

September 20, 2018

WSP |

Question today
imagine tomorrow
create for the future

John Smith, Vice President, Canada

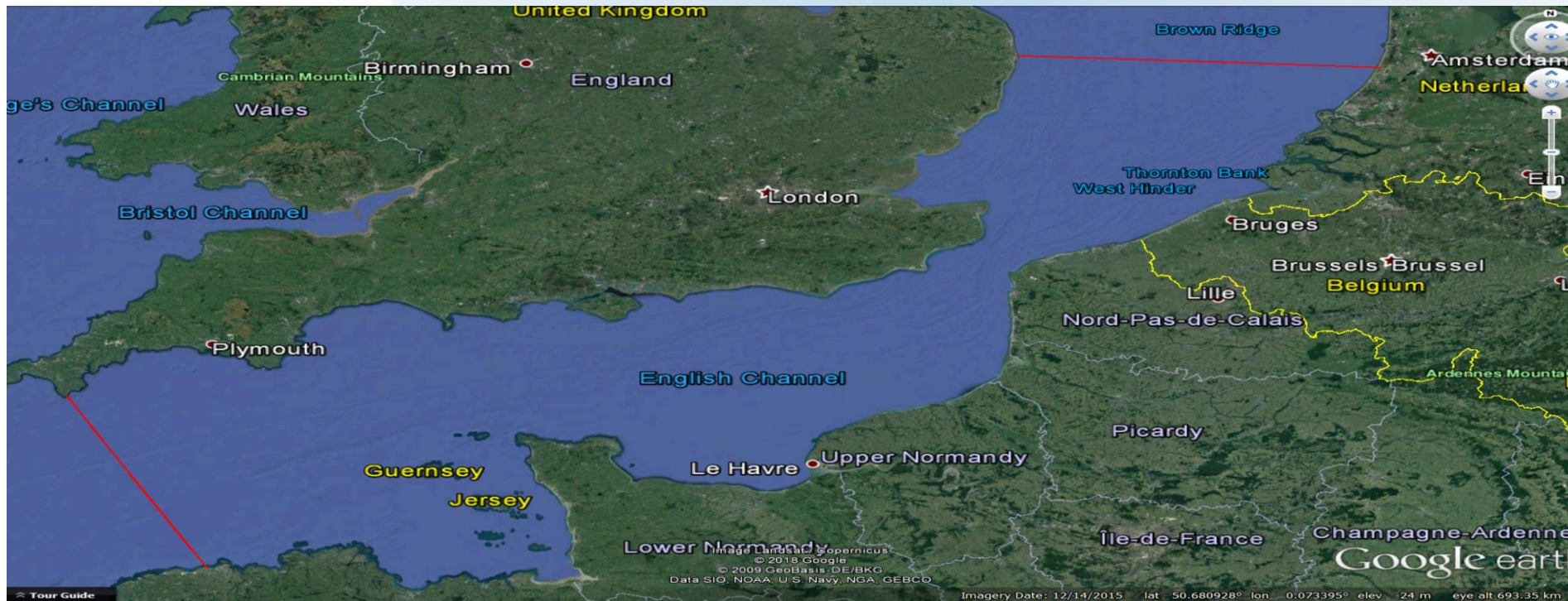


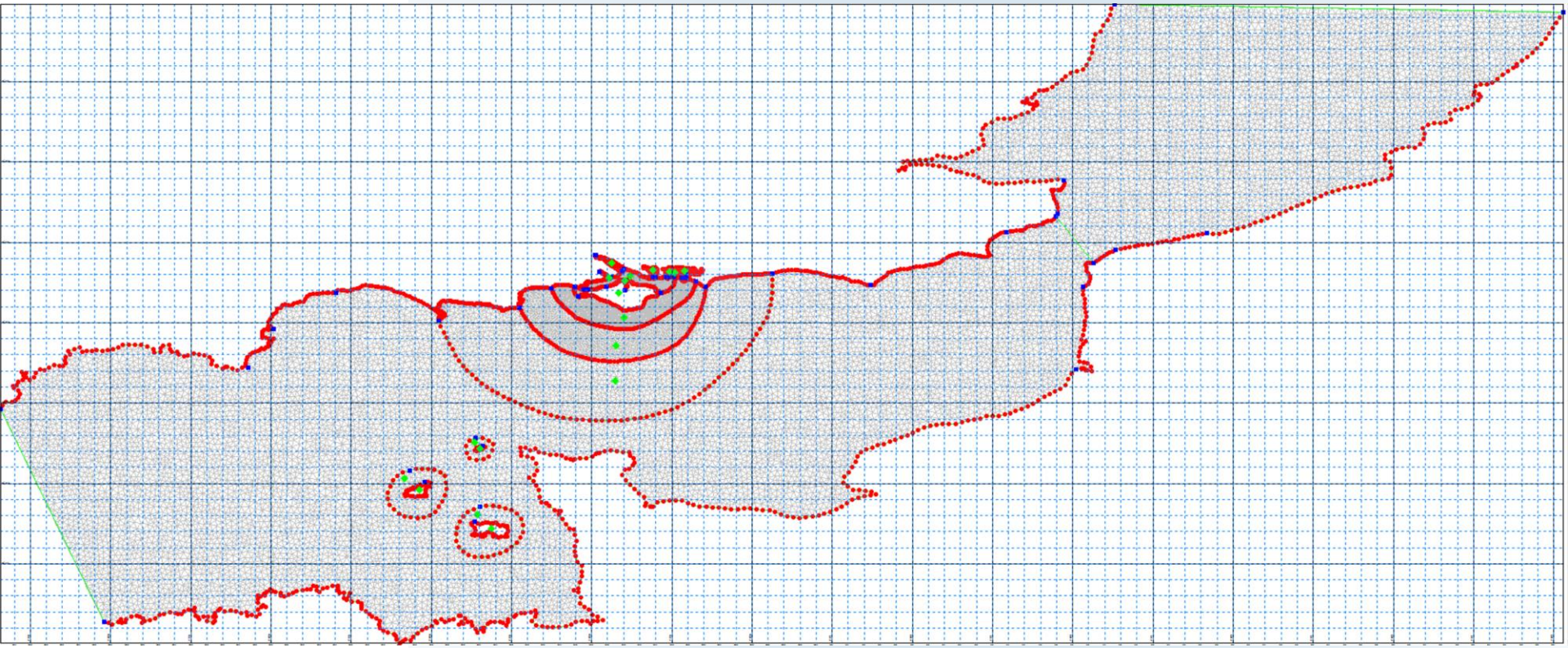
Summary

- Regional scale models
 - English Channel model
 - Continental Shelf model

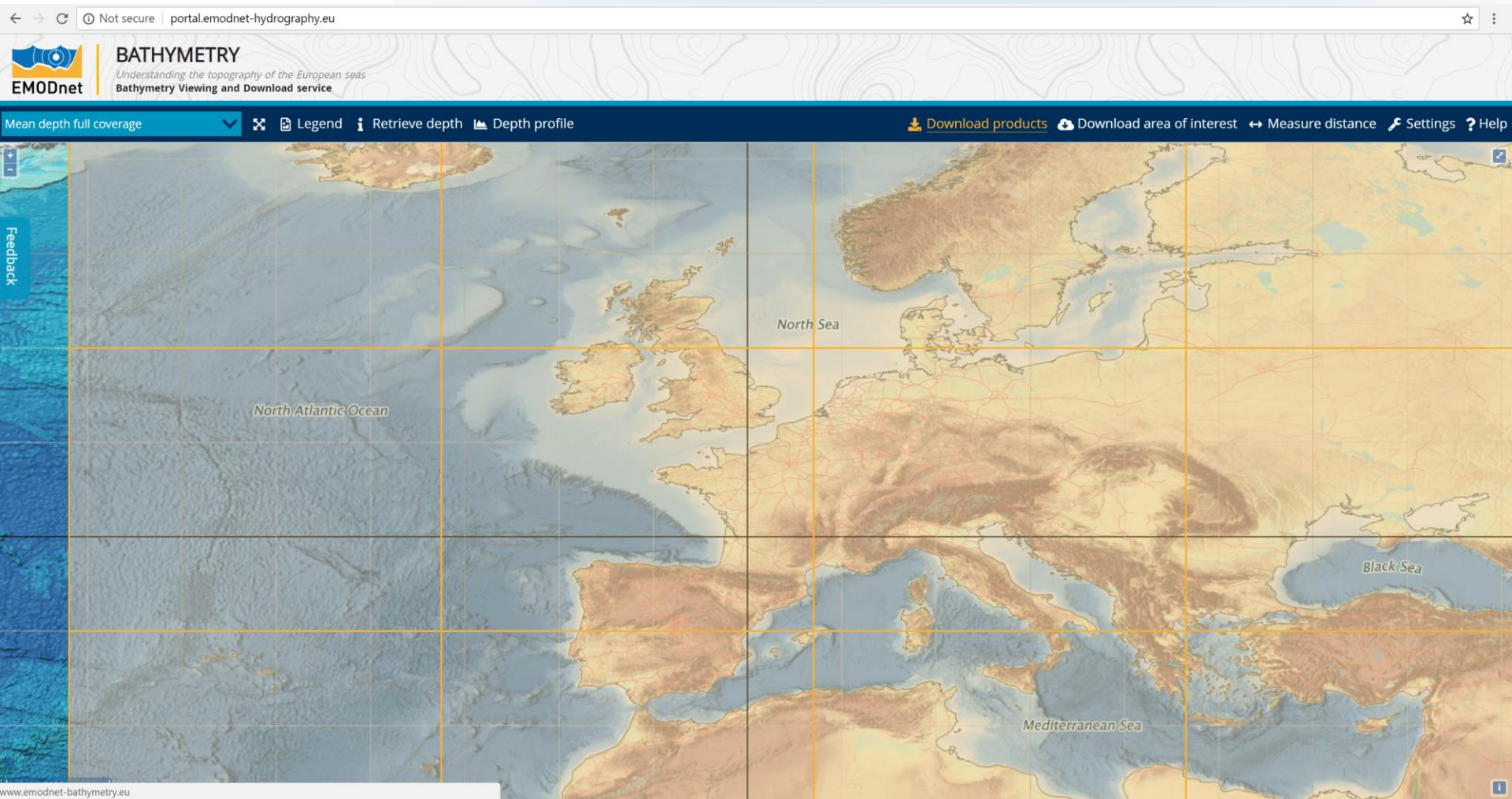
English Channel Model

- A regional model developed to inform tidal dynamics in the Solent area.
- Mesh extends between Newlyn, UK to Plousecat, France in the west and between Lowestoft, UK and Leiden, Holland in the north east.
- Mesh uses WGS84 coordinate system and mean sea level (MSL) vertical datum.

