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Earth observation and the coastal zone: from global images to local flood risk information

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Flood risk is one of the most pressing challenges facing society today. Climate change and increasing population pressures on deltas and floodplains continue to raise future flood risk and intervention to reduce such risk is urgently needed. Conservation, improved management and restoration of ecosystems and vegetated foreshores could form part of such interventions. For application, assessment of such benefits is required and flood protection engineers need trusted and practical tools that provide them with quantitative information on key parameters for analysis and assessments.
The aim of the FAST project was to develop Copernicus services to determine the characteristics of vegetated foreshores and to help harness the potential of foreshores to be used as part of nature-based solutions towards reducing coastal flood and erosion risk. This objective was achieved through the following sub-goals:
1) To execute a set of standardized measurements of different types of wetlands and their capacity to reduce wave impact, 2) to improve models currently used to predict wave attenuation by coastal wetland vegetation (by making sure computer models can replicate what we measure at specific locations), and 3) to find ways of measuring aspects of coastal wetlands from the air and space (using Earth Observation data) so that we can ultimately acquire such data at the global level and determine the importance of
coastal wetlands to society at any specific location and globally, and finally, 4) to coalesce all the above data and make it publically available in a freely accessible online service.
The FAST project team has measured during 3 years vegetation characteristics, wave attenuation and sedimentation and erosion at 8 different coastal field sites in four different countries. Further, EO data from various sources was transformed into global map layers, such as a global vegetation cover, vegetation change and new and more accurate EO-derived elevation maps for the coastal zone. These maps were used in the newly developed MI-SAFE package to provide users with access to data and flood hazard modeling services relating to coastal wetland habitats for many coastlines of the globe. The main vehicle for accessing and demonstrating these services is the online MI-SAFE viewer. Main products are open source map layers and open source XBEACH model results.