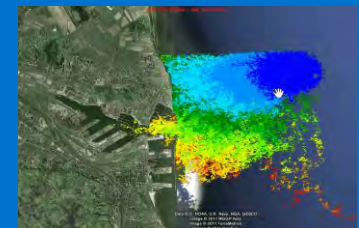
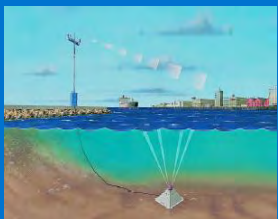
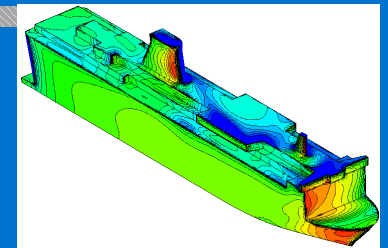
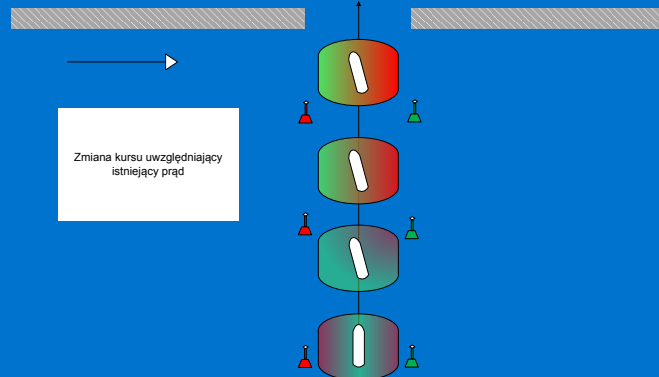
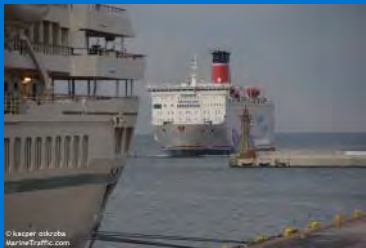


Auckland September, 2015

Safeport

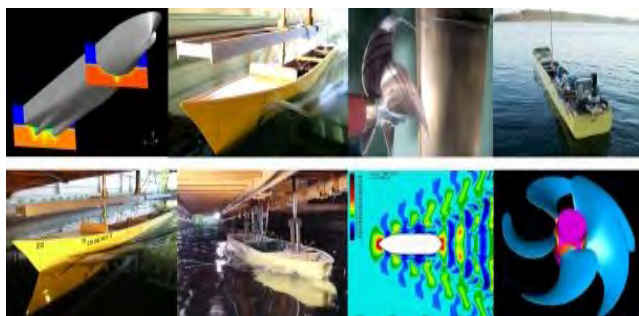
On-board visualization of hydro-meteorological effects on ferries entering and berthing the Port of Gdynia, Poland

