Satellite-derived shorelines extracted using SAET for characterizing the effect of Storm Gloria in the Ebro Delta (W Mediterranean)

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Coastal storms constitute a key factor controlling shoreline position changes. They may deeply modify the beach morphology and contribute to erosive processes. Earth observation data as the images from the Sentinel satellites of ESA’s Copernicus program and the Copernicus Contributing Missions offer potential information for characterizing beach changes.

SAET (Shoreline Analysis and Extraction Tool) is an open-source tool developed within the framework of the ECFAS project intended to enable the automatic shoreline extraction from optical satellite imagery. SAET is assessed in order to determine the accuracy of the resulting satellite-derived shorelines (SDSs) as well as its capacity to detect and characterise beach changes. The SDSs are employed to define the changes of the shoreline position through 82 km of beaches in the Ebro Delta (E Spain) associated with Storm Gloria. The storm peaked on 22 of January 2020 (significant wave heights over 7 m), heavily affecting the whole of eastern Spain.

The accuracy of the SDS extracted using SAET was assessed by comparing its position against the shoreline photo-interpreted on a VHR image. A Spot 7 (1.5 m of spatial resolution) acquired 37 minutes before the Sentinel-2 used for defining the SDS was employed for this purpose. Both images were acquired on 26 of January, four days after the peak of the storm. An average error of 5.18 m (seawards) ± 9.98 m was measured.

The comparison of the position of the SDS obtained before (18/01/2020) and after the peak of the storm (26/01/2020) allows to map the retreat of the shoreline position linked to this event. Within the ECFAS project this approach will be extended to a number of other test cases.

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