



The Early-Warning System for incoming storm surge and tide in the Republic of Mauritius

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The Republic of Mauritius (ROM) is a group of islands in the South West of the Indian Ocean, consisting of the main islands of Mauritius, Rodrigues and Agalega and the archipelago of Saint Brandon. The ROM is particularly vulnerable to the adverse effects of climate change, especially in the coastal zone, where a convergence of accelerating sea level rise and increasing intensity of tropical cyclones is expected to result in considerable economic loss, humanitarian stresses, and environmental degradation. Storm surges and swell waves are expected to be aggravated through sea level rise and climate change effects on weather patterns.

Adaptation to increased vulnerability requires a re-evaluation of existing preparedness measures. The focus of this project is on more effective preparedness and issuing of alerts developing a fully-automated Early-Warning System for incoming storm surge and tide, together with the Mauritius Meteorological Services and the National Disaster Risk Reduction and Management Centre (NDRRMC), such that coastal communities in Mauritius, Rodrigues and Agalega Islands are able to evacuate timely and safely in case of predicted extreme water levels.

The Mauritius Early-Warning System for storm surge and tide was implemented using software from Deltares' Open-Source and free software Community. A set of five depth-averaged Delft3D-FLOW hydrodynamic models are run every six-hours with a forecast horizon of three days, simulating water levels along the coast of the three main islands. Two regional models of horizontal resolution 5km force the three detailed models of 500m resolution; all models are forced at the surface by the 0.25° NOAA/GFS meteorological forecasts. In addition, our Wind-Enhancement Scheme is used to blend detailed cyclone track bulletin's info with the larger-scale Numerical Weather Predictions. Measured data is retrieved near real-time from available Automatic Weather Stations. All these workflows are managed by the operational platform software, Delft-FEWS.

The presently operational Mauritius Early-Warning System produces a set of intuitive tables for each island, containing time- and space-varying information on threshold crossings by predicted water levels. At multiple locations for each island of the ROM, the operator is informed in one glance about the recommended preparedness level, from "Safe" to "Watch", "Alert" or "Warning" based on water level forecasts. The HTML page was designed together with the MMS and the NDRRMC, in order to be easy to interpret and disseminate by local authorities.