Stig Oeen – Business Development Manager Marine Transport



Partners

CTO, Gdynia
Ship Design and Research Centre



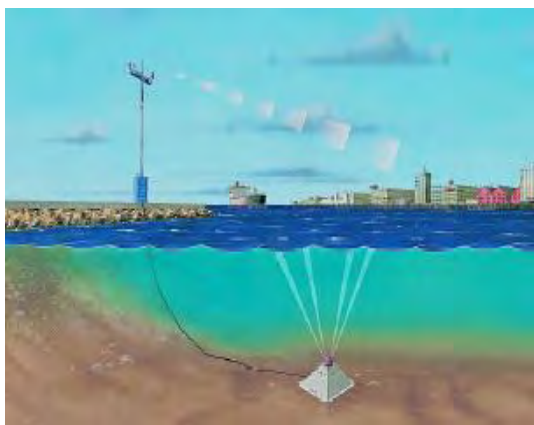
NIVA, Oceanography
Marine Modeling



Sprint
Maritime Safety Information
Exchange System



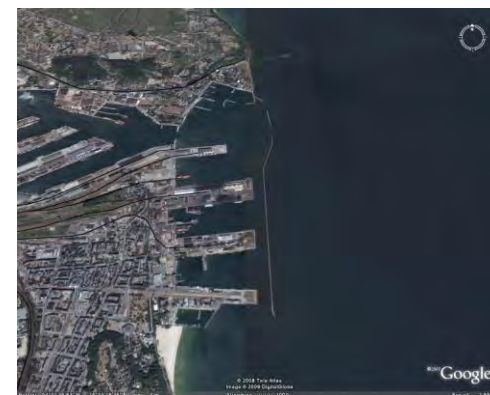
Aanderaa/Xylem



Gdynia Maritime University
Department of Ship Operation

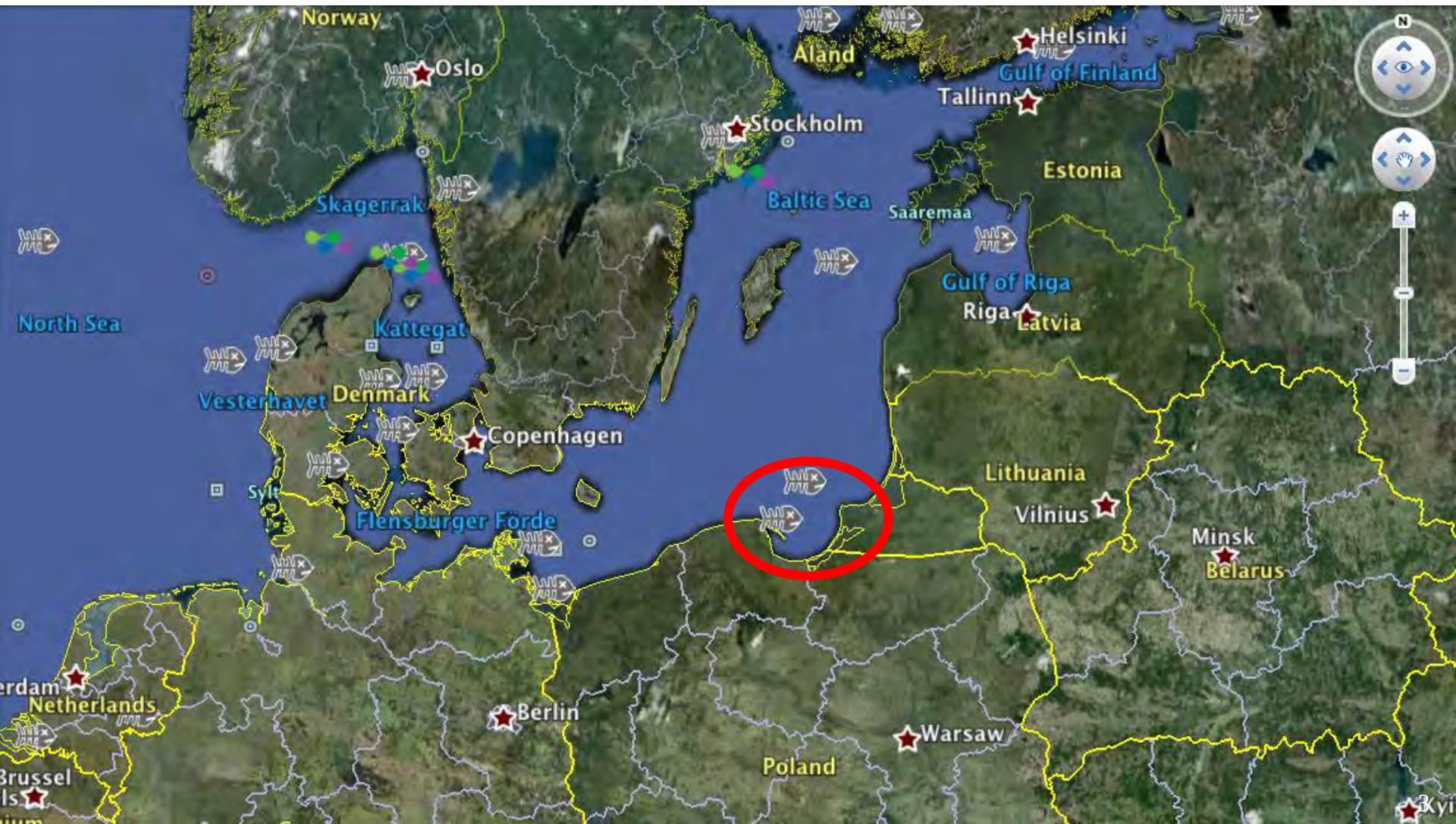


Port of Gdynia



Gdynia Harbour

- Second largest in Poland
- One of the largest in the Baltic Sea

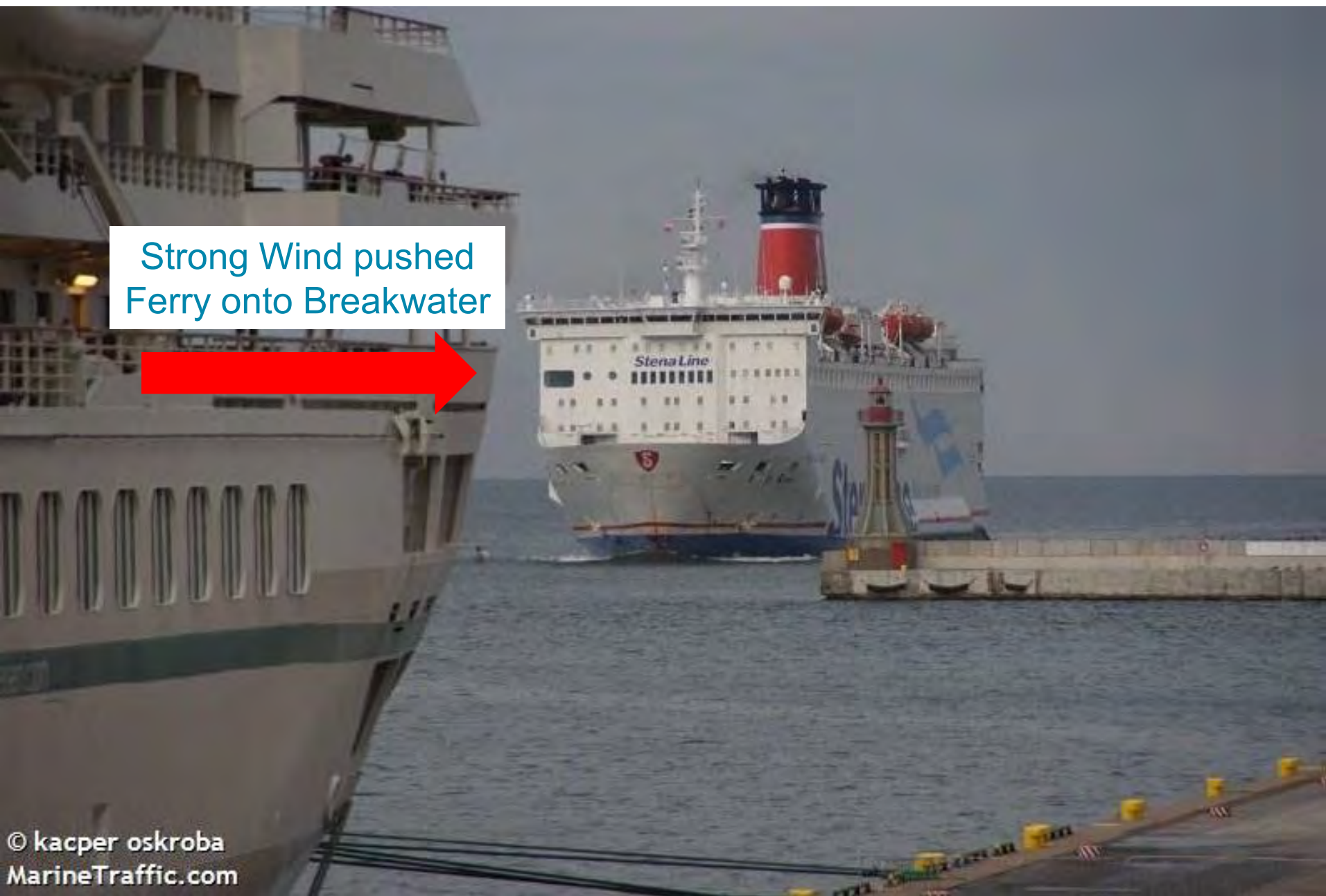
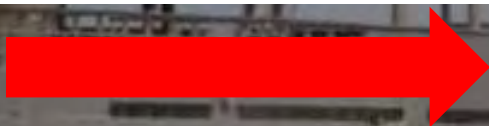


Gdynia Harbour

- In Gdansk Bay
- No tides
- Relatively low currents
- Occasional strong and irregular winds
- Wind driven surface currents



