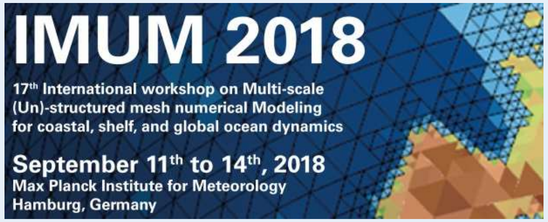

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Generation of operational forecasts on demand:

The OPENCoastS platform

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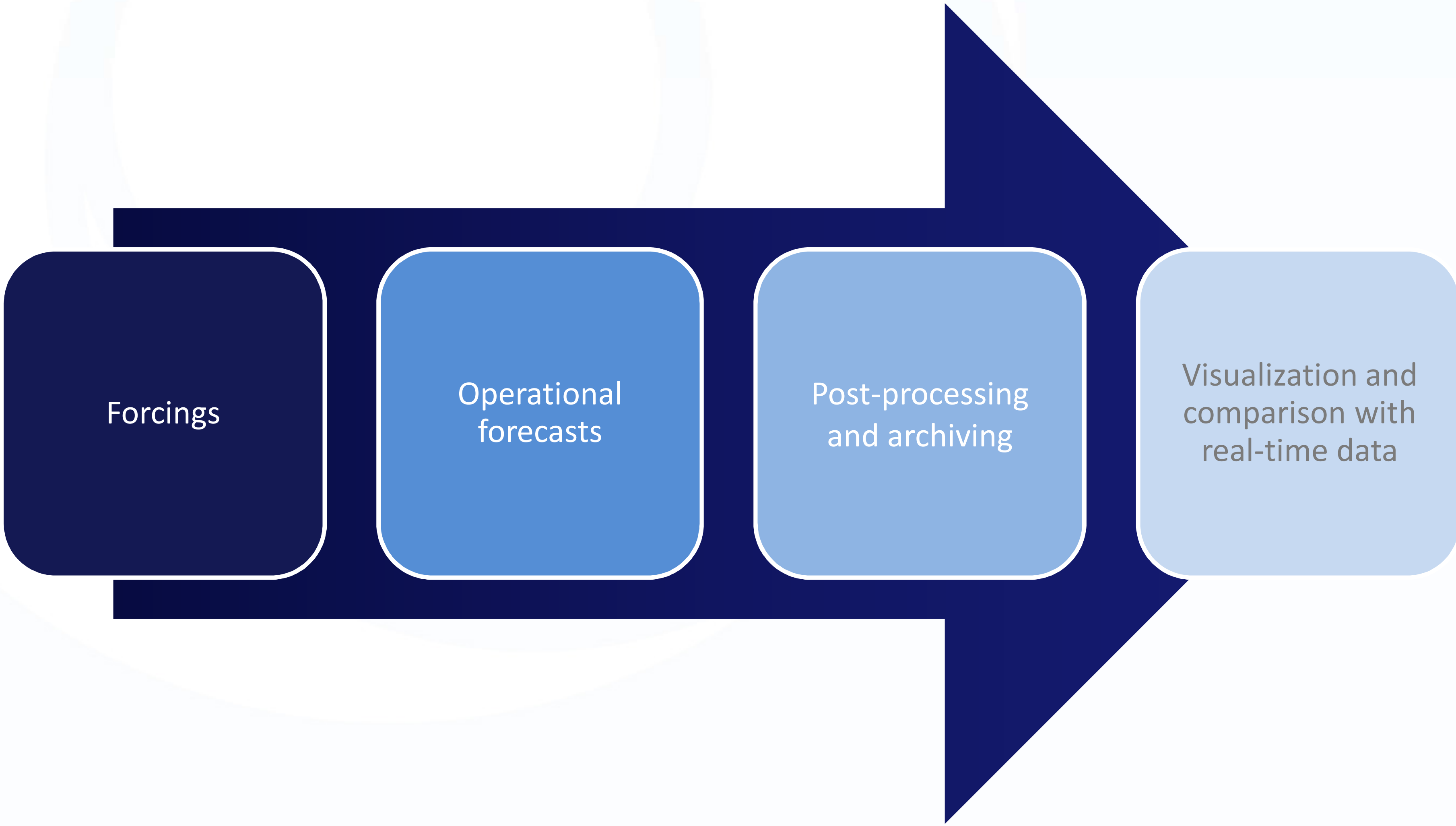
Content

- *Motivation*
- *The OPENCoasts platform*
  - *Concept*
  - *Interface components*
  - *Examples*
- *Summary and perspectives*

