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High-resolution coastal bathymetry retrieved from satellite data: a research application within the Co-ReSyF project.

Luísa Lamas (1), José Paulo Pinto (1), Francisco Sancho (2), Alberto Azevedo (2), Florent Birrien (2), Pedro Vilar (1), and Ana Moura (1)

(1) Instituto Hidrográfico, Lisboa, Portugal (luisa.lamas@hidrografico.pt), (2) Laboratório Nacional de Engenharia Civil, Lisboa, Portugal

A wave tracking method to estimate high resolution coastal bathymetry from SAR images will be presented. The method relies on the mathematical connection between wavelength, retrieved from SAR images using Fast Fourier transformations, and local depth through the linear dispersion relation. Optimal conditions of swell waves and good quality of image acquisition are necessary in order to correctly retrieve the wave parameters from SAR. The wave tracking algorithm also requires a reference bathymetry for a first-guess of the water depth for the farthest offshore point, which marks the limit of deep/intermediate waters. Wave rays are then tracked from this limit to the wave breaking zone (typically at depths of the order of 1 to 10 m). The output of the algorithm consists of the estimated depths interpolated to a uniform rectangular mesh with a horizontal resolution of 150m. This work is a part of a research application developed within the EU H2020 Coastal Waters Research Synergy Framework (Co-ReSyF) project, to demonstrate the operational capabilities of the platform. Several case studies at different locations off the Portuguese Coast will be presented, using high resolution SAR images from KOMPSAT-5 and Sentinel 1. Several issues regarding the synergy between SAR and Optical data to retrieve high-resolution bathymetry in shallower waters will be briefly discussed.