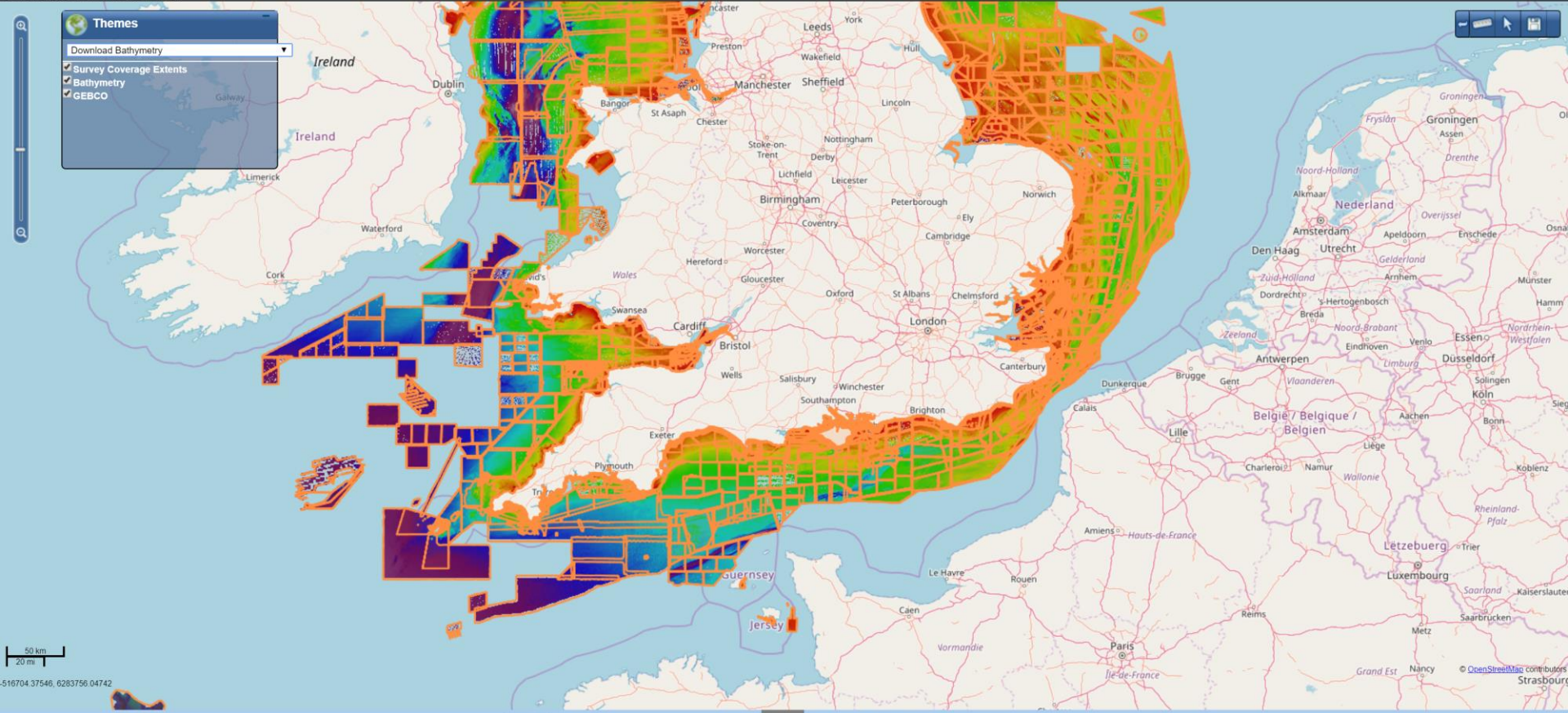




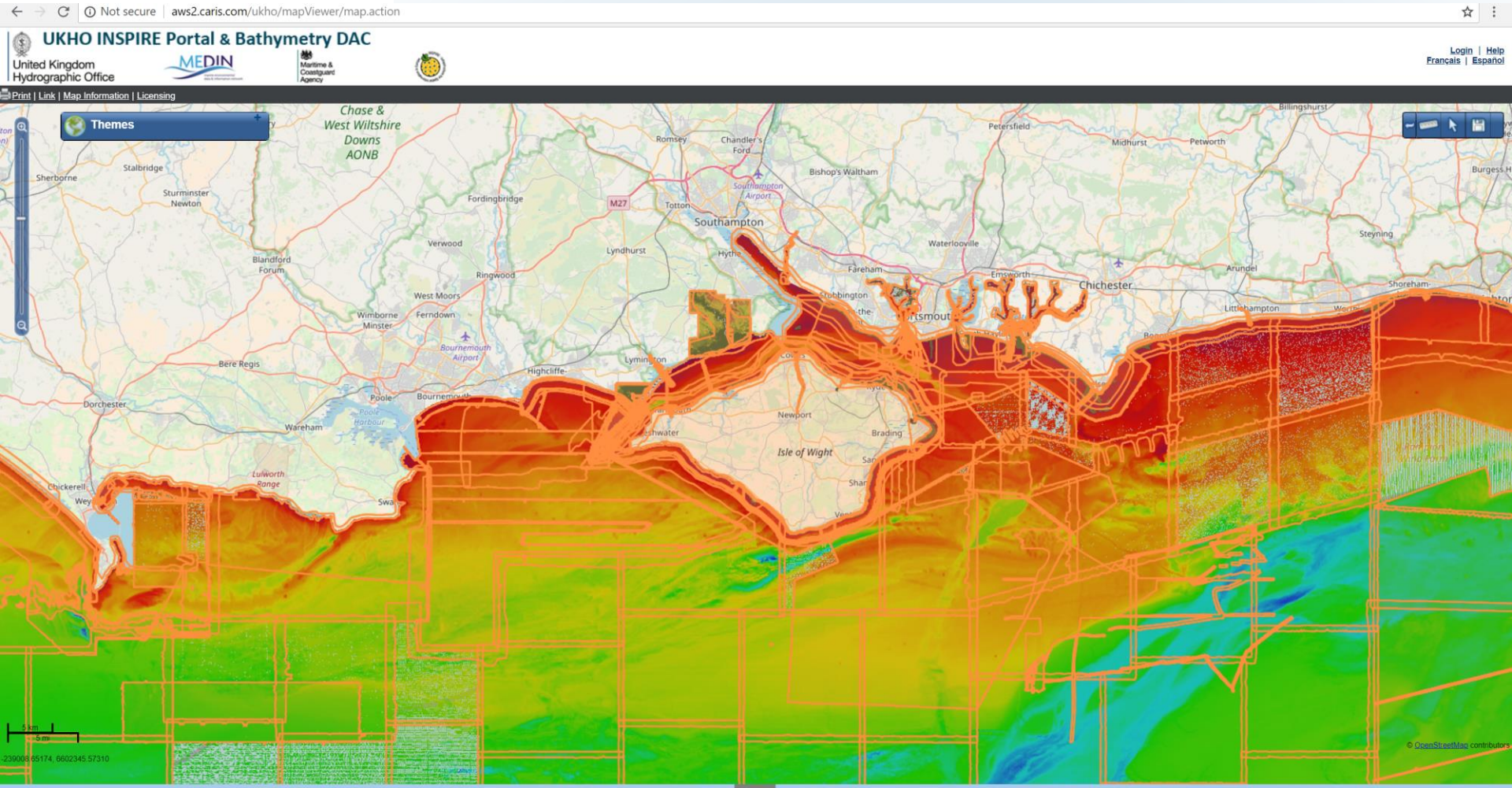
Bathymetry

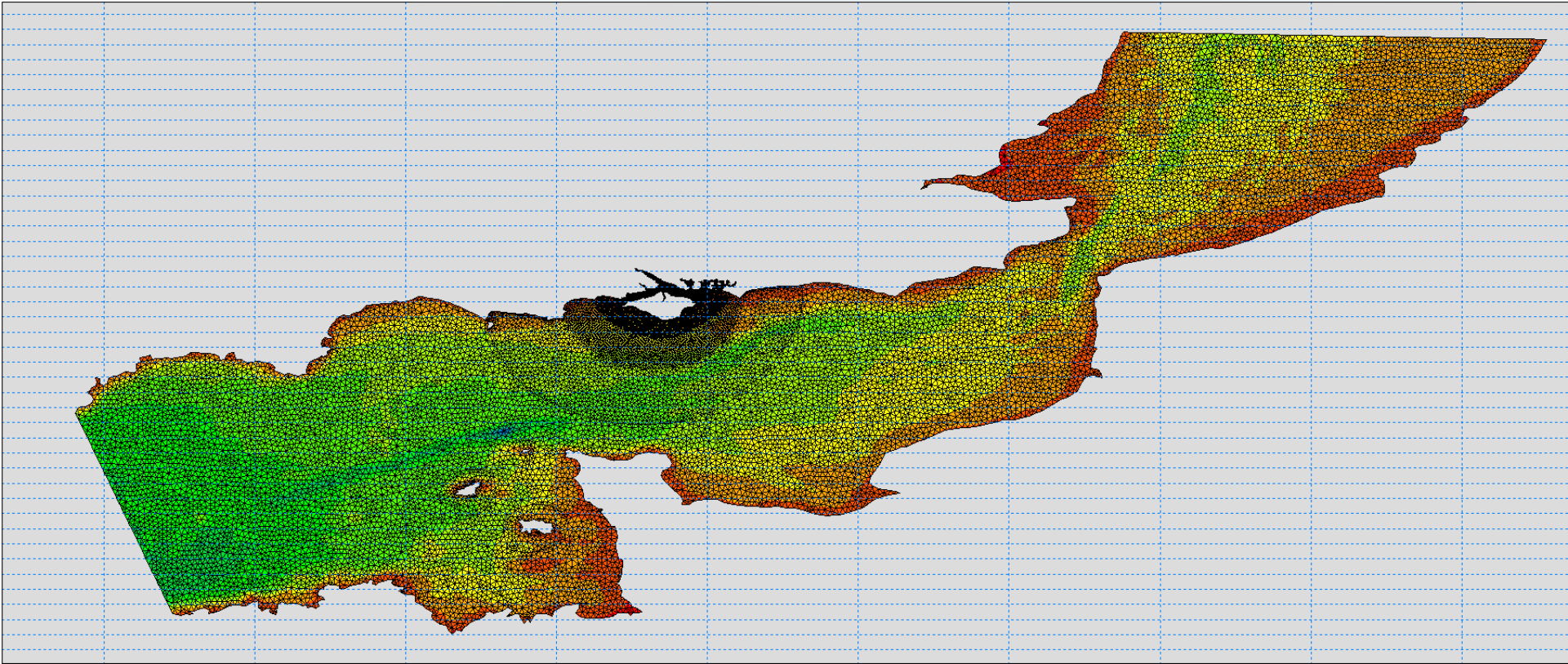


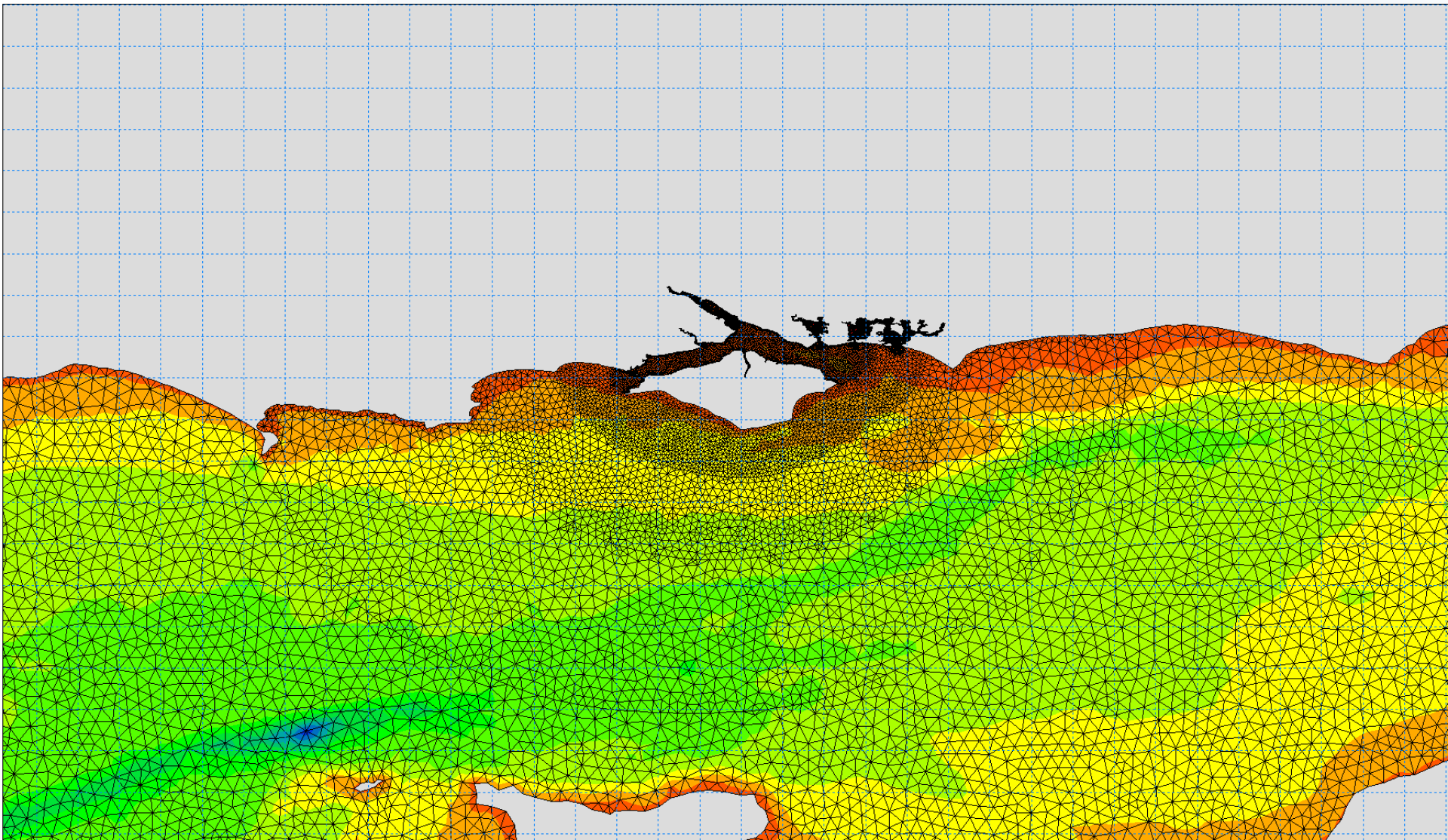
Bathymetry

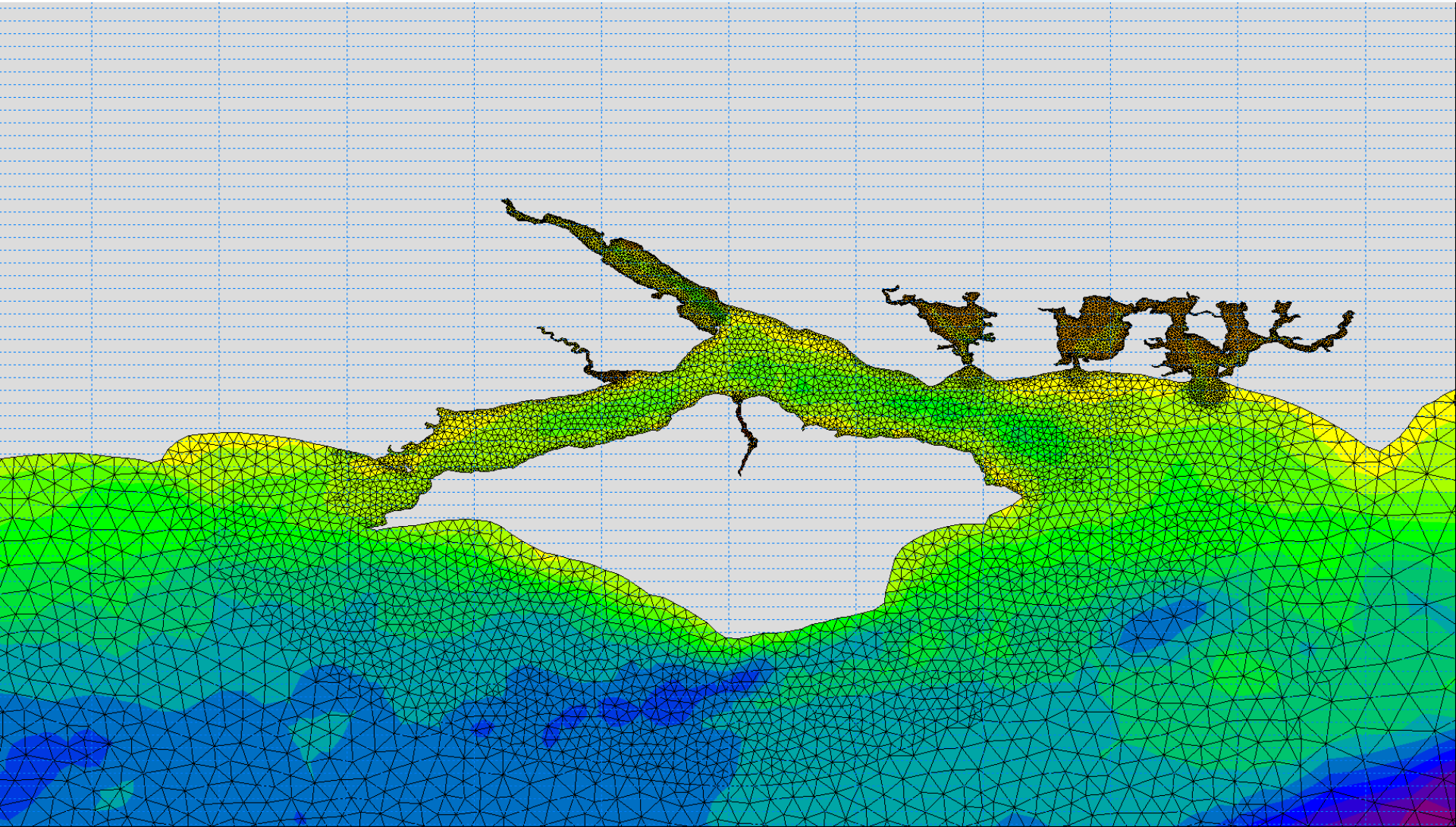


Bathymetry









Boundary conditions

- Boundary conditions were obtained from the DHI Global Tidal Model.
- Spatially varying time series of water levels.
- The 0.125 degree resolution data set were used.