Strong Wind pushed
Ferry onto Breakwater

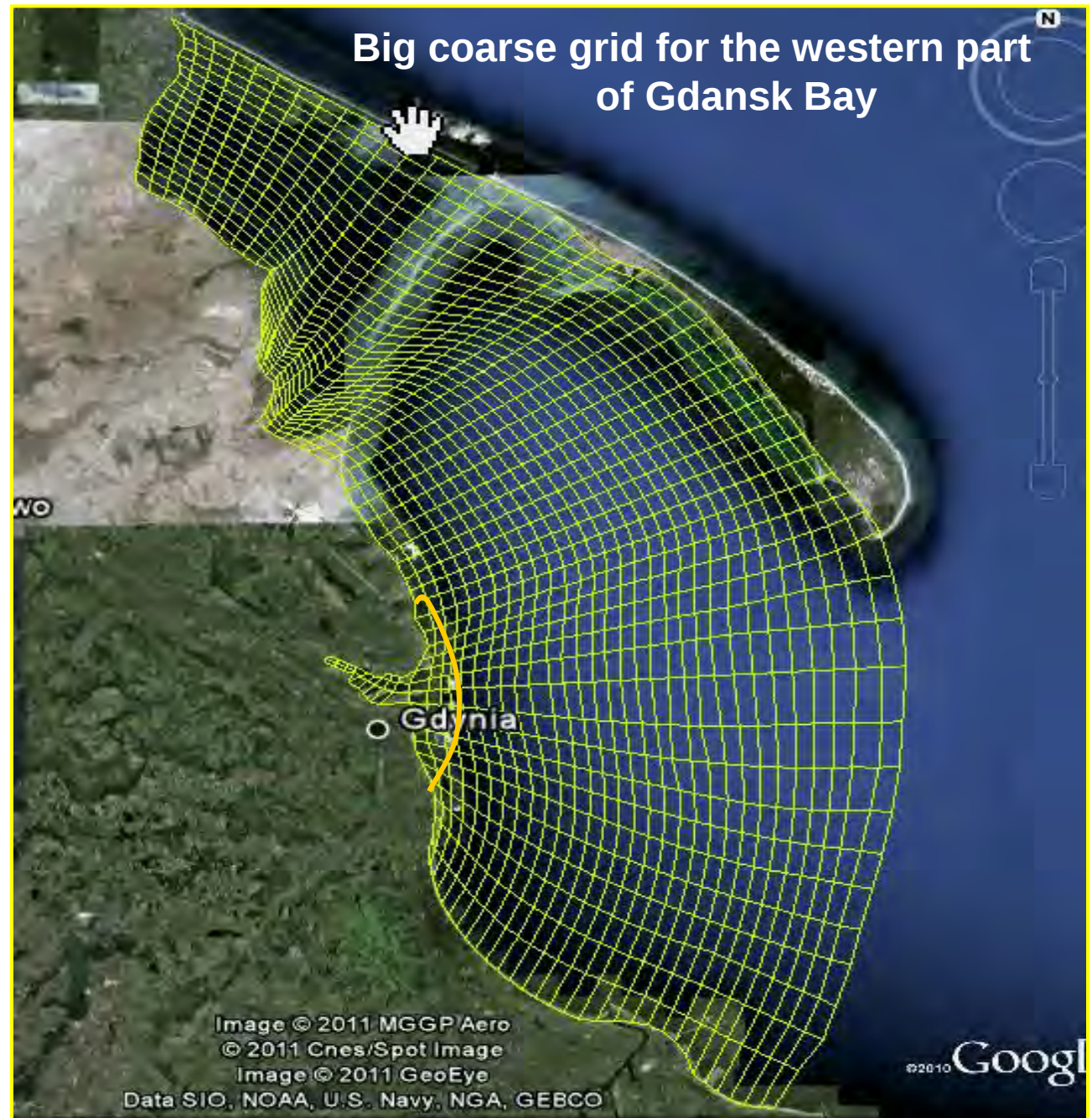


Winter conditions with occasional ice



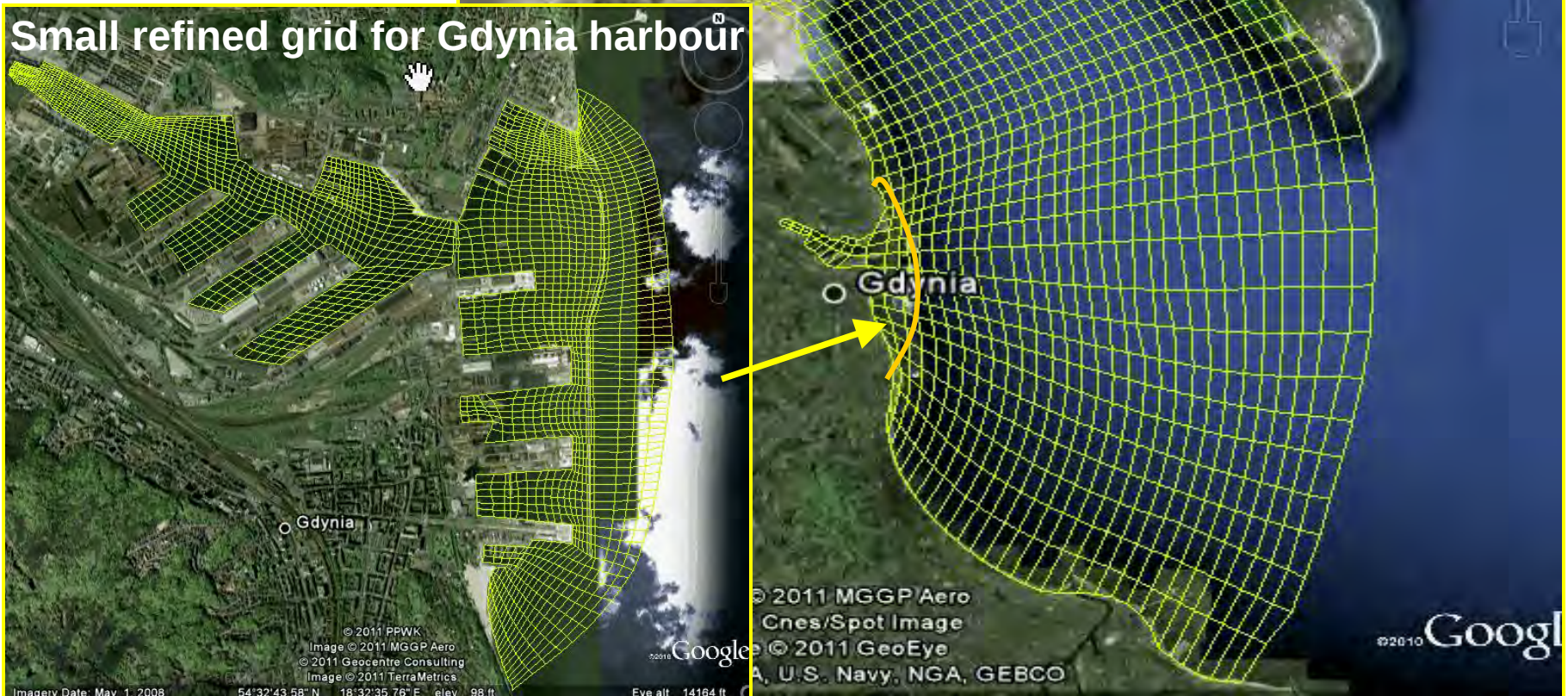
Topography adapted model used for simulating and predicting waves, water level and currents.

Main driving force of model is wind.