EOSC-hub Forecast systems



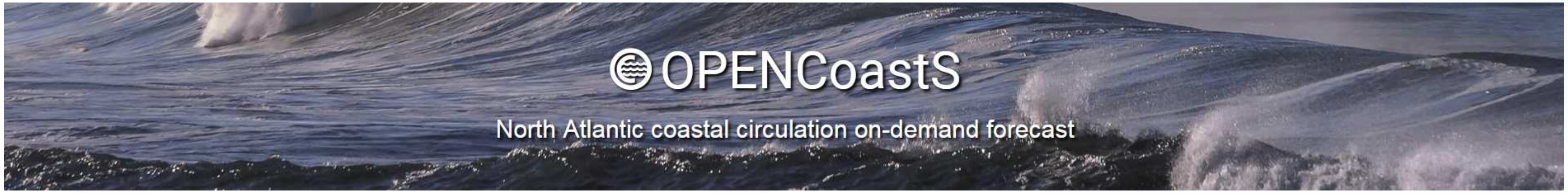
EOSC-hub Forecast systems: present difficulties

- *The development requires mixed teams, with expertise in both numerical modeling and information technologies*
- *Significant effort for development and maintenance*
- *Redundancies are necessary to minimize failures*
- *Computational resources must be available every day*

EOSC-hub Forecast systems: present challenges

- *Develop forecast systems as a service*
- *Make it accessible to people with modeling expertise, but not necessarily IT experts*
- *Make the service flexible in the choice of forcings, processes and models (and their versions)*
- *Take advantage of available online data and model results*
- *Provide computational resources*
- *Manage output files generated daily*
- *Make the development* ***quick and easy***

EOSC-hub The OPENCoastS platform: concept



- *A platform to:*
  - *Implement forecast systems through a browser-based, user-friendly, interface*
  - *Allow the choice of the processes, model and forcings*
  - *Allow the replication and change of forecast systems*
  - *Avoid the need of a large team to generate forecast systems*
  - *Take advantage of the European Open Science Cloud (EOSC) to provide the required computational resources*

