

Gert Leyssen², Joris Vanlede¹, Davy Depreiter²
Niels Jespers², Peter Viaene¹, Boudewijn Decrop²

¹Flanders Hydraulics Research (Waterbouwkundig Laboratorium),
Berchemlei 115, 2140 Antwerp, Belgium

²IMDC, International Marine and Dredging Consultants,
Coveliersstraat 15, 2600 Antwerp, Belgium

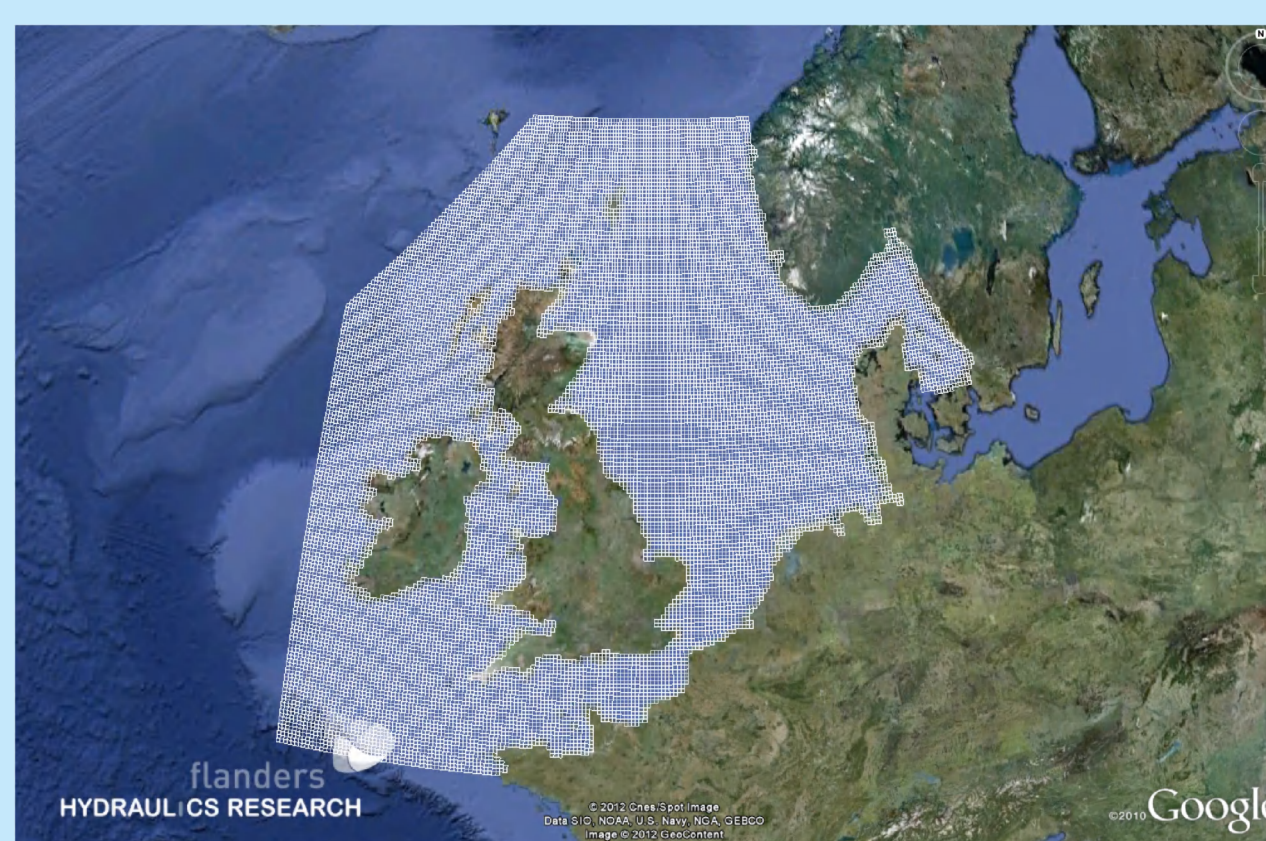
Project objectives:

Deploying the Continental shelf model (CSM)- Zuidelijke Noordzee (ZUNO) modeling train to translate astronomic water level boundary conditions from the continental shelf to the Belgian coastal zone. The wind generated surge is taken into account by imposing wind and pressure fields. An extensive validation procedure and sensitivity analysis is performed with 19 measurement stations in front of the Belgian, the French and the English coast.