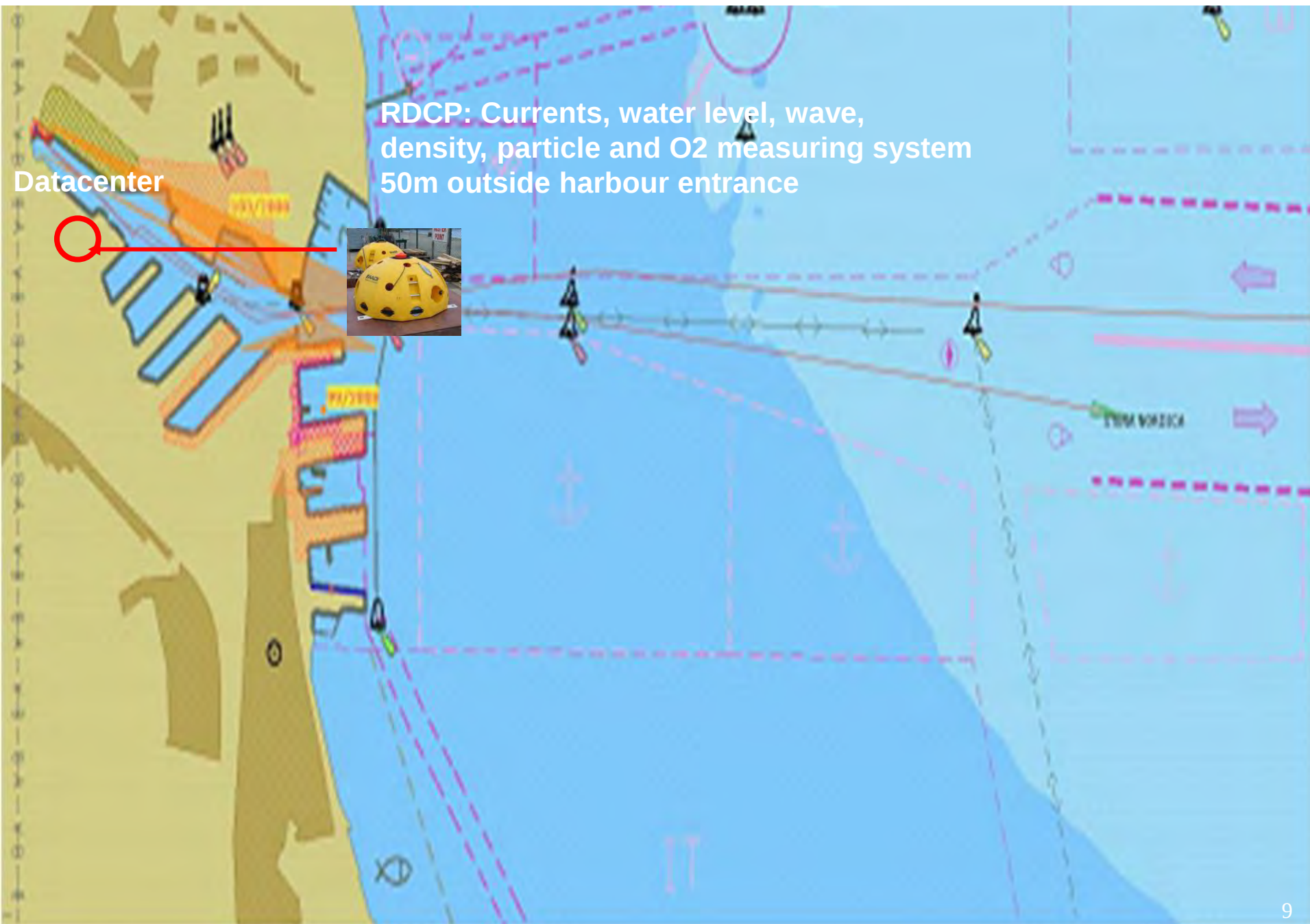


Big coarse grid for the western part
of Gdansk Bay

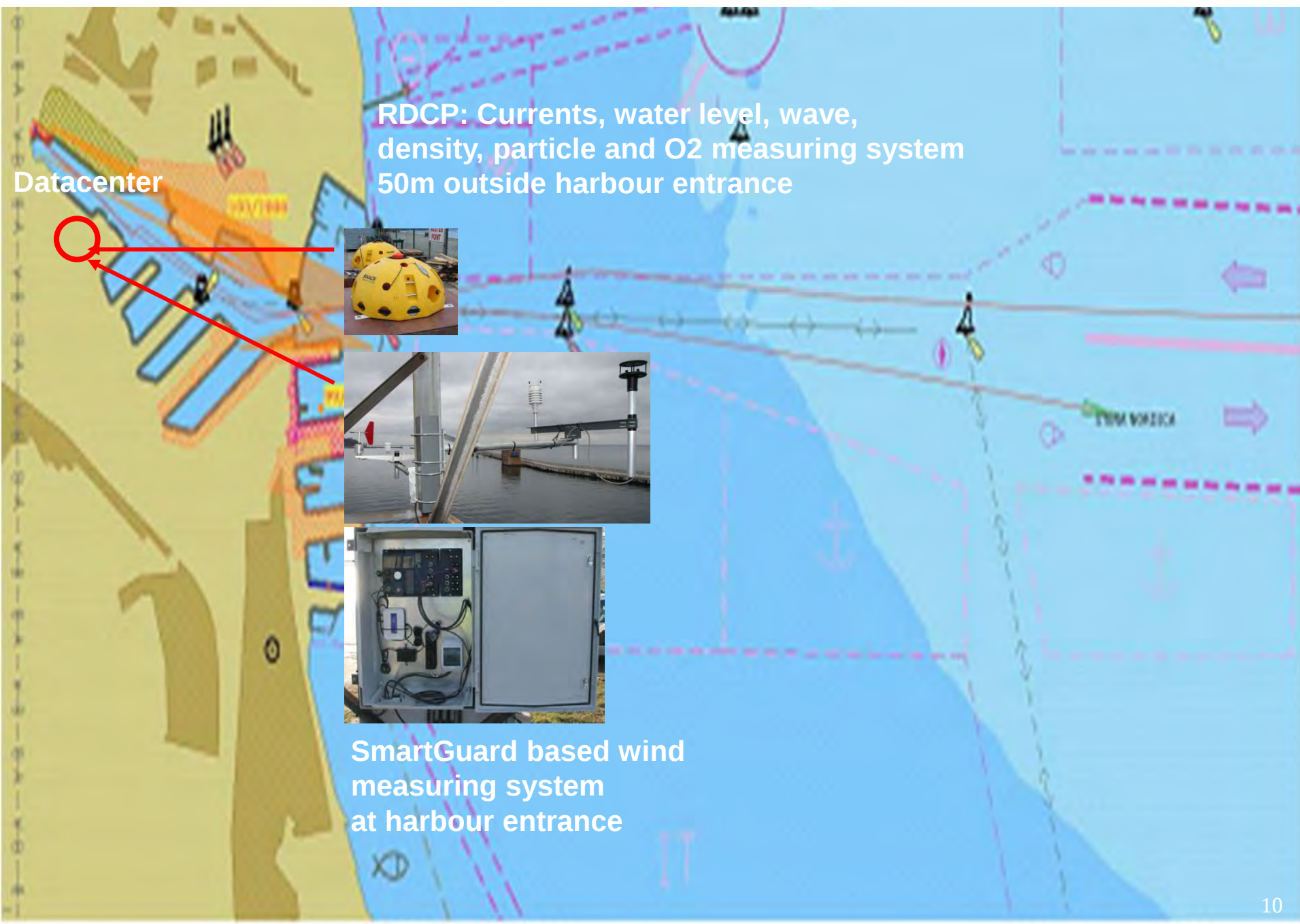
Small refined grid for Gdynia harbour



On-line data goes into dynamic model at data center



On-line data goes into dynamic model at data center



Data used to calibrate
and validate model



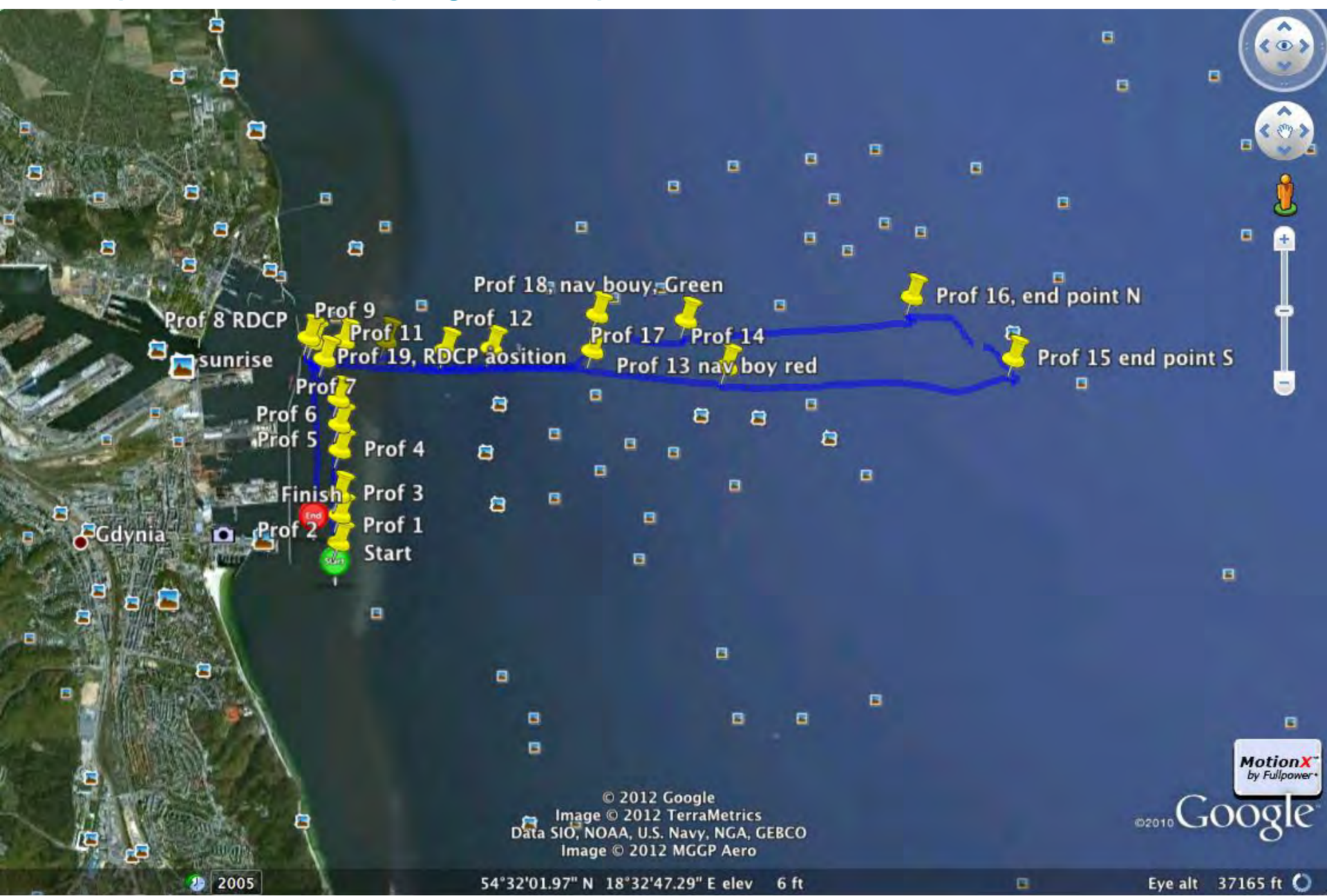
CastAway CTD

- 1 year RDCP data
- Currents (multilevel)
 - Waves
 - Water level
 - Salinity (bottom)
 - Temp (bottom)



