

Implementation of on-line Flood Forecasting Models for the Dender and Maas rivers



Client : AWZ, Flanders Hydraulics

Date : 2004

Budget : € 321.085

Location : Dender, Maas and Demer river basins

Assignment

The assignment included the development of on-line flood forecasting models for the Dender and the Maas river, the update of the on-line forecasting model for the Demer and the development of a hydrological on-line forecasting model for the Bovenschelde, the Leie and the IJzer river basins. The assignment was executed in close collaboration with the Danish Hydraulic Institute (DHI).



Dender mouth in the Scheldt

The forecasting tool for the Dender river basin was developed based on the existing hydraulic and hydrological models. The hydraulic model was updated and stabilized in this study. Indeed, in order to assure a proper on-line simulation both hydrological and hydraulic numerical models need to be robust in handling and calculation.

The forecasting tool for the Grensmaas river basin was based on the existing hydraulic model but was first stabilized as well.

The existing flood forecasting tool for the Demer river basin (previous pilot project) was updated using the existing hydrological and hydraulic models.

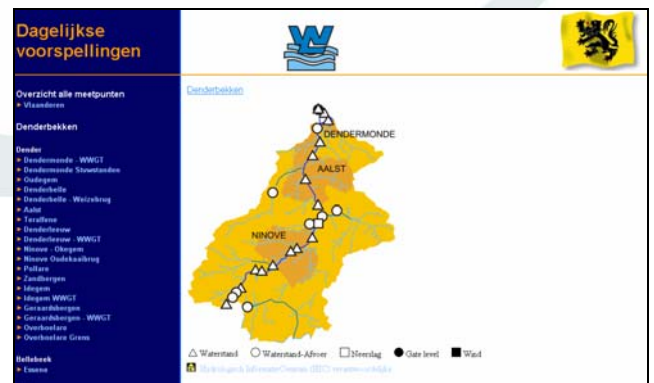


Flood impacts

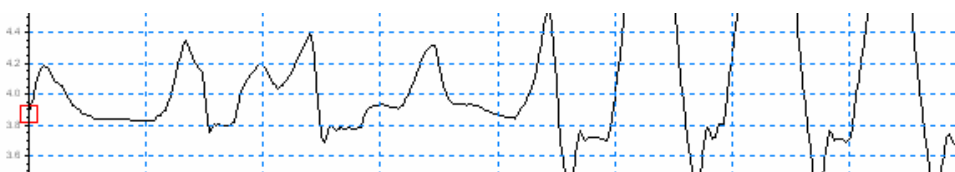
Technical Description

Numerical models

As a basic part of the flood forecasting, two modelling steps translate field precipitation records into water level prediction in the downstream river reach. The hydrological models are based on the conceptual model NAM, while the hydraulic models are based on the hydrodynamic model Mike 11.



Webpage on-line forecasting tool for the Dender river basin



1/10/2005 8:00:00	3.50
1/10/2005 10:00:00	3.71
1/10/2005 12:00:00	4.23
1/10/2005 14:00:00	5.23
1/10/2005 16:00:00	5.99
1/10/2005 18:00:00	5.30

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For the forecasting tools of the Bovenschelde, Leie and IJzer river basins, the existing hydrological models for the Bovenschelde at Bossuit, the Leie at Menen and the IJzer at Roesbrugge-Haringe were used. Extensive statistical analysis of field data and model simulations ensure a proper hydrological simulation.

Forecasting models

The forecasting models for the Dender, Grensmaas, Leie, Bovenschelde and IJzer river basins were developed using the "Data Assimilation" tool of Mike 11. The existing forecasting model for the Demer river basin was based on the previous "Flood Forecasting" tool and was transferred to the new type.

The quality of the forecasting models was evaluated by the retroactive execution of "forecasts" for a number of historical flooding events. This "hindcast" validation proves both the reliability and the stability of the numerical tools.

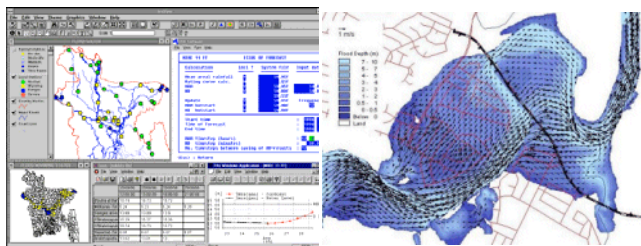
On-line Forecasting Tool

For the online implementation of the forecasting models Mike FloodWatch was used. This software package is a co-ordinating tool that allows the user to execute a number of tasks centrally and automatically: the input and validation of telemetric data (Hydra database), the execution of forecasts (Mike 11 simulations) and the visualisation and distribution of results (ArcGIS or website).

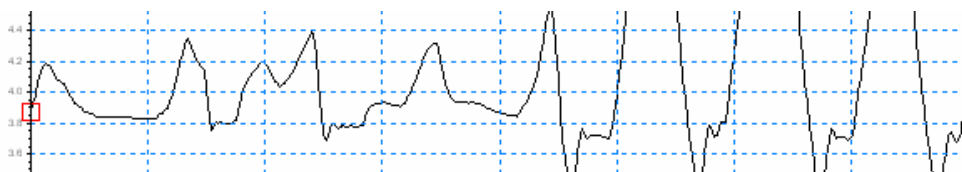
Doing so, these on-line flood forecasting tools for the most important Flemish river basins create a reliable and practical instrument for both a sustainable water management and a proper flood policy during severe flood events. The technical modelling expertise of the water team was fully explored by the successful development of these pilot projects: an interdisciplinary approach, an integrated view on the (river) water cycle with a detailed link to the field reality and a high software knowledge form the essential mix to success.



Flooding of river valley (Dender river basin)



DHI software tools



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