Near Real Time services for supporting Maritime Situation Awareness with Sentinel-1 satellite: observation of surface wind, sea sate and coastal processes

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Innovative algorithms for Sentinel-1 (S1) satellite allow daily observations of meteo-marine parameters, tracking of storm propagation, study of local sea state variability and coastal processes. Several minutes after acquisition, the produced data with geo-coded information on wind speed and wave height can be transferred to the weather services for validation of the forecasting models worldwide. The different kind of data like coastline, wave height, surface wind speed, ice coverage, oil spills etc. can be processed in parallel for the same satellite image and combined with other information (e.g. model results, ship traffic) for supporting Maritime Situation Awareness (MSA). The algorithms currently developed for this purpose are integrated into a prototype processor for Sentinel-1 imagery. The DLR Ground Station Neustrelitz applies this prototype as part of a near real-time demonstrator MSA service. The presented scientific service involves daily provision of surface wind and sea state fields estimated fully automatically from S1 Wide Swath Mode (IW) Synthetic Aperture Radar (SAR) images of North and Baltic Sea. S1 IW covers area-strips of thousand kilometres of earth and ocean surface with a resolution of 10m by sequences of multiple individual IW images with an approximate size of 200km×250km. The NRT processing has been also applied by supporting a research ship cruise in the Antarctic Sea.