

WP 5000

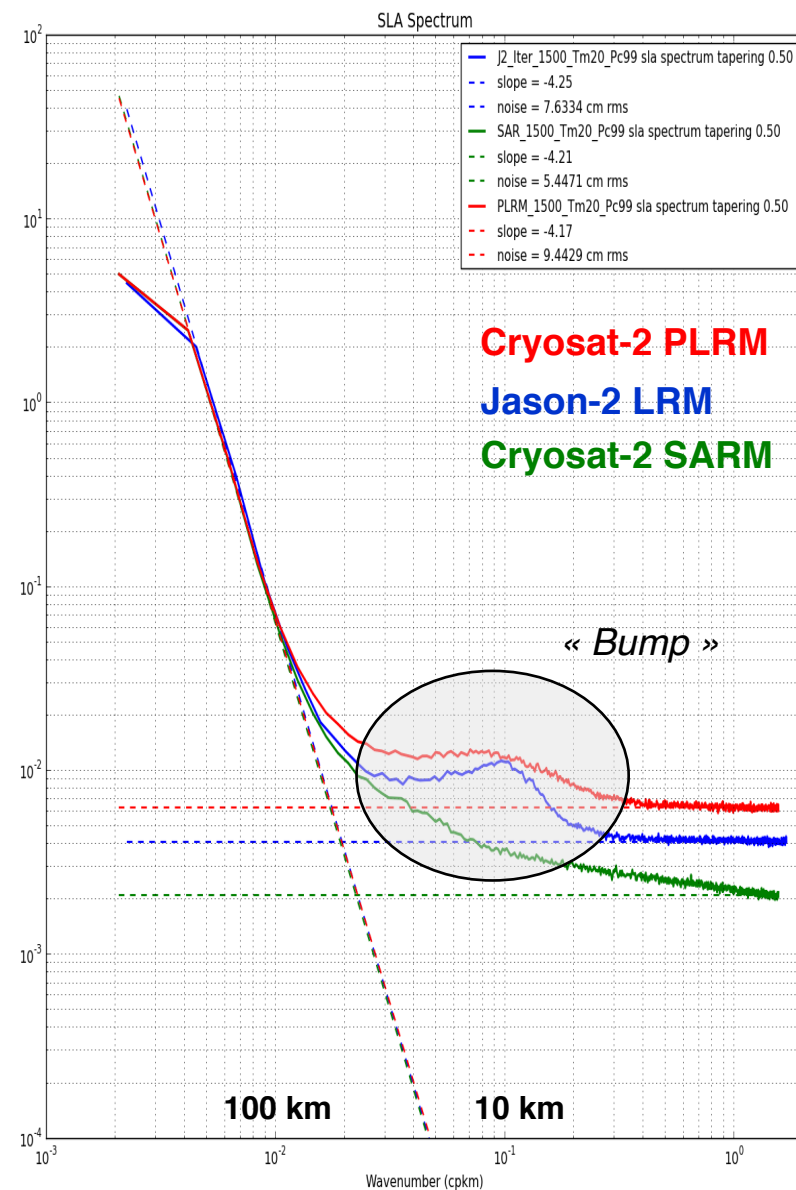
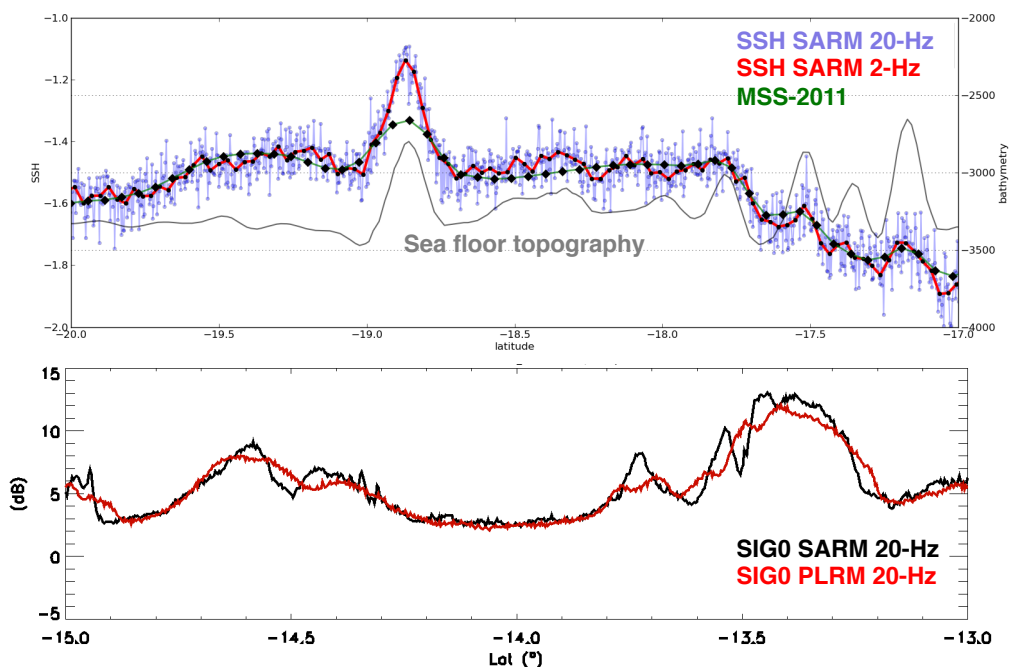
Open Ocean Study

