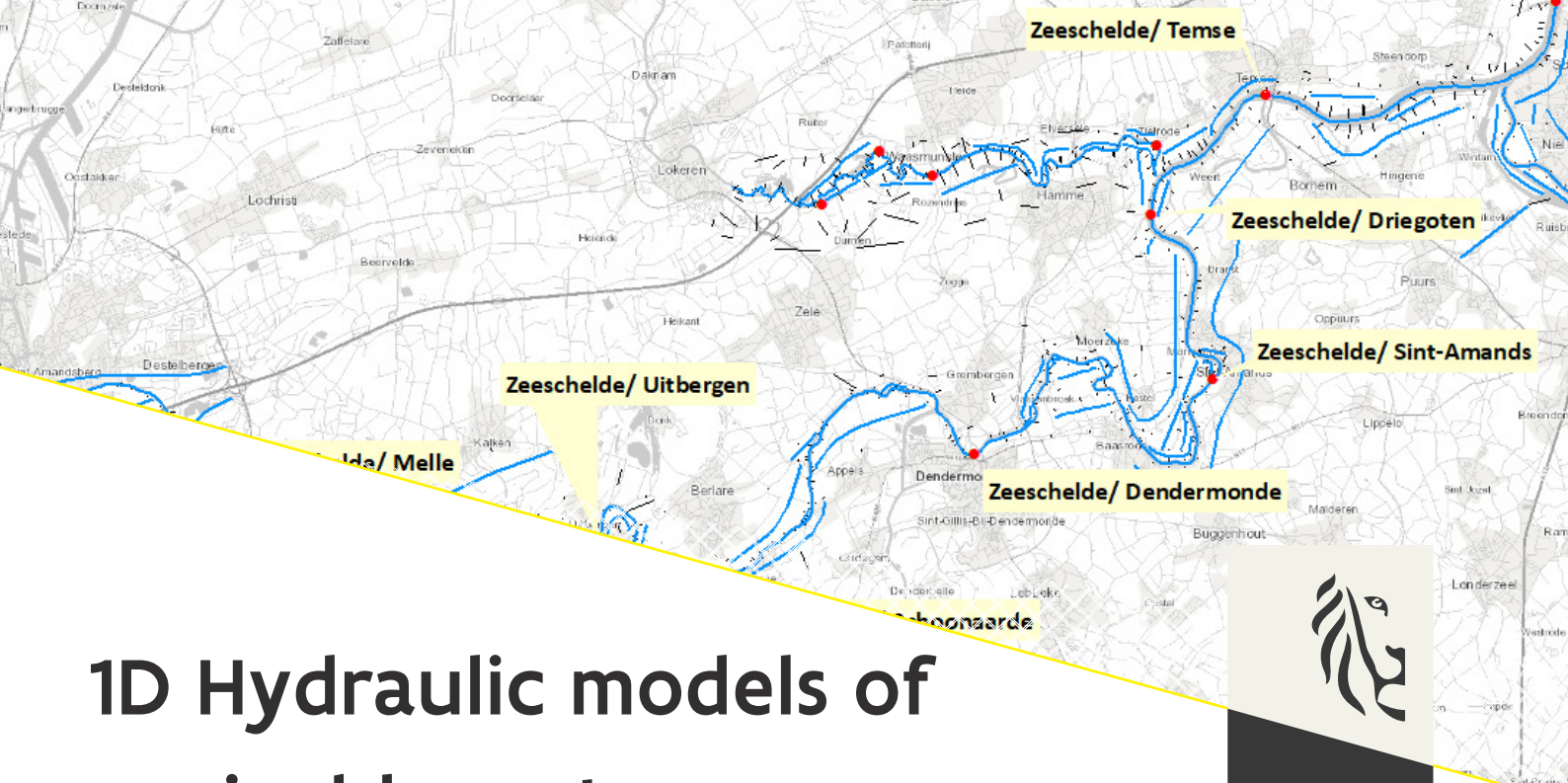


1D Hydraulic models of navigable waterways

Flanders Hydraulics has 1D-hydrodynamic models of the navigable waterways in Flanders. These models were prepared with the software package Mike11, developed and distributed by the Danish Hydraulic Institute (DHI). The navigable waterways in Flanders are modelled using the quasi-2D method.

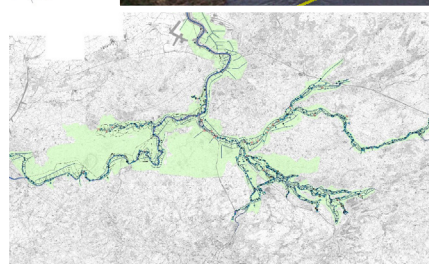
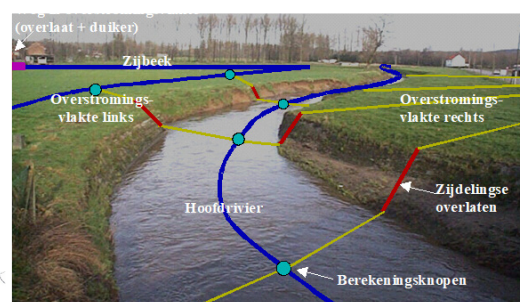
Here, the waterways and floodplains are modelled as parallel branches with computational nodes, which also simplifies the spatial flow image in the floodplain. Bathymetric and topographic measurements are used as the basis for constructing the hydrodynamic model. The cross sections of the river branches of watercourses, at the level of the computational nodes, are derived from bathymetric measurements of the watercourses, combined with LIDAR measurements of the banks. The cross sections of the river branches in the flow areas are derived from topographic surveys, such as the DHM Flanders II.

Flanders Hydraulics has a 1D-hydrodynamic model for the following waterways and their tributaries: Ijzer, Leie-Upper Scheldt-Ghent canals, Dender, Zenne-Zeekanaal, Demer, and the Sea Scheldt and its tidal tributaries.

Applications

The output of the 1D-hydrodynamic models includes water levels, flows and cross-sectional mean velocities in rivers and their floodplains, as a function of time. The 1D-hydrodynamic models are used for studies and advisory work as well as for operational flood forecasting. 1D-hydrodynamic models have the property of being 'fast' to calculate. As a result, these models are often used in studies where many simulations need to be carried out. For operational applications, a simplified model version is often used.

The 1D hydrodynamic model of the Sea Scheldt, in a simplified version, is also used for the preparation of astronomical tide predictions





1D model of the Sea Scheldt

The 1D model of the Sea Scheldt was built as part of the study work for the update of the Sigma Plan (IMDC et al, 2003). To date, the model is used for advisory work for the Sigma Plan. Over the years, the model was updated by adjusting the topo-bathymetry of the watercourses and floodplains. These updates are followed each time by a calibration in which the riverbed roughness is adjusted. Here, the simulated water levels are compared with the measured water levels. The most recent calibration was carried out in 2019 (IMDC, 2020).

