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Global Storm Surge Forecasting and Information System

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The Global Storm Surge Forecasting and Information System is a first-of-its-kind operational forecasting system for storm surge prediction on a global scale, taking into account tidal and extra-tropical storm events in real time. The system, built and hosted by Deltares, provides predictions of water level and surge height up to 10 days in advance from numerical simulations and measurement data integrated within an operational IT environment.

The Delft-FEWS software provides the operational environment in which wind forecasts and measurement data are collected and processed, and serves as a platform from which to run the numerical model. The global Delft3D model is built on a spherical, flexible mesh with a resolution around 5 km in near-shore coastal waters and an offshore resolution of 50 km to provide detailed information at the coast while limiting the computational time required. By using a spherical grid, the model requires no external boundary conditions. Numerical global wind forecasts are used as forcing for the model, with plans to incorporate regional meteorological forecasts to better capture smaller, tropical storms using the Wind Enhanced Scheme for generation of tropical winds (WES). The system will be automated to collect regional wind forecasts and storm warning bulletins which are incorporated directly into the model calculations.

The forecasting system provides real-time water level and surge information in areas that currently lack local storm surge prediction capability. This information is critical for coastal communities in planning their flood strategy and during disaster response. The system is also designed to supply boundary conditions for coupling finer-scale regional models. The Global Storm Surge Forecasting and Information System is run within the Deltares iD-Lab initiative aiming at collaboration with universities, consultants and interested organizations. The results of the system will be made available via standards such as netCDF-CF, OpenDAP, WaterML2 and/or JSON REST as an interoperability experiment.