- Data were extracted along the boundaries to the west and north east.
- 85 data points characterise the western boundary.
- 47 data points cover the north eastern boundary.
- Consistent with the model mesh the vertical datum of boundary information is MSL .
- No additional sources of inflow, such as rivers, are included in the regional scale model.

Bed Roughness

- Spatially varying bed roughness was applied to the regional model
- Mannings M values used
- The Mannings M values were calculated as a function of seabed or sediment type and water depth

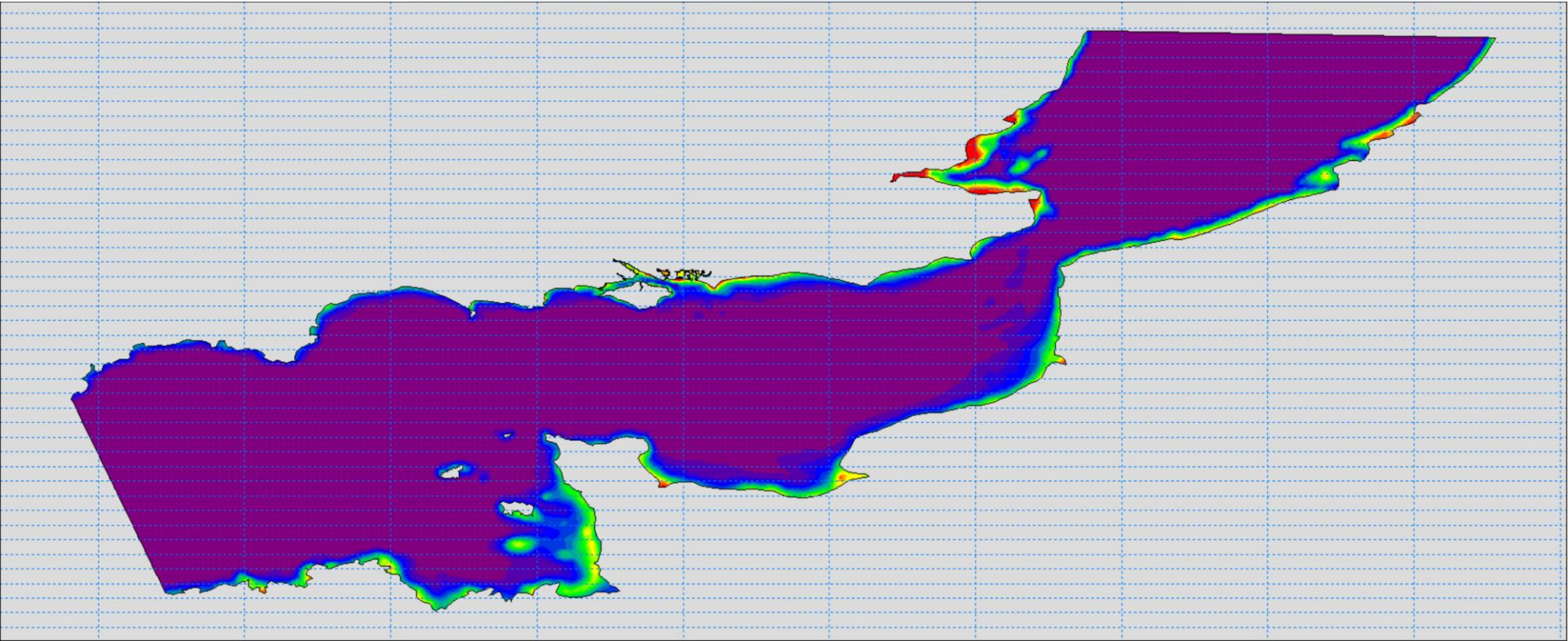
$$M = \frac{1}{\sqrt{C_d/g \cdot h^{1/6}}}$$

$$C_d = \left(\frac{1}{\sqrt{0.32 h}} \right)^{1/7} \cdot C_{100}$$

- C_{100} is the drag coefficient 1m above the bed.
- Values were obtained from Soulsby (1997).
- Spatial distribution of sediment type was obtained from EMODnet.

