Geophysical Research Abstracts
Vol. 18, EGU2016-12451, 2016
EGU General Assembly 2016

Operational forecasting for the Rhine-Meuse Estuary – Modelling and Operating Storm Surge Barriers

Tom Bogaard (1), Theo van Dam (2), Daniel Twigt (3), and Sacha de Goederen (4)

(1) Deltares, Delft, The Netherlands (tom.bogaard@deltares.nl), (2) Ministry of Infrastructure and the Environment; Rijkswaterstaat, Netherlands (theo.van.dam@rws.nl), (3) Deltares, Delft, The Netherlands (daniel.twigt@deltares.nl), (4) Ministry of Infrastructure and the Environment; Rijkswaterstaat, Netherlands (sacha.de.goederen@rws.nl)

Large parts of the Netherlands are very vulnerable to extreme storm surges, due to its low lying, highly populated and economically valuable coastal areas. In this project the focus is on the low-lying Rhine-Meuse estuary in the south-western part of the Netherlands. The area is protected by a complex defence system, including dunes, dikes, large barriers and a retention basin. Hydrodynamics in this complex delta area are influenced by tide, storm surge, discharges of the rivers Rhine and Meuse and the operation of barriers.

A forecasting system based on the generic operational platform software Delft-FEWS has been developed in order to produce timely and accurate water level forecasts for the Rhine-Meuse estuary. Barriers as well as their complex closing procedures are included in this operational system. A high resolution 1D hydrodynamic model, forced by Numerical Weather Prediction (NWP) product from the Dutch national weather service (KNMI) and hydrodynamic conditions from the Dutch Water Authority (Rijkswaterstaat), runs every six-hours with a forecast horizon of seven days. The system is operated at Rijkswaterstaat, who is responsible for hydrodynamic forecasting and the operation of the main storm surge barriers of the Netherlands.

By running the hydrodynamic model in an automated way the system is able to provide accurate forecasts at all times: during calm weather conditions or when severe storm situations might require closing of the barriers. Especially when storm and peak discharge events coincide, careful operation of the barriers is required. Within the Delft-FEWS platform tools have been developed to test different closing procedures instantly, in case of an event. Expert forecasters will be able to examine effects of multiple closing procedures as well as (partial) failure of the barriers on water levels in the estuary. Apart from forecasting, the system can be used offline to mimic storm events for training purposes. Forecasters at Dutch Water Authorities of Rijkswaterstaat can use the platform to study effects on hydrodynamics combing artificial storms and peak discharge events with different closing procedures.

Where specialist will be able to use the system for scenario studies, results of the final forecast will be made available for the public using a tailor made webpage showing forecasts of time-varying water levels and barrier operations.