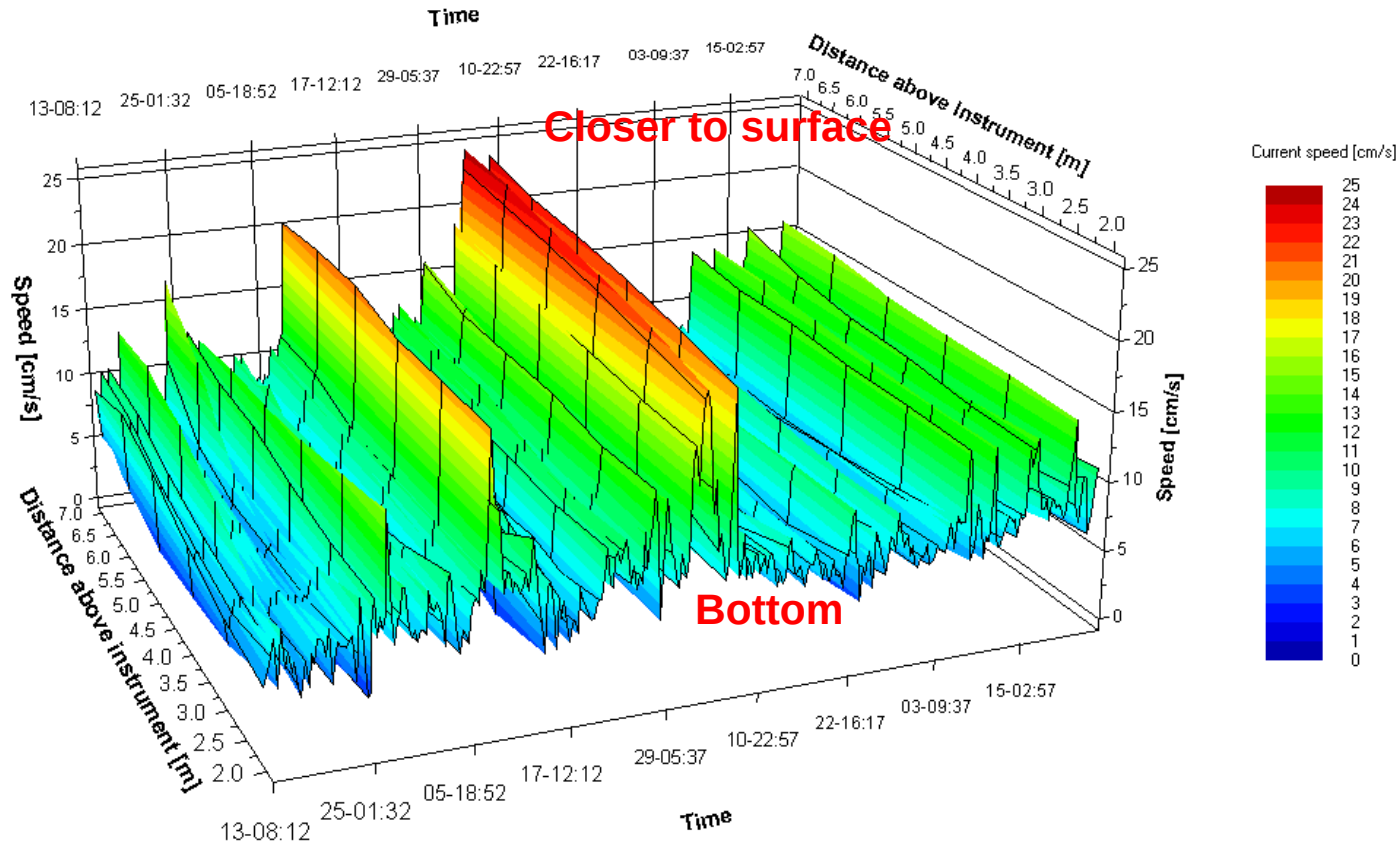
SeaGuard
profiles

Example of field campaign CTD profiles



Examples of data

3D Horizontal Speed - Column1



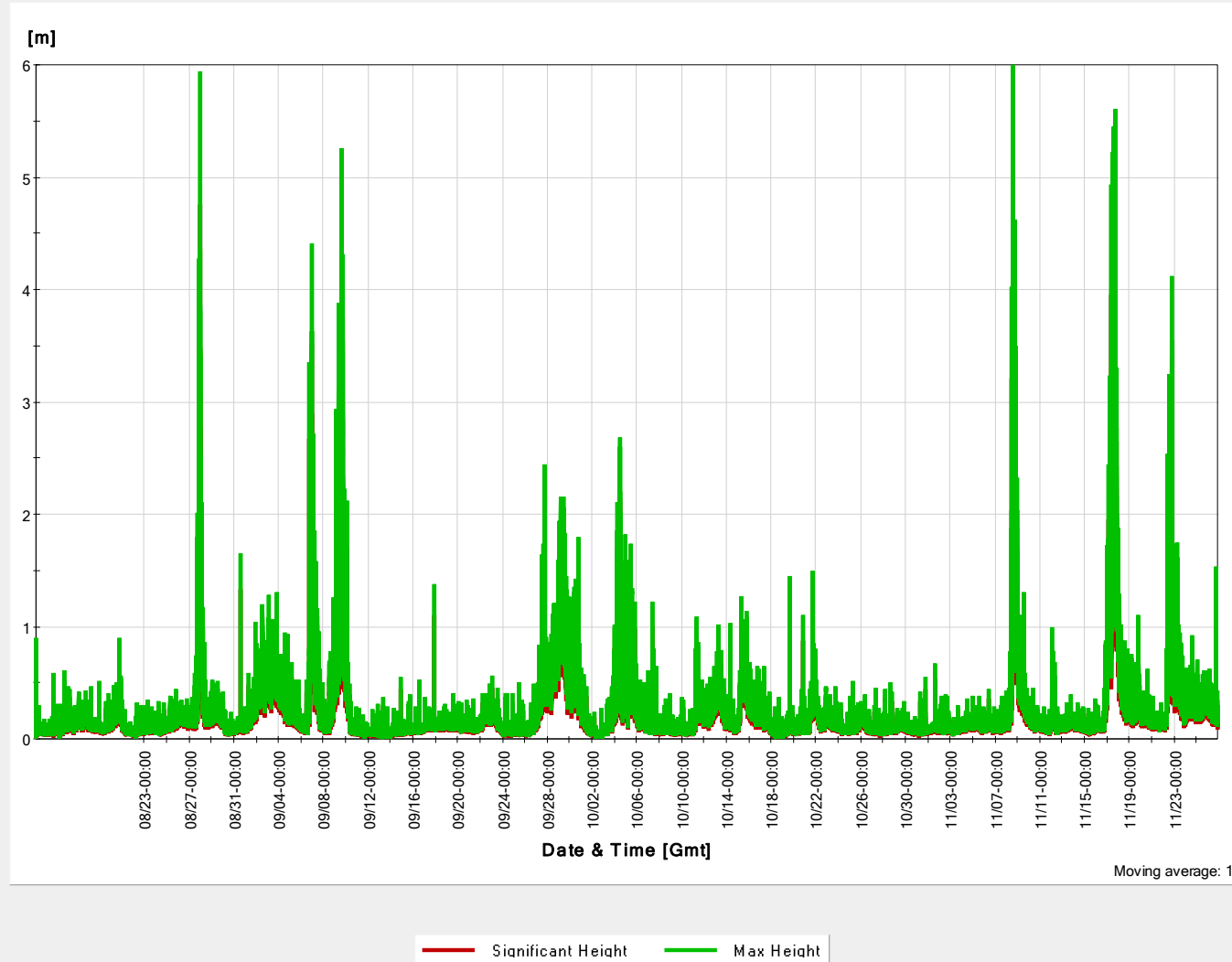
Time range: 2010.08.13 - 08:12 to 2010.11.26 - 20:27

