



Applications for mid-range forecasts - Simulations of storm surges

Oscar Jurado (1,2), Ólafur Rögnvaldsson (2,3), and Angel Ruiz-Angulo (1)

(1) Centro de Ciencias de la Atmósfera – CCA, Universidad Nacional Autónoma de México, (2) Geophysical Institute, University of Bergen, Norway, (3) Belgingur, Reykjavik, Iceland (or@belgingur.is)

A possible application for mid- to long range forecasts is the simulation of storm surges. Storm surge is the abnormal rise of water generated by a storm, over and above the predicted astronomical tide. The main forcing for a storm surge is due to the wind stress from big storms, usually tropical cyclones.

The goal of this project was to model storm surges at the Atlantic- and Indian Ocean coasts of Africa, using predicted winds and surface pressure from a mid-range weather forecast model. For the storm surge simulation the ADvanced CIRCulation (ADCIRC) numerical model was used. The ADCIRC model has an unstructured mesh, developed specifically for this project, with a resolution of approximately 4 km along the coast of Africa. The weather forecast is created by the Advanced Research WRF model, run at a 9 km horizontal resolution for a region covering the continental Africa.

We were able to successfully use the meteorological forecast data to initialise and force the storm surge forecast. The results show that while the storm surge model is able to see changes in ocean free surface level, it has some issues with forecasting the correct amplitude change for specific locations. This could be solved by increasing the resolution along the coast, but it should be noted that bathymetry data is a big limitation for doing so in the region.