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## Improving SAR Altimeter processing over the coastal zone and inland waters - the ESA HYDROCOASTAL project

**David Cotton**<sup>1</sup> and the HYDROCOASTAL Project Team\*

<sup>1</sup>Satellite Oceanographic Consultants Ltd, Stockport, United Kingdom of Great Britain and Northern Ireland  
(d.cotton@satoc.eu)

\*A full list of authors appears at the end of the abstract

### Introduction

HYDROCOASTAL is a two year project funded by ESA, with the objective to maximise exploitation of SAR and SARin altimeter measurements in the coastal zone and inland waters, by evaluating and implementing new approaches to process SAR and SARin data from CryoSat-2, and SAR altimeter data from Sentinel-3A and Sentinel-3B. Optical data from Sentinel-2 MSI and Sentinel-3 OLCI instruments will also be used in generating River Discharge products.

New SAR and SARin processing algorithms for the coastal zone and inland waters will be developed and implemented and evaluated through an initial Test Data Set for selected regions. From the results of this evaluation a processing scheme will be implemented to generate global coastal zone and river discharge data sets.

A series of case studies will assess these products in terms of their scientific impacts.

All the produced data sets will be available on request to external researchers, and full descriptions of the processing algorithms will be provided

### Objectives

The scientific objectives of HYDROCOASTAL are to enhance our understanding of interactions between the inland water and coastal zone, between the coastal zone and the open ocean, and the small scale processes that govern these interactions. Also the project aims to improve our capability to characterize the variation at different time scales of inland water storage, exchanges with the ocean and the impact on regional sea-level changes

The technical objectives are to develop and evaluate new SAR and SARin altimetry processing techniques in support of the scientific objectives, including stack processing, and filtering, and retracking. Also an improved Wet Troposphere Correction will be developed and evaluated.

### Project Outline

There are four tasks to the project

- Scientific Review and Requirements Consolidation: Review the current state of the art in SAR and SARin altimeter data processing as applied to the coastal zone and to inland waters
- Implementation and Validation: New processing algorithms will be implemented to generate a Test Data sets, which will be validated against models, in-situ data, and other satellite data sets. Selected algorithms will then be used to generate global coastal zone and river discharge data sets
- Impacts Assessment: The impact of these global products will be assess in a series of Case Studies
- Outreach and Roadmap: Outreach material will be prepared and distributed to engage with the wider scientific community and provide recommendations for development of future missions and future research.

## **Presentation**

The presentation will provide an overview to the project, present the different SAR altimeter processing algorithms that are being evaluated in the first phase of the project, and early results from the evaluation of the initial test data set.

**HYDROCOASTAL Project Team:** David Cotton (SatOC Ltd, UK), Albert Garcia-Mondejar, Ferran Gibert, Ester Vendrell (isardSAT, ES), Christine Gommenginger (NOC, UK), Ole Andersen, Karina Nielsen, Heidi Rannal (DTU Space, DK), Luciana Fenoglio-Marc (University of Bonn, DE), Michele Scagliola (Aresys, IT), Mathilde Cancet (NOVELTIS, FR), Marcello Passaro, Denise Dettmerring (Technical University of Munich), Pierre Fabry (Along-Track, FR), Nicholas Bercher (AltiHydroLab.fr, FR), Angelica Tarpanelli (CNR-IRPI), Stefano Vignudelli (CNR- IBF), Francesco de Biasio (CNR-ISP), Peter Bauer-Gottwein (DTU Environment), M.J. Fernandes, Clara Lazaro (U Porto), Cornelis Slobbe, Marc Naeije (TU Delft), Jesus Gomez-Enri (University of Cadiz), Peter Thorne, Elena Zakharova (NUIM), Andrew Shaw (SKYMAT), Marco Restano (SERCO, ESA), Jérôme Benveniste (ESA-ESRIN),