

OPERATIONAL FORECAST OSR

Continuous prediction of water levels, currents, and salinity in the Port of Rotterdam using the 3D flow model OSR

For operational processes in the Port of Rotterdam, the Port Authority has been using predictions of water levels, currents, and salinity with the Operational Flow Model Rotterdam (OSR) for many years. During the transition of the system between two managed parties, Svašek Hydraulics temporarily manages this forecast system. A robust system has been set up on Svašek's internal computational cluster, which generates a forecast four times a day. Results are automatically uploaded to the Port Authority's database, and online flow animations are produced.

The model chain used for predictions consists of a series of nested models, including the Harbor Model (WAQUA, 2D) and the NSC-Fine Model (TRIWAQ, 3D). The combination of the coarse-resolution two-dimensional Harbor Model and the higher-resolution three-dimensional NSC-Fine Model ensures an efficient model chain with shorter computation times.

The Harbor Model utilizes sea boundary conditions (astronomical tide and wind setup) adjusted for each calculation based on measurements along the coast using Kalman filtering. Discharges imposed on the river branches are based on measurements and predictions from Rijkswaterstaat at

Lobith. Additionally, wind predictions from Rijkswaterstaat at Hoek van Holland are used to account for wind influences in the models. The results of the Harbor Model, along with wind predictions, serve as input for the NSC-Fine Model, where the flow is computed with ten vertical layers.

Four times a day, a new forecast is made for more than two days into the future with the most recent boundary conditions. This approach enables an accurate prediction of water levels, currents, and salinity, which are continuously validated with measurements in the port area by the Port Authority.

Client

Port Authority of Rotterdam

Location

Port of Rotterdam

Date

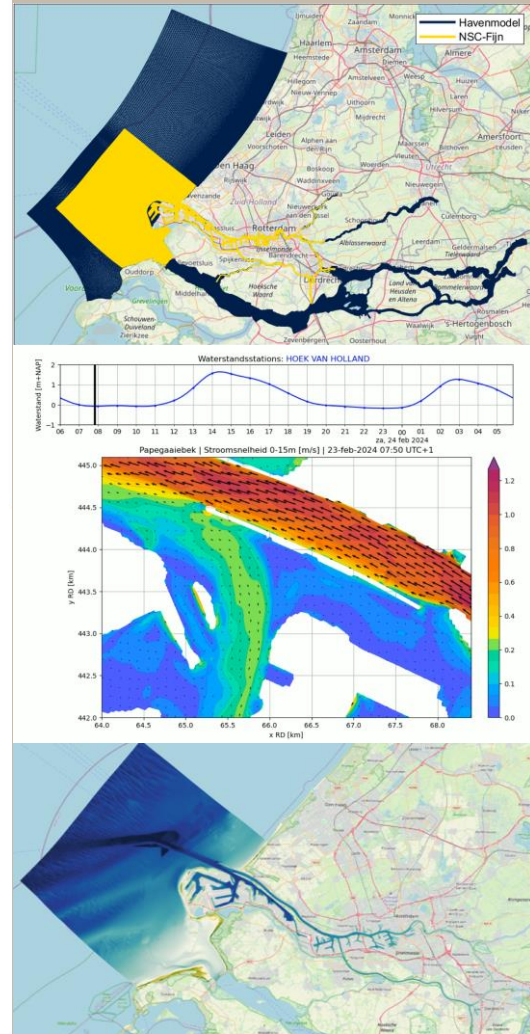
2023-present

Services

3D modelling

Forecast service

Flow animations



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