

10th Coastal Altimetry Workshop - 21-24 February 2017, Florence, Italy

SEED QUESTIONS

S1: Waveforms and Retracking

Chairs: Marcello Passaro, Walter H. F. Smith, Pierre Thibaut

- 1) The Coastal Altimetry community has seen the proposal of several solutions from different groups aimed at using a homogenous retracking strategy regardless of the surface. Is there a consensus on this choice, or can a precise classification of the echoes, together with dedicated and specific retracking solutions, still bring better results
- 2) The development of retracking techniques and the improvements in precision are focusing the attention on high-rate (20 Hz or higher) altimetry. Is it time for distributing high-rate sea level products to the general public, or are traditional 1-Hz products already satisfactory for the non-expert coastal altimetry user?
- 3) How can we improve the description of the retracking quality for the end user? Is the typical 'standard deviation of the 1-Hz block' still a valid reference to judge the uncertainty on the estimated parameter? Can other statistics ('goodness of fit', ...) be a useful tool to understand how trustful is a retrieval?
- 4) The REAPER project has been useful in distributing a well-documented, updated SGDR product to exploit the 'old' missions with modern techniques, including retracking. Despite the new reprocessing of TOPEX (and the release of new orbits and SSHA), the reprocessed waveforms are not being distributed yet and the documentation of the L1B product in PODAAC dates back to 1993. Can we recommend an update of this product, so that our community can understand the difficulties and the challenges of a coastal-dedicated TOPEX reprocessing?

S2: Range and Geophysical Corrections

Chairs: Mathilde Cancet, Joana Fernandes, Marie-Laure Frery

- 1) With new techniques (SAR altimetry, interferometry) measuring at higher spatial resolutions and closer to the coast than conventional altimeters, what are the needs and the new requirements in terms of range and geophysical corrections (wet tropospheric correction, tides, DAC, SSB, MSS, MDT, etc.)?
- 2) What are the potential difficulties/show stoppers that remain in the development of corrections adapted to these new spatial resolutions? Adapted to the coastal regions? Methods? Access to auxiliary data (ex: bathymetry for the tides)?
- 3) Is there a need for corrections at higher data rate than 1hz to fully exploit e.g. SAR data near the coast? Is there enough information to derive them?
- 4) Future microwave radiometers are designed with higher frequencies for retrieval of the wet tropospheric correction more and more closer to shoreline (Jason-CS, ACCRA study). For the radiometers already in-flight or designed with only low frequencies, what can be done to improve the retrieval in the coastal areas for operational processors?
- 5) Coastal areas show quick changes in space and time, and the validation of the corrections is more critical due to this complexity. The assessment of performances of new missions closer to the coast is difficult due to partial validation of the corrections in these areas. Are there any advances in the validation of coastal corrections?
- 6) Are the corrections easily available (access) and usable (format)?

S3: Performance and Cal/Val of Coastal Altimetry

Chairs: Pascal Bonnefond, Luciana Fenoglio and Remko Scharroo

The performance of coastal altimetry has dramatically improved in the last few years, thanks to new retracers and particularly to the use of the Delay Doppler unfocused methodology (a.k.a. SAR altimetry). The focused DDA promises to still further reduce contamination of altimeter data near the coast.

- 1) What are the current limits and limitations of SAR altimetry and how are they expected to change in the near future?
- 2) Are we confident enough with SAR data to map coastal ocean surfaces, currents, wave heights, and wind speeds?
- 3) Can we quantify (as a function of distance from coast and direction) the reduction of land contamination in SAR mode compared to LRM?
- 4) How close to the coast can SAR altimetry be effectively used?
- 5) How can we proceed from here to prepare for SWOT technology?
- 6) Absolute calibration of altimetric sea level at dedicated sites gives insights about measurement biases at the mm level. Can we explain the discrepancies and improve our confidence in the calibration?

S4: Altimetry for Regional and Coastal Models

Chairs: Claire Dufau, Ole Roggenbuck, John Wilkin

Coastal altimetry products visibility and current use

- 1) Are the coastal products known in the modelling communities?
- 2) Do oceanographers (non-specialist altimetrists) know how to use the products correctly?
- 3) Are altimeter SLA/SSH products easily used in conjunction with in situ observations from tide gauges, pressure gauges, inverted echo sounders?
- 4) Are there limitations in the use of coastal altimetry products?
 - a. Discontinuity with open ocean altimetry?
 - b. Noise?

