



Earth Observation in aid of surge monitoring and forecasting: ESA's eSurge Project

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The understanding and realistic modelling of surges supports both preparation and mitigation activities and should eventually bring enormous societal benefits, especially to some of the world's poorest countries. Earth Observation data from satellites have an important role to play in storm surge monitoring and forecasting, but the full uptake of these data by the users (such as environmental agencies and tidal prediction centres) must be first encouraged by showcasing their usefulness, and then supported by providing easy access.

The European Space Agency has recognized the above needs and, through its Data User Element (DUE) programme, has initiated in 2011 the eSurge project, whose aims are: a) to contribute through Earth Observation to an integrated approach to storm surge, wave, sea-level and flood forecasting as part of a wider optimal strategy for building an improved forecast and warning capability for coastal inundation; and b) to increase the use of the advanced capabilities of ESA and other satellite data for storm surge applications. The project is led by Logica UK, with NOC (UK), DMI (Denmark), CMRC (Ireland) and KNMI (Netherlands) as scientific partners.

eSurge aims to provide easy access to a wide range of relevant data for a range of historical surge events, as well as performing a series of experiments to demonstrate the value of this data, and running workshops and training courses to help users make use of the available data.

The eSurge database of Earth Observation and in situ measurements for past surge events is now publicly available. In 2013 the project moves into its service demonstration phase, adding more data and events, including a demonstration near real time service. The project works closely with its users in order to meet their needs and to maximise the return of this data.

A novel dataset provided by eSurge is coastal altimetry. Coastal altimetry has a prominent role to play as it measures directly the total water level envelope (TWLE), i.e. one of the key quantities required by storm surge applications and services. But it can also provide important information on the wave field in the coastal strip, which helps the development of more realistic wave models that in turn can be used to improve the forecast of wave setup and overtopping processes. We will present examples of how altimetry has captured a few significant surge events, and we will describe how a multi-mission coastal altimetry processor is being integrated in the eSurge system and the data are blended with tide gauge data to extract the main modes of variability in the coastal regions.

We will finally describe the forthcoming demonstrative service in near real time (eSurge-Live). The pilot regions for this application will be the European Seas and the North Indian Ocean.