Substrate	C_{100}
Rock or other hard strata	0.0010
Coarse sediment	0.0017
Seabed	0.0015
Sand to muddy sand	0.0017
Mud to sandy mud	0.0015

Bed Roughness



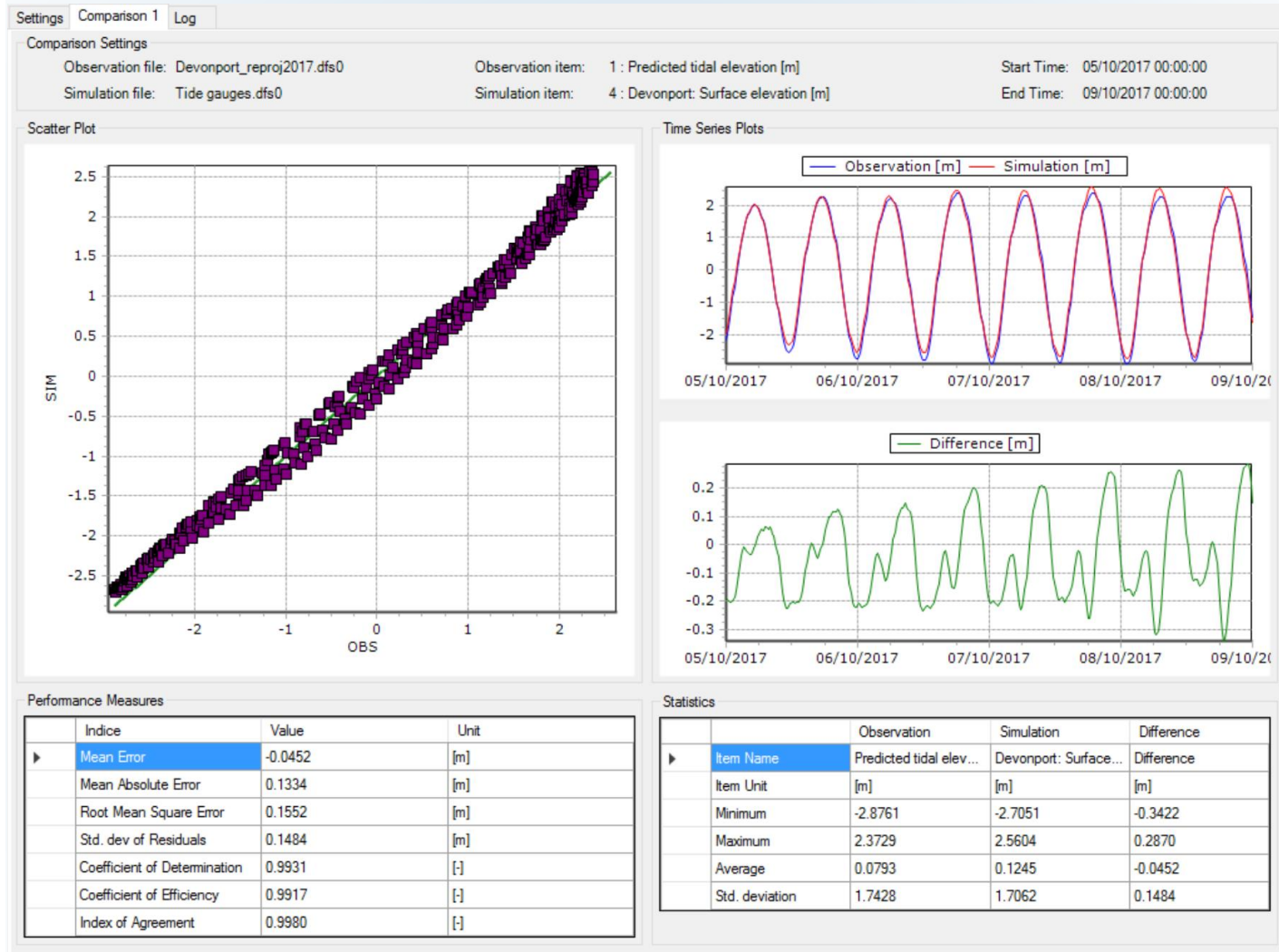
Mannings M
54-32

wsp

Calibration

Spring tide