Storm surge prediction in the Belgian Coastal zone

Modeling train

CSM



ZUNO

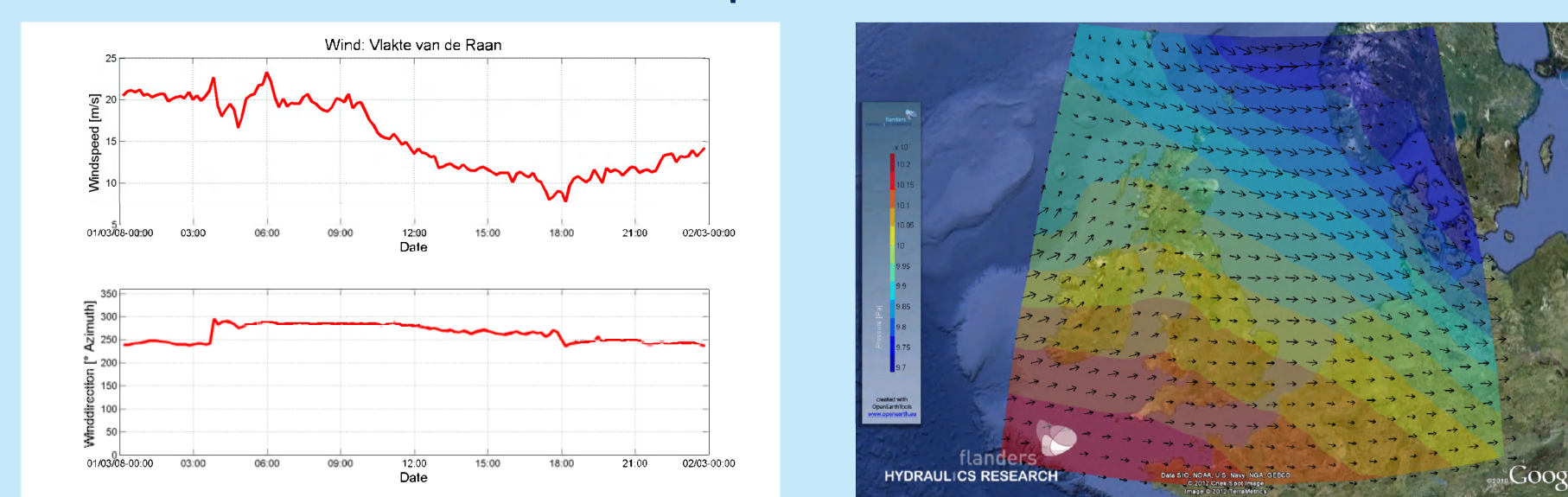


NEVLA

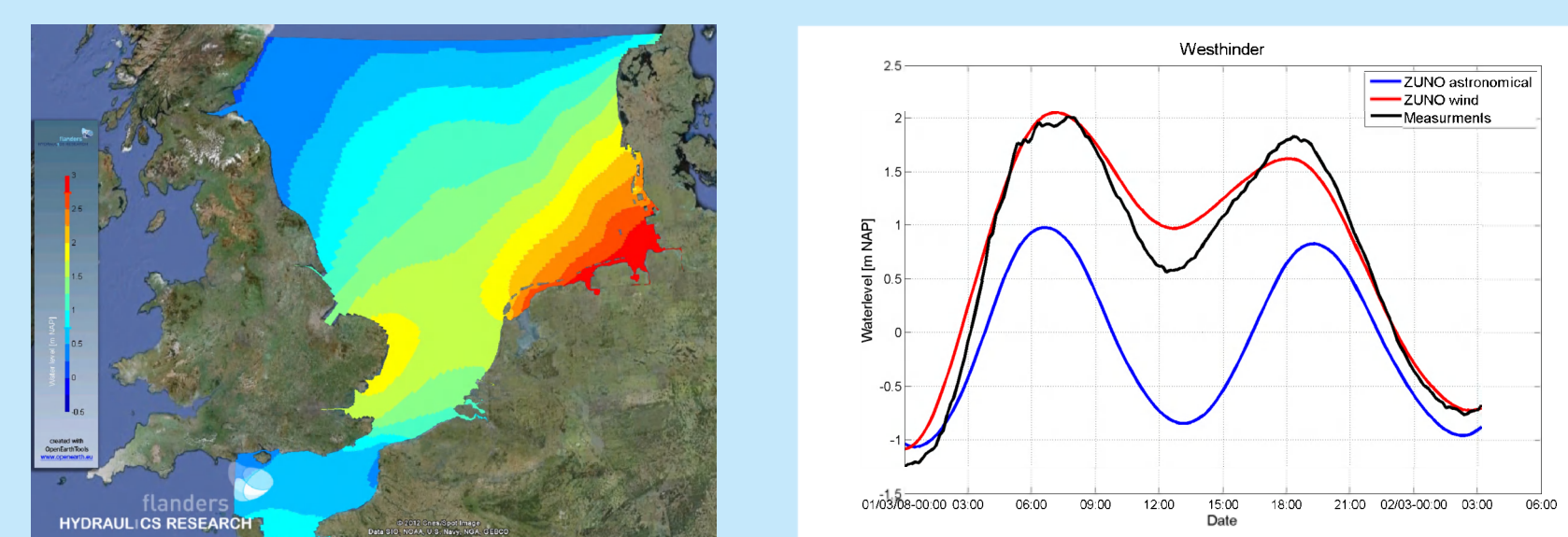


Results

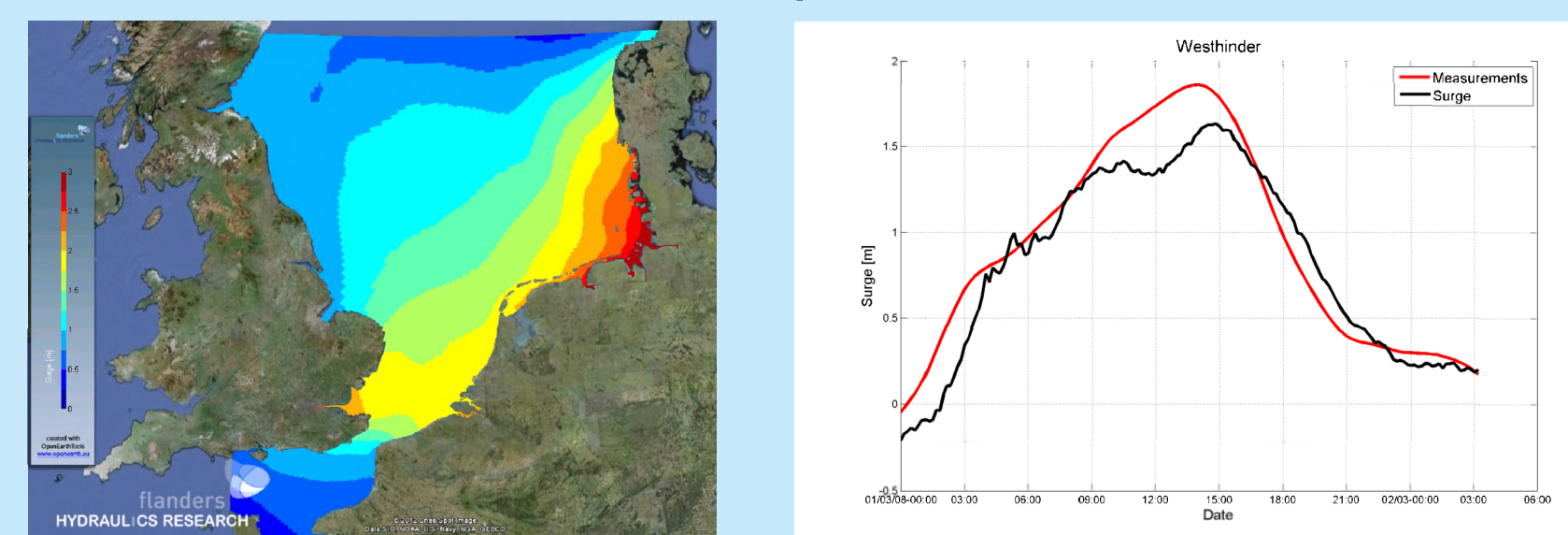
Wind and pressure fields



Water level



Surge



Model Quality

	Bias [m]	RMSE [m]	Bias M2 amplitude [m]	Bias M2 phase [m]
Belgian coast	0,10	0,18	0,05	3,5

Operational prediction systems

A hydrodynamic modeling train is running in operational mode at the Hydrologic Information Center (Flanders Hydraulics Research).

- Water level expectations and storm tide warnings
- Data-assimilation (Kalman filtering) of water level observations in the North Sea
- Downstream boundary conditions for hydrological models of inland river systems.

Combined prediction of surge and discharge with separate modeling systems is especially useful in estuaries.

Applications

- **Hindcast**
 - Generation of boundary conditions
 - Hydrodynamic models
 - Sediment transport
 - Scenario analysis
- **Operational prediction system**
 - Kalman filtering
 - Surge levels > 3 m possible

Reports

- Leyssen, G.; Vanlede, J.; Mostaert, F.; (2011) Modellentrein CSM-ZUNO, Deelrapport 1: Opzet en gevoeligheidsanalyse, WL2011R753_12rev2_0, I/RA/11313/11.087/GLE.
- Leyssen, G.; Vanlede, J.; Decrop B.; Mostaert, F.; (2011) Modellentrein CSM-ZUNO, Deelrapport 2: Validatie, in preparation.