- c. Time period coverage (delayed mode)?
 - d. Availability (real-time)?
 - e. Information missing? (e.g., access information)
 - f. No multi-mission inter-calibration?
- 5) What could be done to improve the visibility and usability:
- a. Comparison projects
 - b. Coastal gridded products?
 - c. Level 3 (gridded) or Level 2B (track) data to standard nominal track
 - d. Concrete actions such as a cookbook by use-case, a way to share experience in use of coastal altimetry (a forum)?

Quality of SLA and SSH in coastal areas

- 6) Are tide models sufficiently accurate?
- 7) Could regional models be incorporated into data systems (like RADS does for some regional tide models)
- 8) Are the MSSH models in coastal areas good enough?
- 9) Could heterogeneous regional models be used to improve MSS
- 10) Is the atmospheric pressure loading in shallow areas and near to steep coastal orography modelled with a sufficient accuracy? --- Do we need regional DAC?
- 11) Does the DAC with combined Inverse Barometer and high frequency ocean variability cause problems for coastal dynamic interpretation?

Synergy with regional/coastal modelling

- 12) Are some products more suitable for regional-/coastal modelling than others?
- 13) To what extent do coastal models benefit from the coastal altimetry products?
- 14) What coastal processes can be detected on Sea Level? Within which signal-to-noise ratio ?
- 15) Should the modelled values or the measurements get a higher weight during the assimilation?
- 16) How should the weighting of different techniques look like by an empirical modelling?
- 17) Are coastal products consistent with standard products, e.g. with respect to
 - a. Sea level datum
 - b. Averaging process for Mean Sea Surface

S5: Applications I – Currents, Waves and Winds

Chairs: Jerome Bouffard, Jessica Hausman, Svetlana Karimova

Altimetry-derived currents in the coastal zone: challenges, solutions, and perspectives

- 1) What are the main issues and best existing procedures to derive meaningful altimetry current over the coastal domain? What are the potentials and limitations of observing coastal currents with pulse-limited and SAR altimeters?
- 2) What are the main sources of discrepancies between in situ and altimetry observed surface currents in the coastal areas? --- How does non-exact space/time coincidence between altimetry and in situ measurements affect comparing, validating, and exploiting altimetry datasets? --- How great is the contribution of ageostrophic component of surface currents? Can this contribution be adequately assessed from altimetry data? --- How does the knowledge on local oceanographic processes help while validating altimetric signals?
- 3) What are the perspectives for resolving smaller scale circulation features? What is the physical content/meaning of small-scale dynamics derived from altimetry measurements?
- 4) New perspectives, an old problem: Closed contours of SLA and mesoscale eddies –are these terms interchangeable?
- 5) How to better exploit potential synergy between coastal altimetry (in terms of SWH, WS, SSH, and current) with other remote sensing observations (e.g. Sentinel-1), cruise campaigns, and marine observatories (e.g. MOOSE, SOCIB, etc.)?
- 6) How can we use coastal altimetry to improve and /or better interpret the physical content of “non-perfect” in situ measurements (reference level and synopticity issues, ageostrophic parts, instrumental error, etc.)?
- 7) How to better promote and support the use of coastal altimetry toward the oceanographic community?

S6: Applications II - Sea Level and Extreme Events

Chairs: David Cotton, Kaoru Ichikawa, Clara Lázaro

- 1) How can altimeter data best help coastal defence managers?
- 2) What are the key decisions that coastal defence managers are having to make, and what information / evidence do they need to support this decision making process?
- 3) What are the biggest areas of uncertainty in their knowledge?
- 4) Where (geographically) can coastal altimeter data be most useful?
- 5) What are the limiting factors on the capability and utility of altimeter data in monitoring sea level and extreme events? - e.g. Accuracy, proximity to coast, maintaining track over complex topography, (high resolution) geophysical corrections, bathymetry, coverage (spatial and temporal), availability of data in near real time, insufficiently long time series, in-situ validation data, ...