05.10.17 -
09.10.17

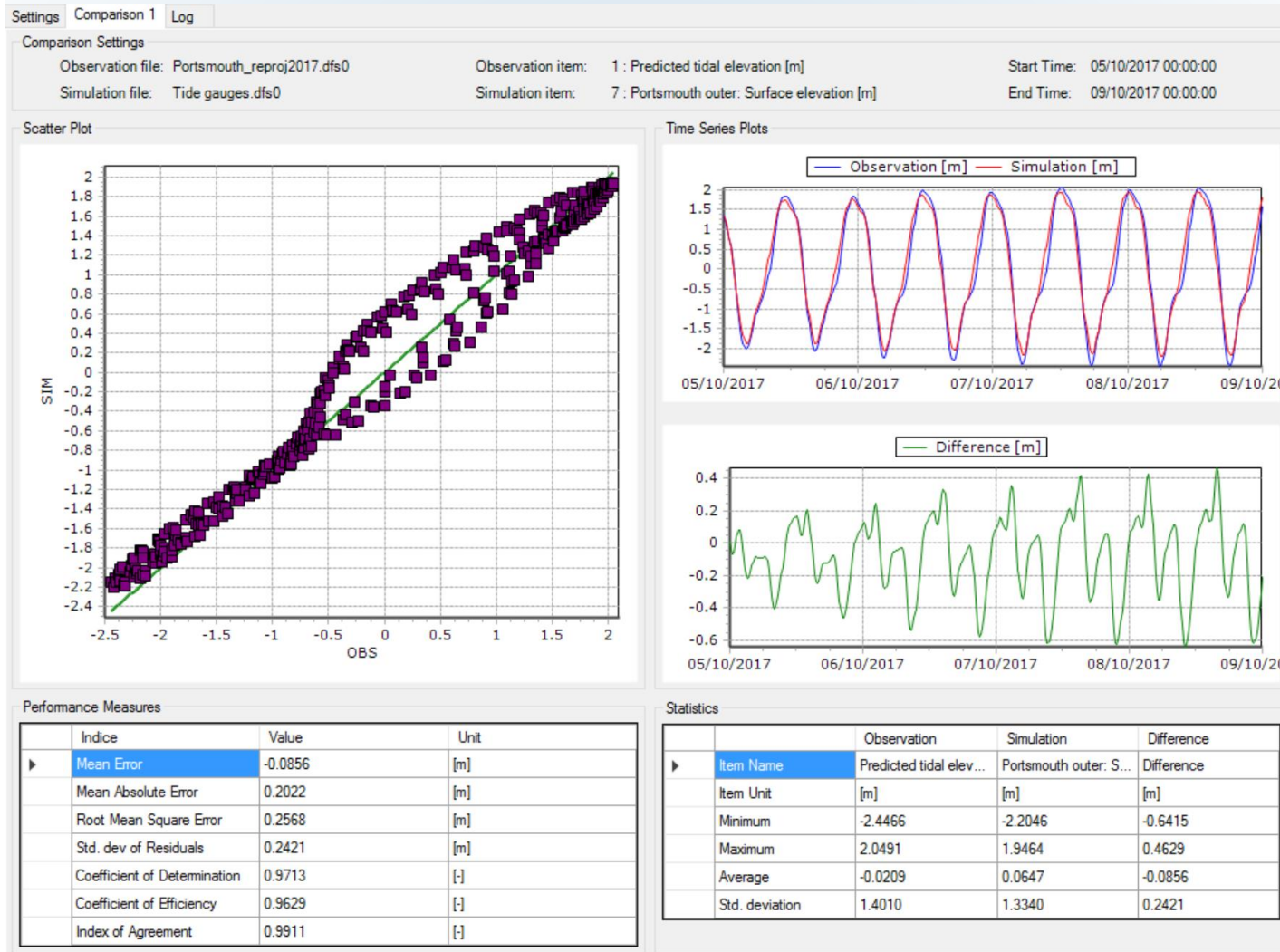
Devonport



Calibration

Spring tide
05.10.17 -
09.10.17

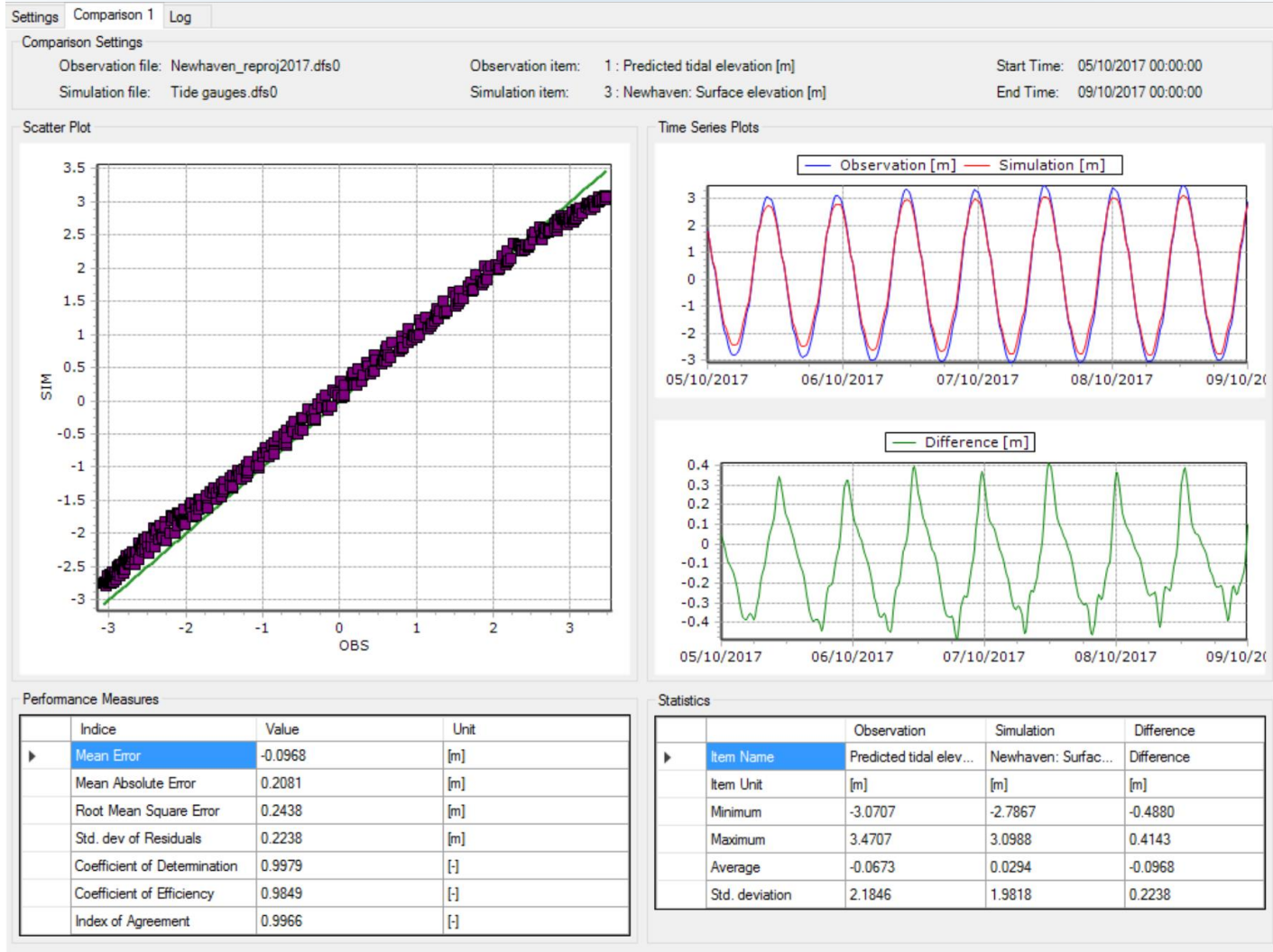
Portsmouth



Calibration

Spring tide
05.10.17 -
09.10.17

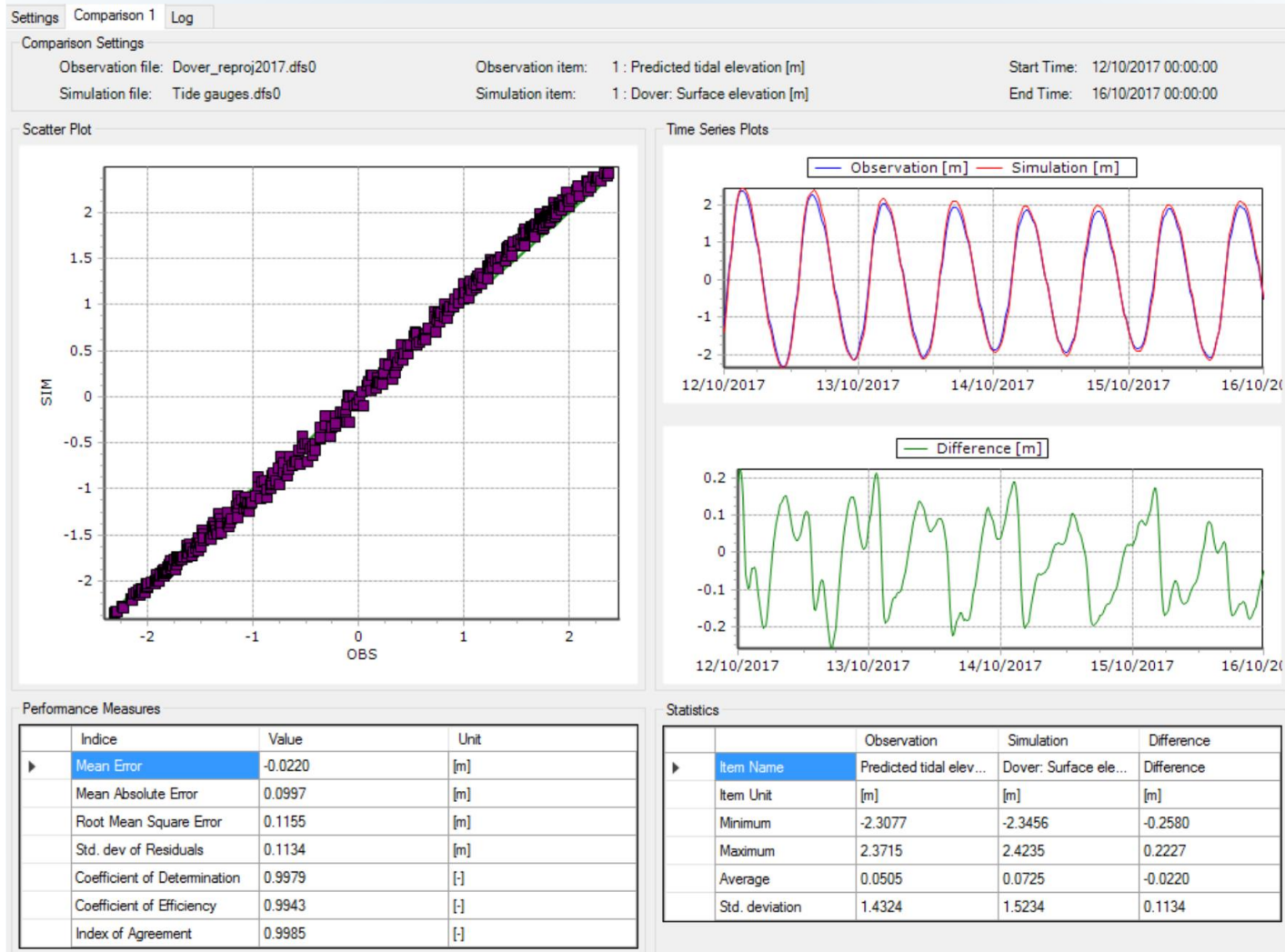