Overview

T. Moreau



- Lower the noise level by 40% compared to LRM mode (due to more independent looks)
- Better performance close to land (due to a smaller along track footprint $\sim 300\text{-}400\text{m}$)
- Ability to resolve shorter-scale ocean features (between 10 and 80 km) whereas LRM mode is affected by correlated errors (“bump”)
- Better detect small sea mounts (badly seen in MSS)
- Better characterize the surface roughness (sigma-0)



To improve the SARM capabilities, investigations have to be done:

- To understand the remaining discrepancies between PLRM and SARM in low sea-state conditions, but also above 2m wave height in range (few cms) and swh (10 to 20 cm), and the dependency of their difference with wave height
- To reduce the noise level in range (up to a “theoretical” value \sqrt{n}), and in swh

➔ WP5000 CalVal activities will analyze and quantify the impact and benefits of using alternative and innovative L1b/L2 ocean processing in S-3 IPF regarding the issues described above

- To characterize the SARM sensitivity to long wave fields and mitigate potential swell-induced biases (with the use of more appropriate processing)
- To develop a SARM SSB model (in spite of low geographical coverage) based on relevant sigma-0 retrieval and wind model computation methods

➔ Ocean studies in WP5000 will be undertaken on swell impact and SSB

Start	January 2016 (T0 + 3 months)
End	July 2017 (T0 + 21 months)
Partners	CLS, TU Delft, NOC, SatOC
Objectives	To validate and evaluate the Open Ocean test data sets, and carry out the science studies on swell and sea state bias
WP	<p>5100 Performance specification and Product Validation Plan (CLS, TU Delft)</p> <p>5200 Development of a sea state bias solution in SAR mode (NOC, TU Delft)</p> <p>5300 Analysis of SAR mode sensitivity to swell fields (TU Delft)</p> <p>5400 Error analysis and Product Validation Report (CLS)</p> <p>5500 Demonstration products and Product Specification Document (CLS)</p>
Input	L2 Test data sets, IOOD, PSD, ATBDs, EUMETSAT SSB Study, WTC model
Output	Product Validation Plan, Product Validation Report, Output Products
Quality Control	<ul style="list-style-type: none"> - Outputs to be reviewed by team before delivery to ESA. - Draft PVR to be reviewed by steering group

Partners

CLS, TU Delft

Key Objectives

- To fully characterize the performances of the existing Sentinel-3 altimetry processing (SAR and PLRM) in open ocean,
- To perform a Product Validation Plan (PVP) for the validation of the innovative algorithms.

Activities

- Description of the validation strategy with performance metrics documented in the PVP [CLS] T0 + 4
- Evaluation of Sentinel-3 reference performances in SAR [CLS] and PLRM [TU Delft] T0 + 12

Input

- L2 Test data sets (Phase1)

Output

- Product Validation Plan, D2.4
- Product Validation Report (Phase 1), D2.5

Risks

Non-sufficient amount of processed data to allow robust statistical analyses and efficient assessment of S-3 reference performances

Partners

NOC, TU Delft

Key Objectives

- To review and analyse existing SSB solutions in LRM and SAR mode,
- To analyse the impact of swells on SAR mode altimetry data
- To identify the best methods to compute SAR mode SSB corrections,
- To propose Cal/Val methods for SAR mode SSB corrections

Inputs from NOC/EUMETSAT swell study

(EUMETSAT ITT 14/209556 Jason-CS SAR Mode Sea State Bias Study)

NOC/Eumetsat study

Activities

- started on 21 sept 2015
- ends on may/june 2016 (+8 months)

Input

- N/A

Output

- Outputs of the NOC/Eumetsat study

Risks

- N/A

Partners CLS, TU Delft (+ round-robin participants)

Key Objectives To analyse the impact of applying the alternative SAR altimetry algorithms on the Sentinel-3 ground processing performance

Activities Validate and cross-calibrate innovative methods and algorithms through a set of diagnoses and compile findings into Product Validation Reports (PVR) for the following T0 + 21

- SAR (IsardSat, CLS) [**CLS**]
- PLRM (TU Delft) [**TU Delft**]
- Improved Wet Tropospheric Correction (UPorto) [**CLS**]

Input

- L2 Test data sets (Phase 2)
- IODD
- Product specifications (PSD and ATBDs)
- WTC model

Output - Product Validation Report (Phase 2), D2.5

Risks Non-sufficient amount of processed data to allow robust statistical analyses and efficient assessment of the impact of the new products

Partners

CLS

Key Objectives

To produce innovative SAR-mode data products in a portable format for public domain dissemination and documentation

Activities

Generate 1/20Hz output products (in netcdf) from data set provided by WP4000, together with altimeter geophysical corrections and ancillary data that are used in the assessment tasks

T0 + 21

Input

- L2 Test data sets (Phase 2)
- Product specifications (PSD)
- WTC model

Output

- Output Products, D2.9

Risks

Non-sufficient amount of processed data to allow robust statistical analyses and efficient assessment of the impact of the new products

Main outcomes

shall establish a clear characterization of the performances of each algorithm, providing arguments and detailed evidence for recommending or not the use of improved algorithms in the Sentinel-3 ground processing over open ocean

Deliverables

- Validation report for each algorithm
- Report on the analysis of SAR mode sensitivity to swell fields
- Review of a sea state bias solution in SAR mode
- Output products

Risks

- Not enough data to assess each algorithm
- No clear comparison results between SARM and PLRM due to non-colocated surface points (near the coast)
- No clear conclusion coming out from this assessment

Recommendations

- To coordinate with WP5000 team for the selection of the geographical zones and periods of the Test Data Sets