Decimation: 95
Moving average: 11

Horizontal currents are in general between 0-25 cm/s

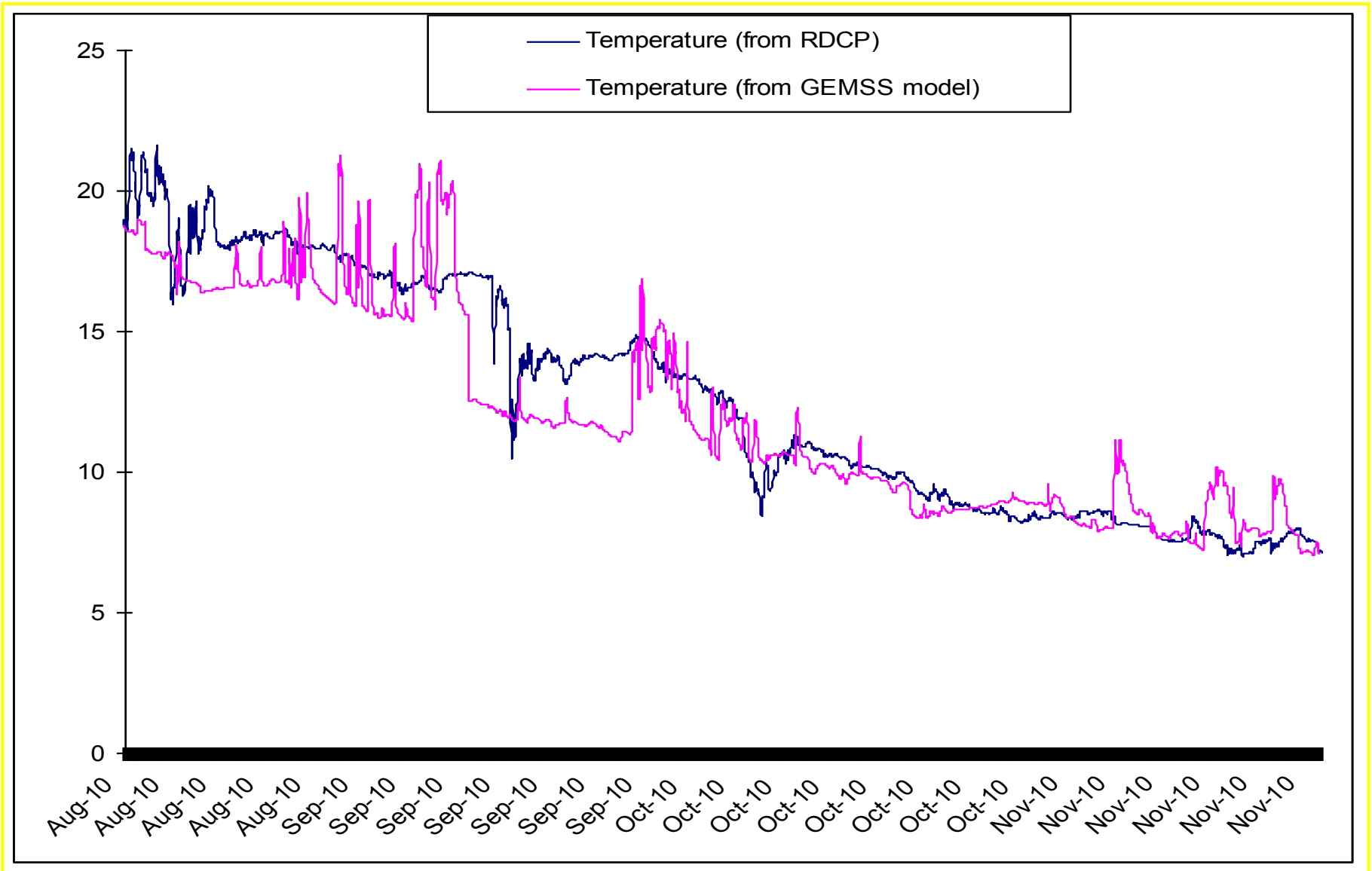
Examples of data

Wave Heights

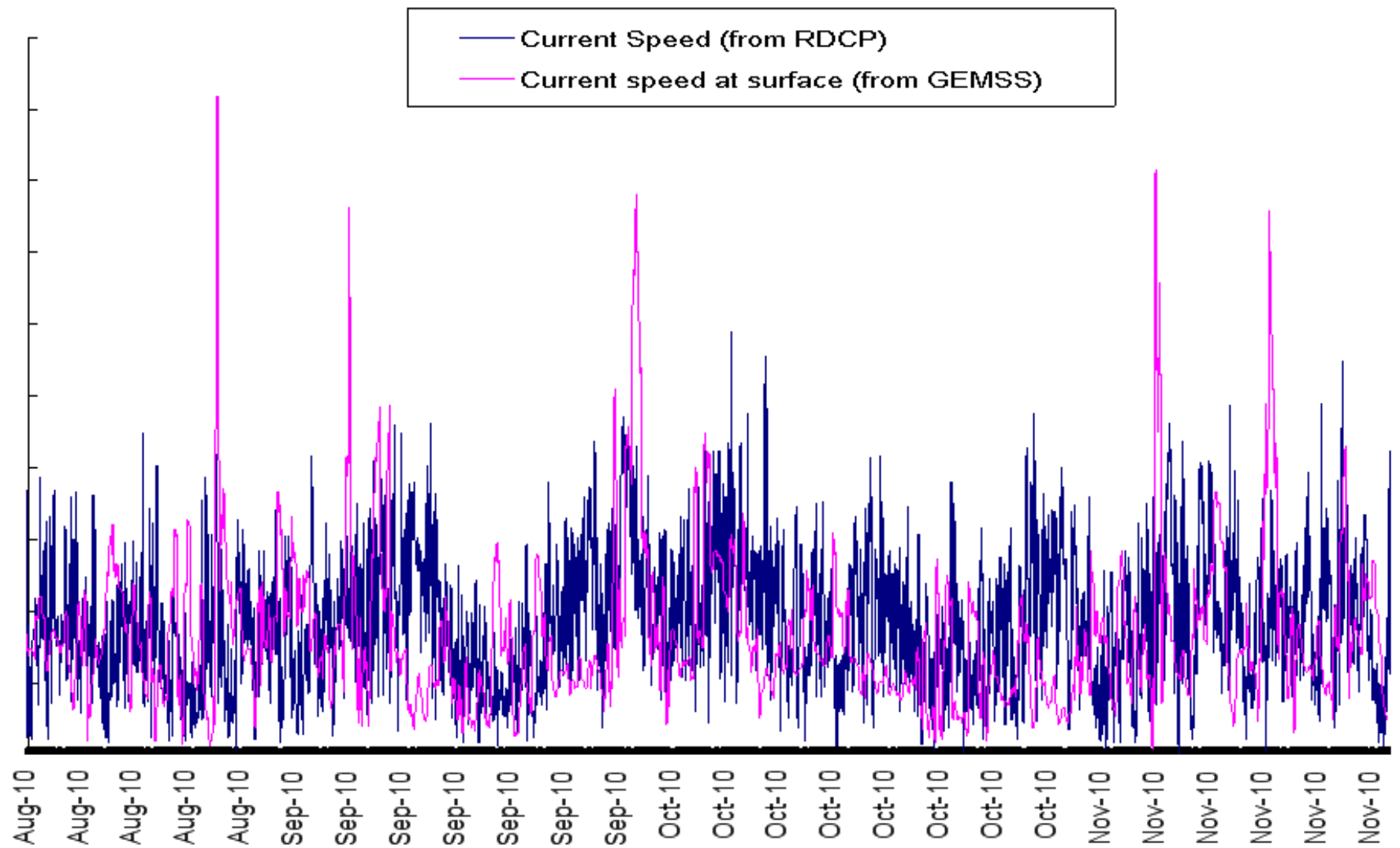


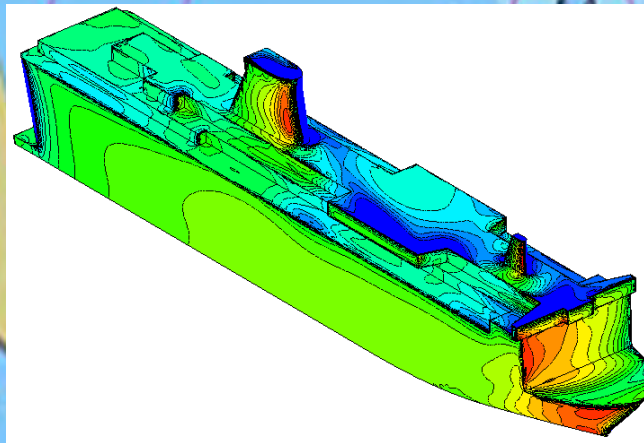
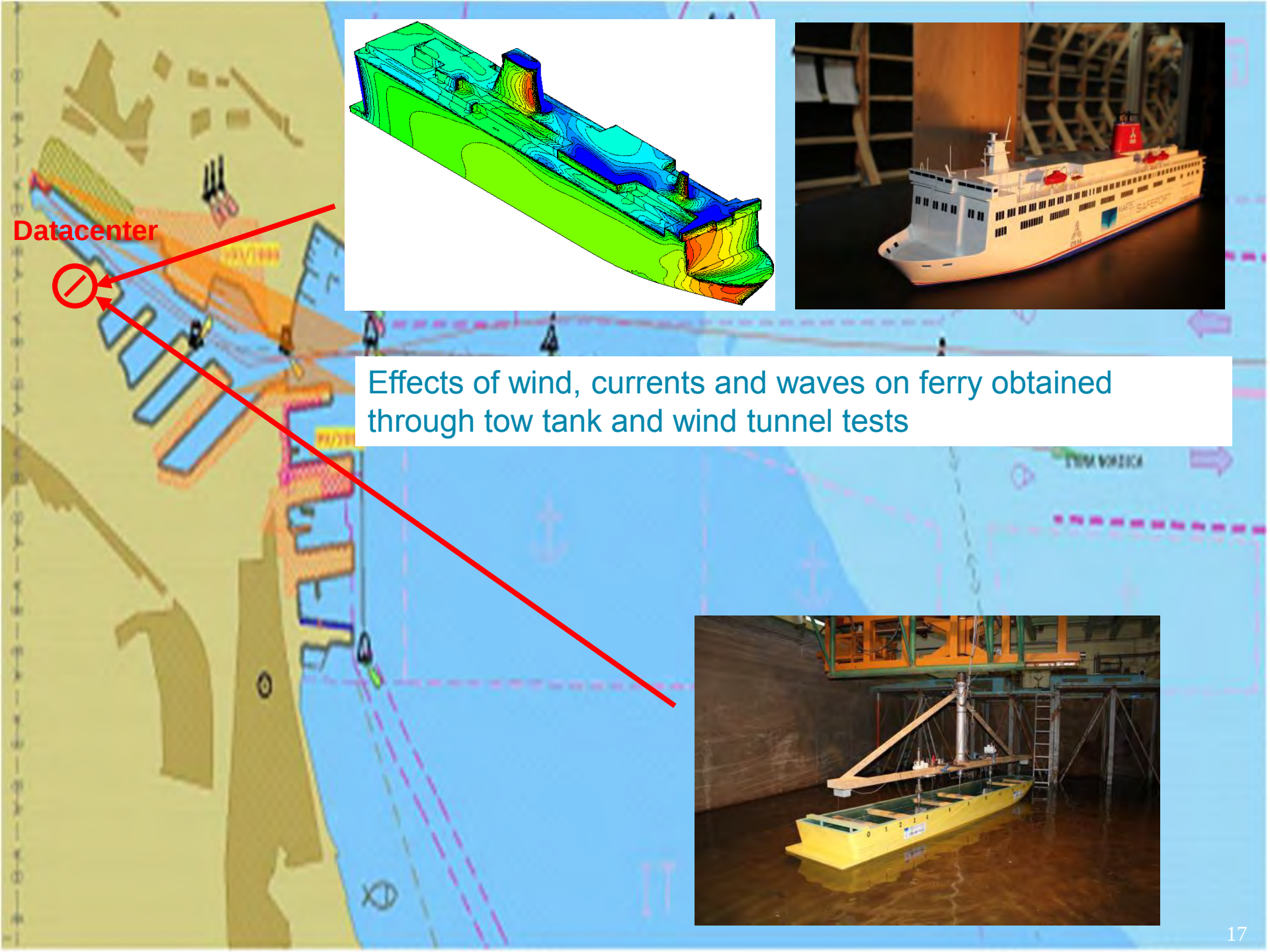
Maximum wave height outside harbour during one year was up to 6m