Newhaven



Calibration

Spring tide
05.10.17 -
09.10.17

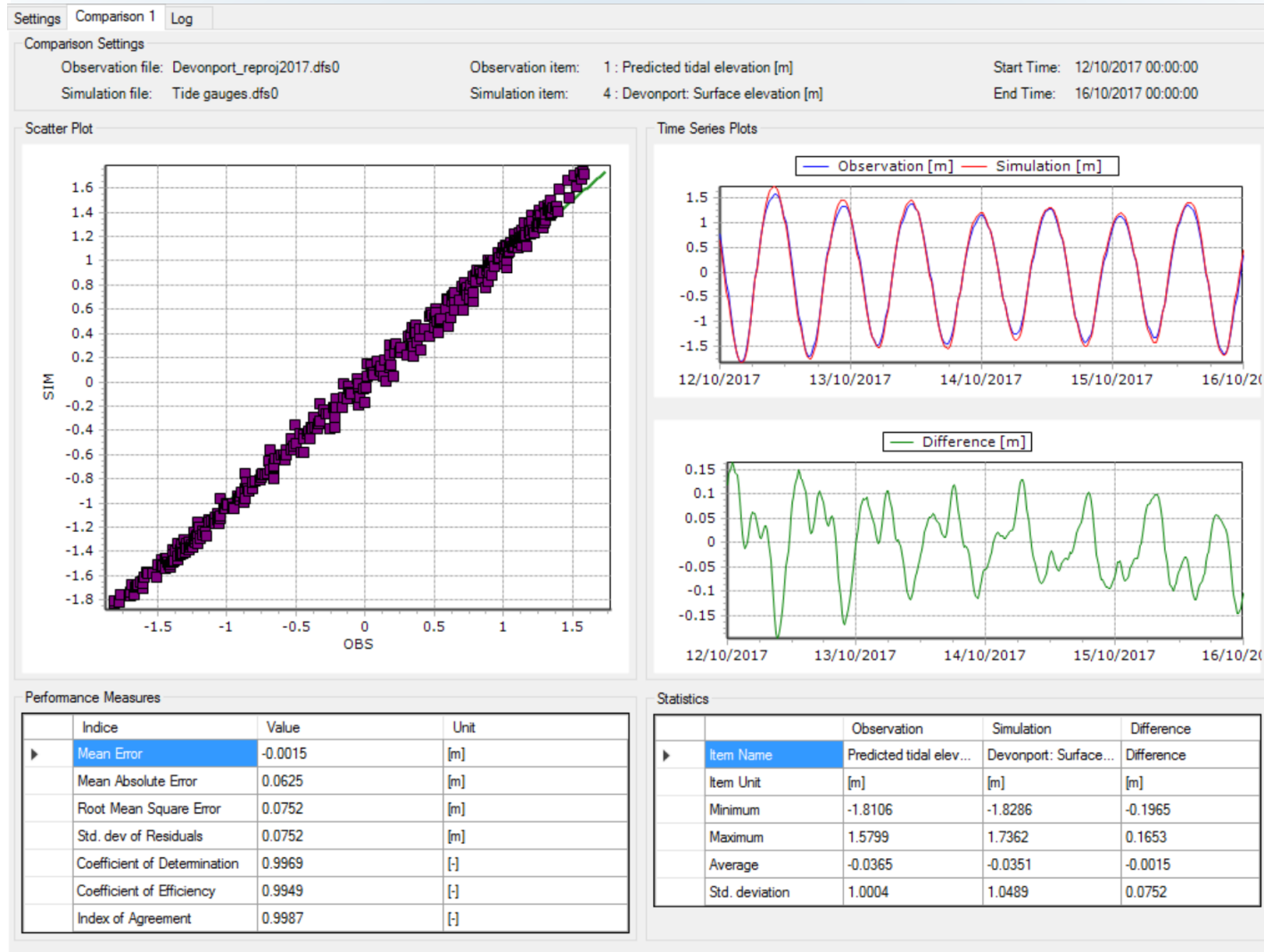
Dover



Validation

Neap tide
12.10.17 -
16.10.17

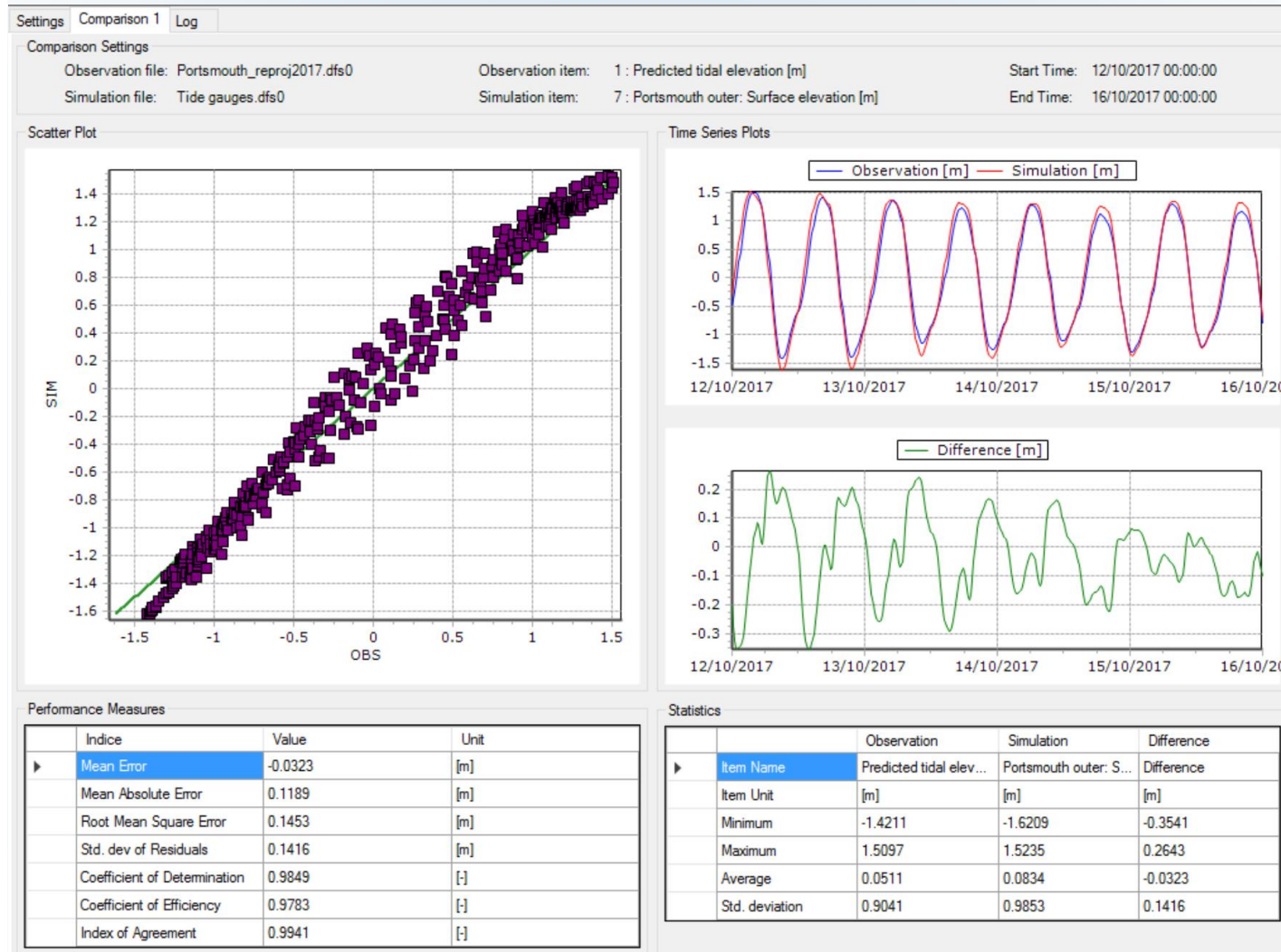
Devonport



Validation

Neap tide
