

Validation Cases

Delft Dashboard (DDB) is a tool for rapid setup of coastal and estuarine hydrodynamic and basic morphological numerical models. The quality of numerical models created with Delft Dashboard in comparison to observations and/or other well-calibrated models in reproducing water levels is assessed in the attached report. The report contains three different model validations. First of all, a model for the **Gulf of Mexico** is set up and verified (Chapter 3). The focus is on the quality of the predicted water levels compared to measurements and practicalities related to grid and settings. Next, a **Mississippi coastal model** previously developed by NRL (Chapter 4) and an existing **North Sea** model developed by Deltares (Chapter 5) are reconstructed using DDB. The focus will be on the quality of water levels compared to measurements and also compared to the already existing model.

Conclusions related to the quality of a model setup made by Delft Dashboard:

- Numerical models created with Delft Dashboard have a good skill in the reproduction of the tidal propagation in the ocean or on the continental shelf. For example, the combined error of amplitude and phases of all the constituents in the North Sea is in the order of 15 centimeters. This was in the same order compared to state-of-the-art, well-calibrated process-based models (+/- 8 centimeters).
- The reproduction of in-situ observations, which are usually obtained near the coast, is more difficult. This is typically related to errors in topography, bathymetry and roughness. For stations in larger oceanic basins, the model skill of a DDB model and a well-calibrated model is similar. For example the RMSE for in-situ observations in the Gulf of Mexico, the RMSE was in the range of 5 to 15 centimeters for both the DDB and the well-calibrated model. For in-situ observations on a more complicated (i.e. more shallow) shelf (e.g. the North Sea) the errors increased. The RMSE for the well-calibrated model varied between 10 and 20 centimeters. For the DDB model the error increased between 35-60 centimeters.
- In order to improve the quality of the water level reproduction with a DDB model, the resolution can be increased and more accurate bathymetric information can be used. Note: GEBCO '08 has a resolution of $1/20^\circ \times 1/20^\circ$. When using a dataset with a finer resolution, the model resolution can also be increased.



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