Comparing model and measurements: temperature



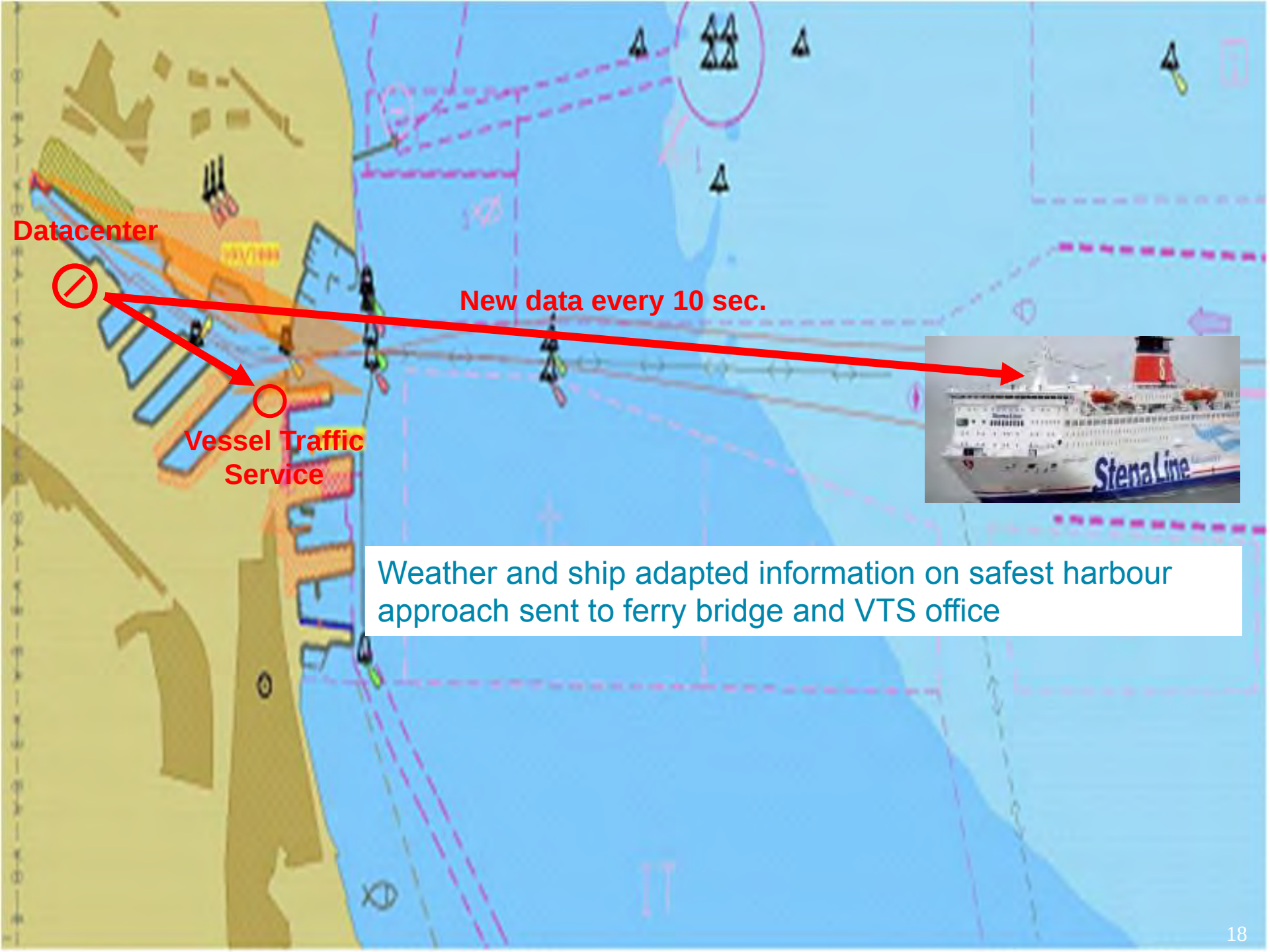
Comparing model and measurements: surface currents





Effects of wind, currents and waves on ferry obtained through tow tank and wind tunnel tests





Datacenter

New data every 10 sec.

