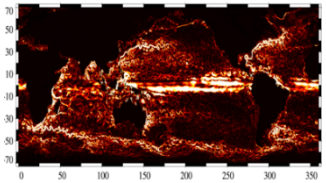
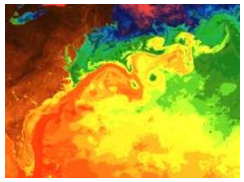


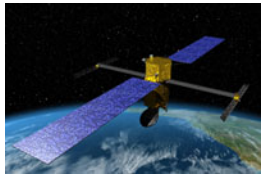


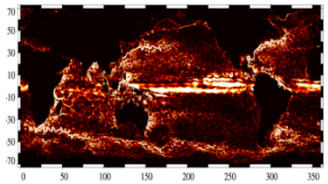


General objectives

- SWOT Ocean main objective is the observation of mesoscale and submesoscale signals for wavelengths between 20 and 200 km. Signals are of a few cm^2 only. SWOT capability to observe these signals will thus strongly depend on the level of measurement errors.
- SWOT is a complex and very challenging mission. A particular attention should be paid to preparatory activities. We plan to provide expert advice to the CNES/NASA Project team:
  - on properties of mesoscale & submesoscale signals and their impacts on mission science requirements or design/accommodation.
  - on benefits/limits of comparing SWOT with conventional nadir altimeter data
  - to explore the feasibility and benefits of new cross-calibration techniques of Ka-RIN data and to explore methods for producing high resolution global maps of sea surface height by merging SWOT observations with data from conventional altimeter missions.
  - on the utility of SWOT data for operational oceanography applications and develop future requirements.







Detailed activities

Characterization of mesoscale/submesoscale signals - Specific work to be conducted in 2013 & 2014:

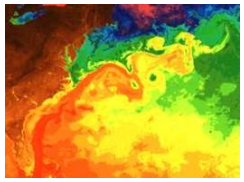
- characterize altimeter error wavenumber spectra from tandem mission data
- characterize altimeter wavenumber and frequency/wavenumber for wavelengths < 200 km.
- estimate where and over which spectral range nadir altimeters can provide useful data
- comparison with high resolution models (coll. with Klein et al. – SDT).
- Analysis of AirSWOT observations ?

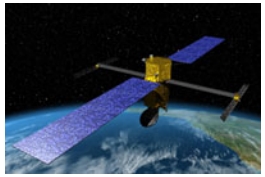
Calibration/validation and high level products. We plan to provide advice/support to the project on:

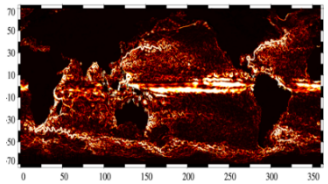
- Intercalibration and validation with conventional altimeter missions (LRM and SAR).
- Quantifying the impact and role of nadir observations.
- Developing/testing a prototype processing system for intercalibration with conventional altimeter missions derived from Dibarboure et al (2011)
- Defining/testing of techniques to merge SWOT data with those from nadir altimeters (e.g. Pujol et al., 2012). Integrating SWOT observations in SSALTO/DUACS.

Operational applications. We plan to provide advice/support to the project on:

- Requirements from data assimilation (coll. Dombrowsky et al. SDT). It is unlikely that the complex data processing needed to intercalibrate and merge SWOT data with conventional altimeter data can be fully transposed in a data assimilation system. Different strategies will have to be defined.
- Applications will be served after SWOT data are ingested into a multiple altimeter processing system and a global/regional/coastal data assimilation system. Specific requirements in terms of data latency, resolution and products + real time data processing issues will have to be addressed.







Key phase A – issues

Choice of orbit (fast repeat and 22 day cycles): need a (very) careful analysis. Is the nominal choice the best one ?

-impact for intercalibration

-space/time coverage and redundant/non-redundant information

-impact for science investigations

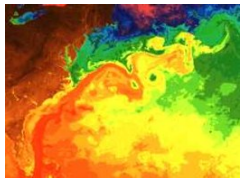
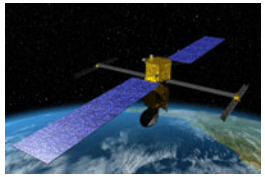
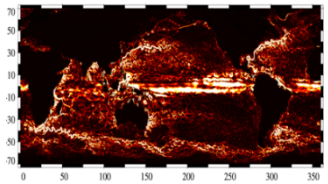
-requirements from very high resolution models (e.g. model validation, data assimilation)

-applications

Error budgets : to be refined/validated (end to end simulators)

Role of nadir altimeter : very much needed (validation, intercalibration)

Repetitivity : to be quantified but probably not a major issue in 2020 (to a certain extent)

High level data products (gridded in space and time): what does that mean for SWOT (as the resolution is very much dependant on time). A mesocale high level product and submesocale zooms ?

Real time processing issues