12.10.17 -
16.10.17

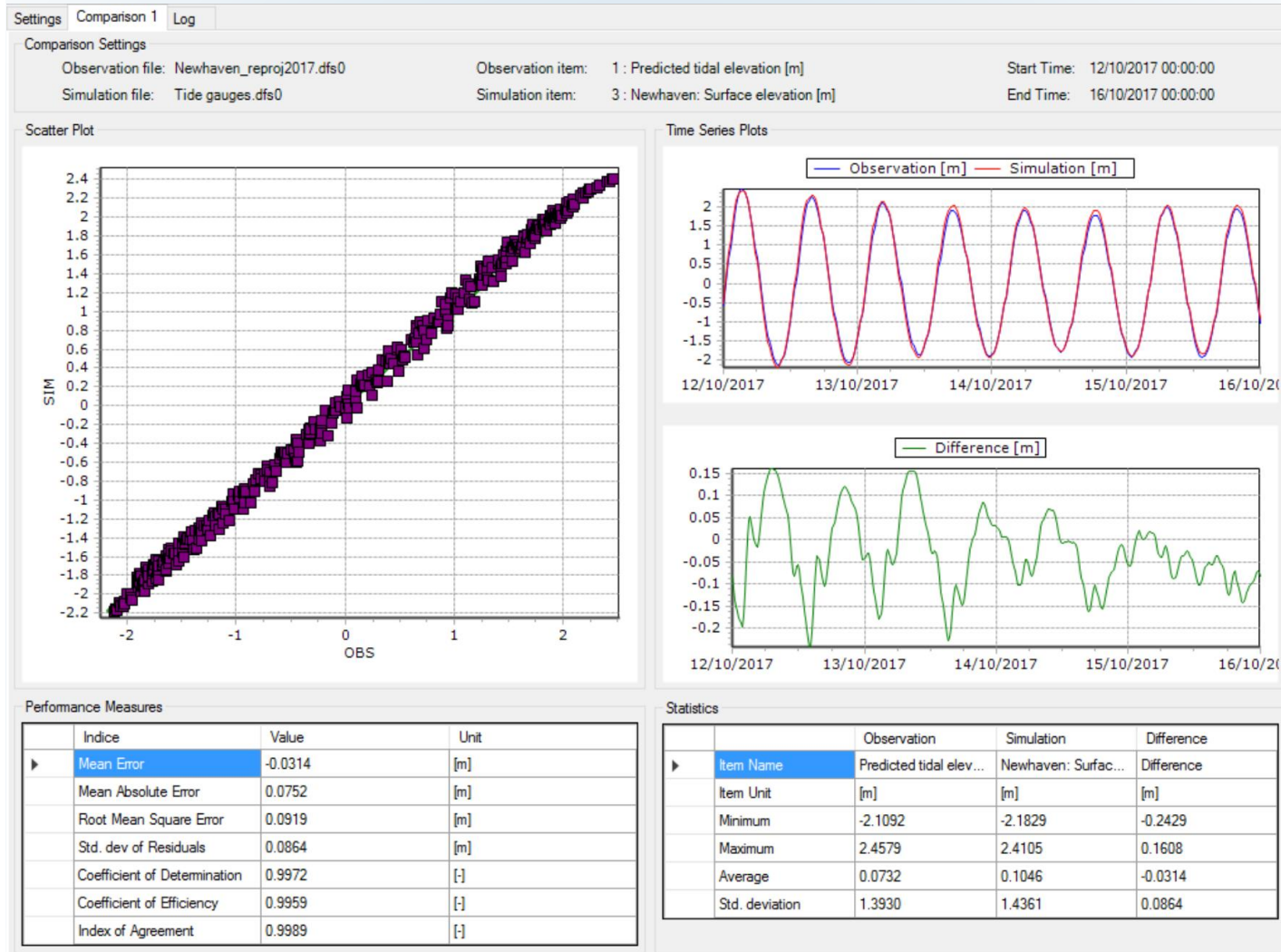
Portsmouth



Validation

Neap tide
12.10.17 -
16.10.17

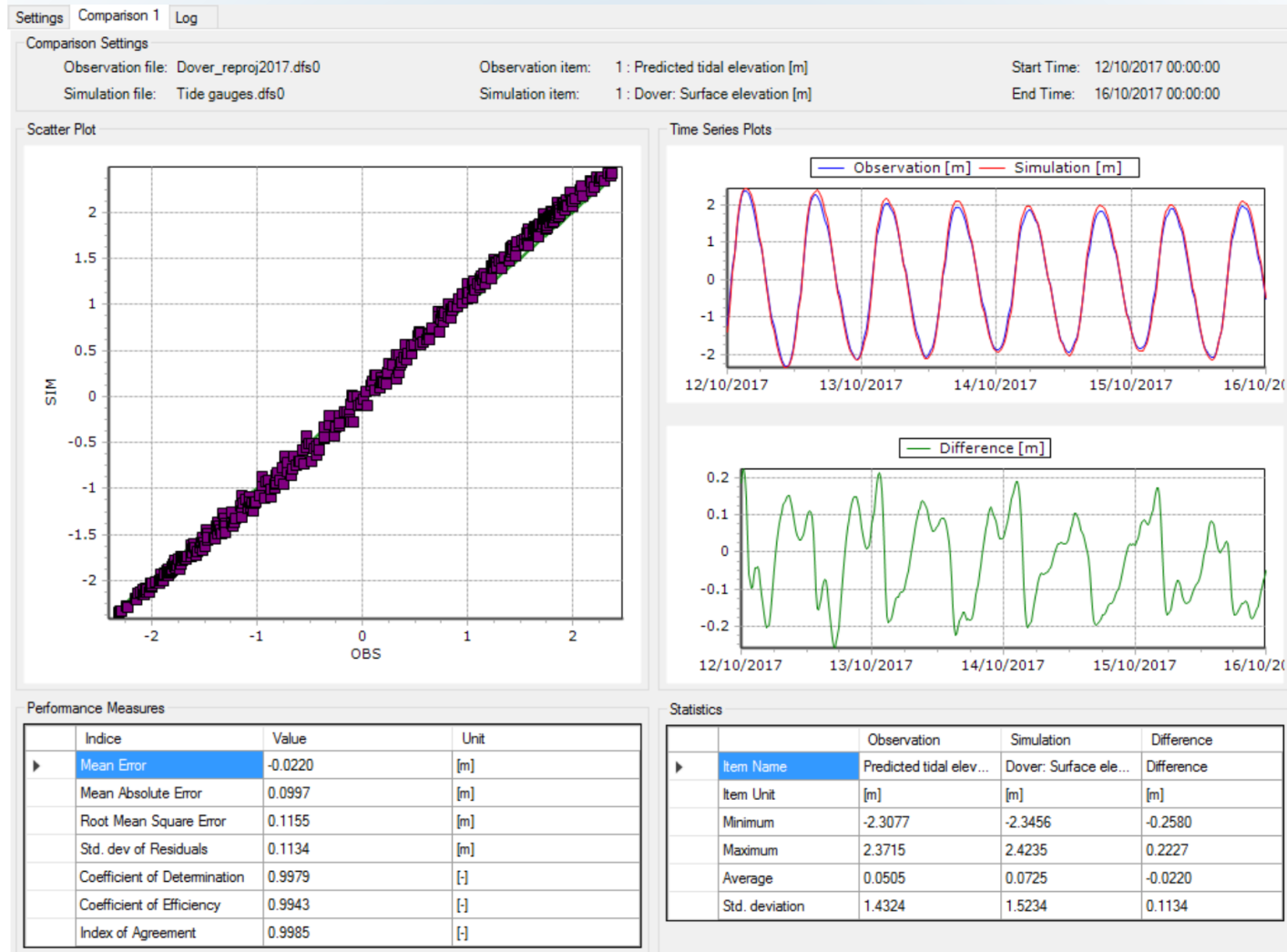
Newhaven



Validation

Neap tide
12.10.17 -
16.10.17

Dover



Bad data

Bournemouth