Vessel Traffic Service

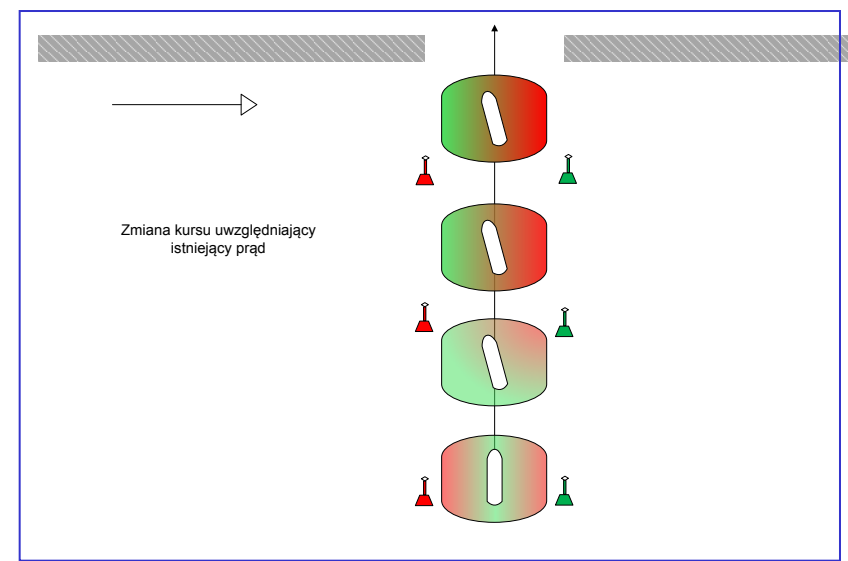
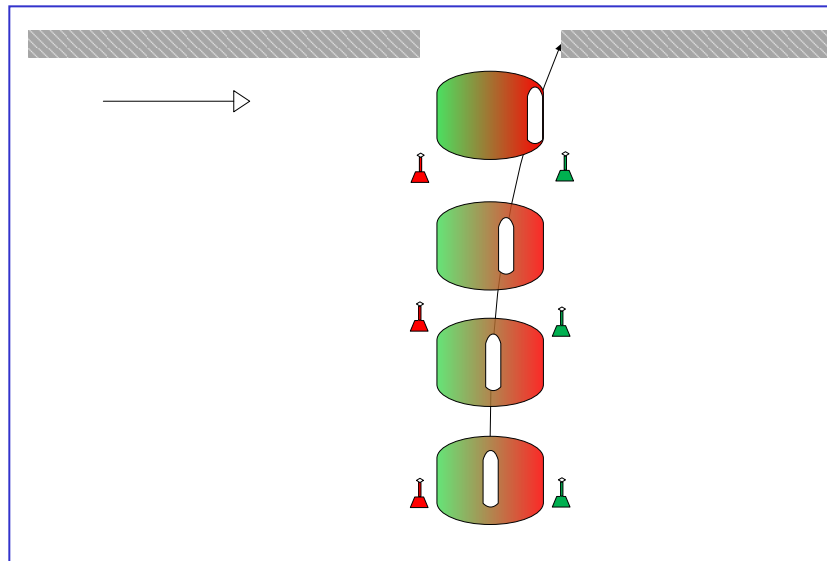
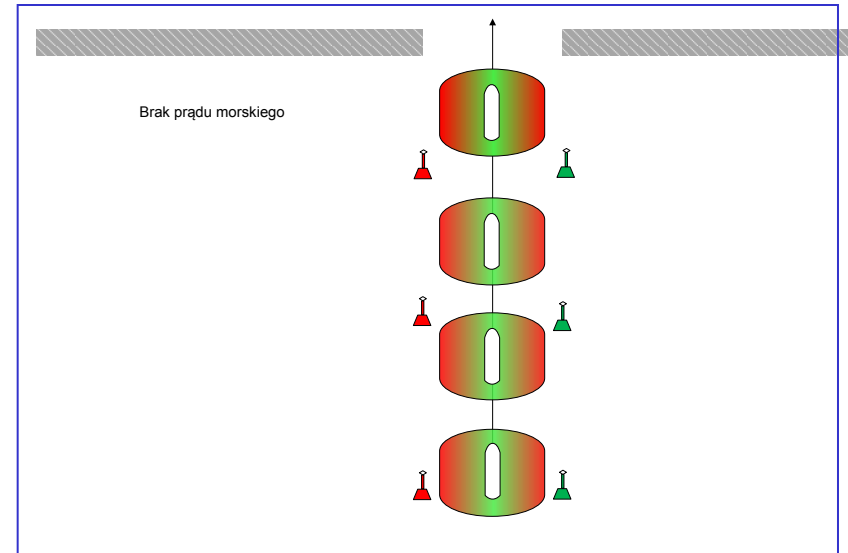
Weather and ship adapted information on safest harbour approach sent to ferry bridge and VTS office



Ship Virtual Mask overlay plotted
on existing charts.

Final product tested and ready at
the end of 2013.

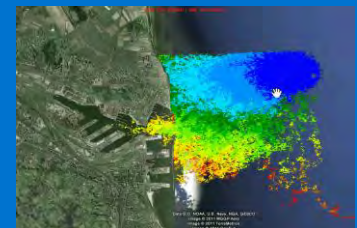
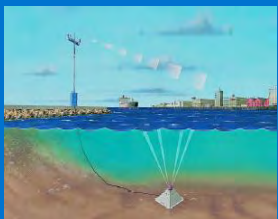
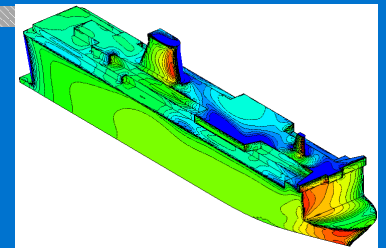
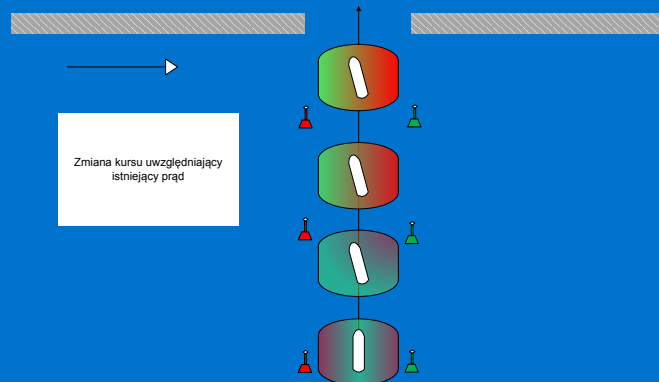
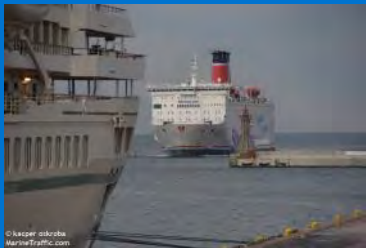
SAFER HARBOUR APPROACH!



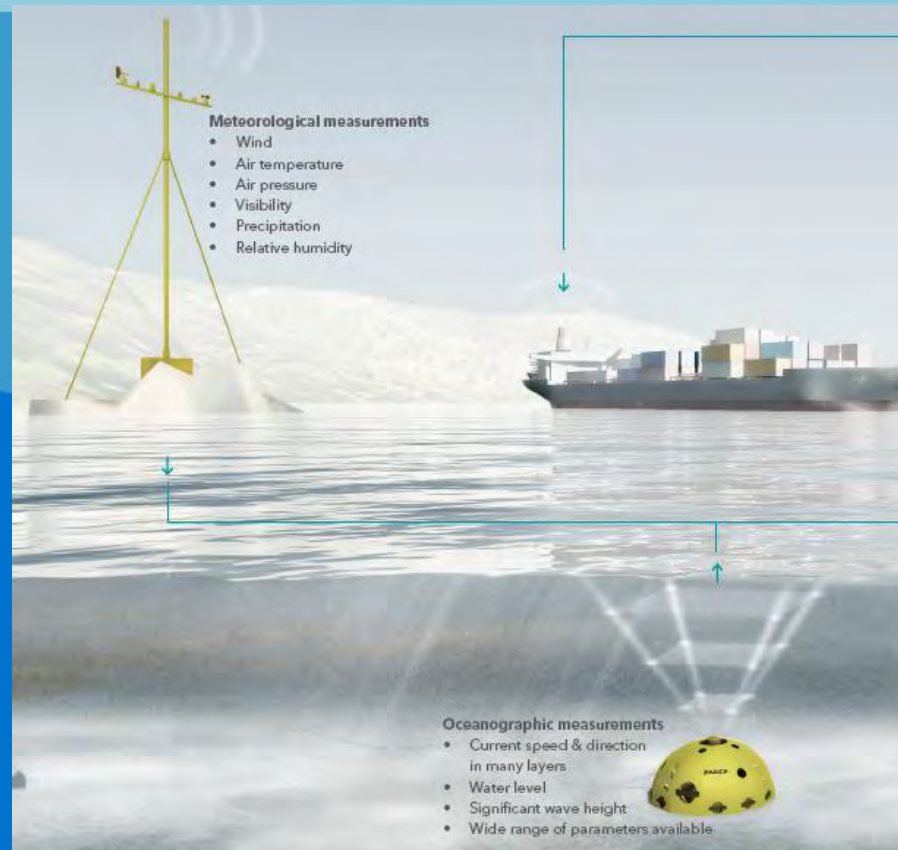
Auckland, September 2015

Conclusions

- Ferry has been pushed onto brake water at the Gdynia harbour entrance
- For safer entry important to know and compensate for local conditions
- Model assimilate real-time data to predict waves, water level and currents
- Model was calibrated/verified with more than one year of high quality field data
- Scaled ferry specific tow tank and wind tunnel tests predicts effects on ship
- Data is transmitted every 10 sec. with recommendations on safe approach
- Model adapted for cleaning of chemical spill, if occurring



Auckland, September 2015



Aanderaa is the only manufacturer offering complete turn-key hyd/met systems for ports where all instruments and sensors are made in-house.
This assures compatibility and reliability.

Auckland, September 2015

Real-time communication from Aanderaa Hyd/Met system distributed by AIS system.

Data Buoy

- Wind
- Air temperature
- Air pressure
- Visibility
- Precipitation
- Relative humidity

VTS Office

Real-time communication from Aanderaa Hyd/Met system.

Aanderaa offers modern and efficient solutions for on-line data transfer, data storage and display. No other manufacturer offers the same flexibility and reliability.

Auckland, September 2015



Aanderaa deliver complete systems and is the preferred company to supply hyd/met systems for Vessel Traffic Service integrators. Our systems run all over the world.