The OPENCoastS platform: information requirements

OCEAN

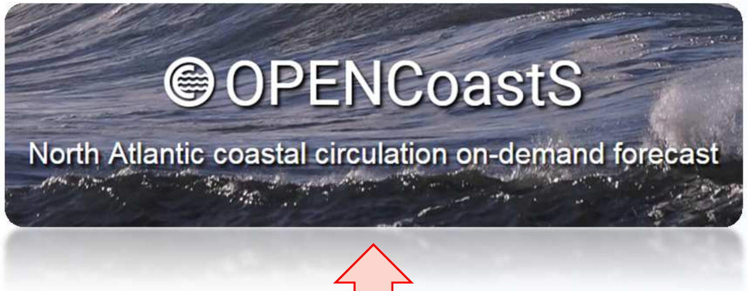
PRISM2017
FES2014
…

ATMOSPHERE

NOAA / GFS
…

DATA

EMODnet Physics
…



USER

Grid
Parameters
…

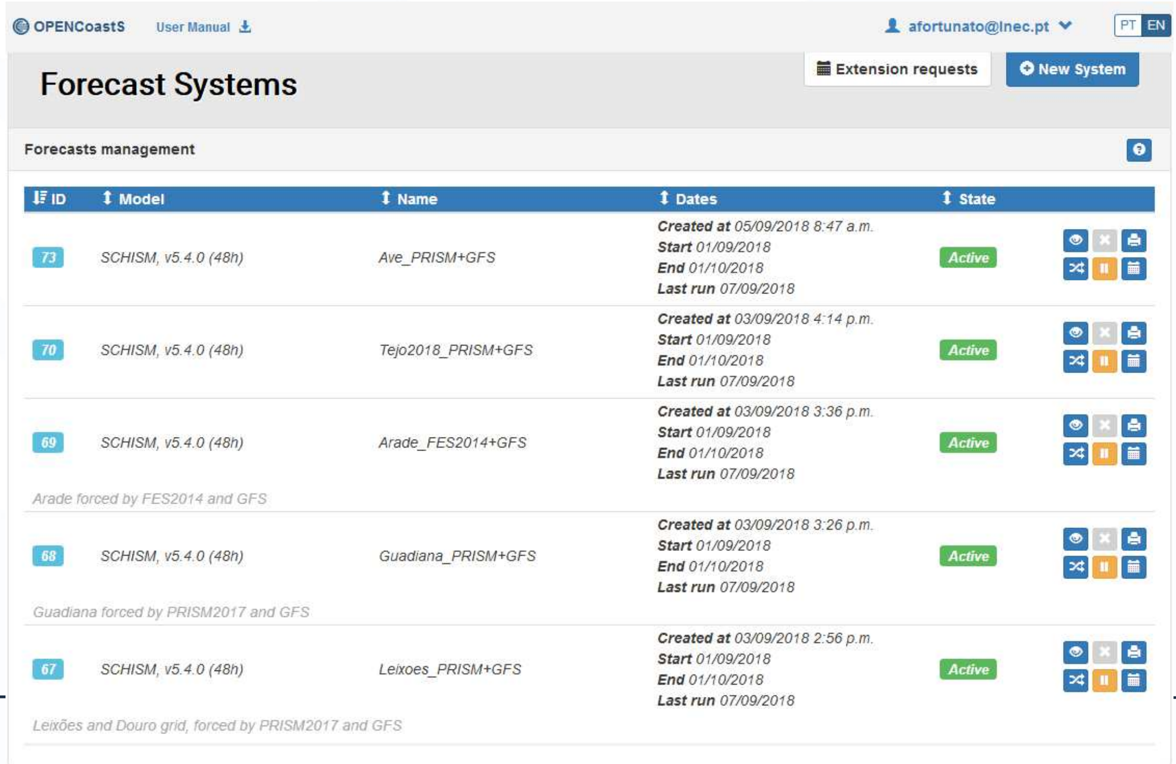
EOSC-hub The interface components

1. *Configuration Assistant*
   - *Guides the user though the generation of a forecast system*
   - *Provides guidance, detailed information and suggestions*
   - *Performs basic verifications*

EOSC-hub The interface components

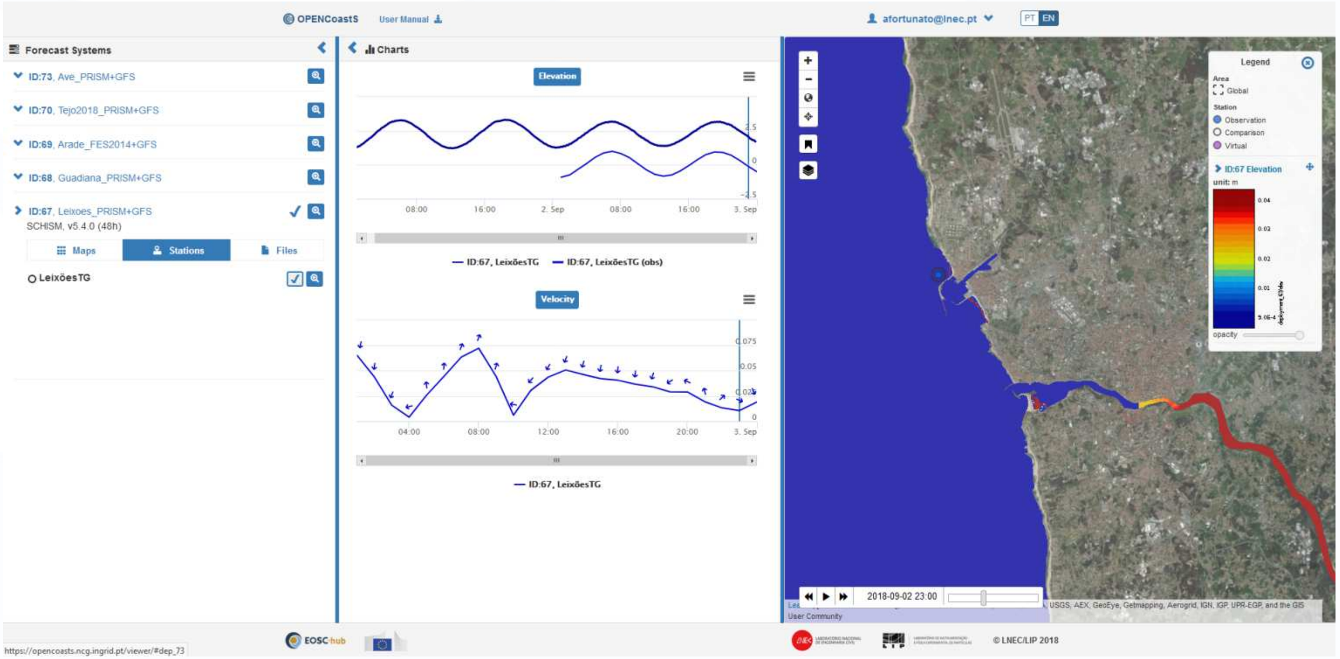
2. *Forecast manager*

- *Lists all present and past forecasts of the user*
- *Allows viewing the forecast configurations, stopping and restarting forecasts, cloning forecasts, etc.*



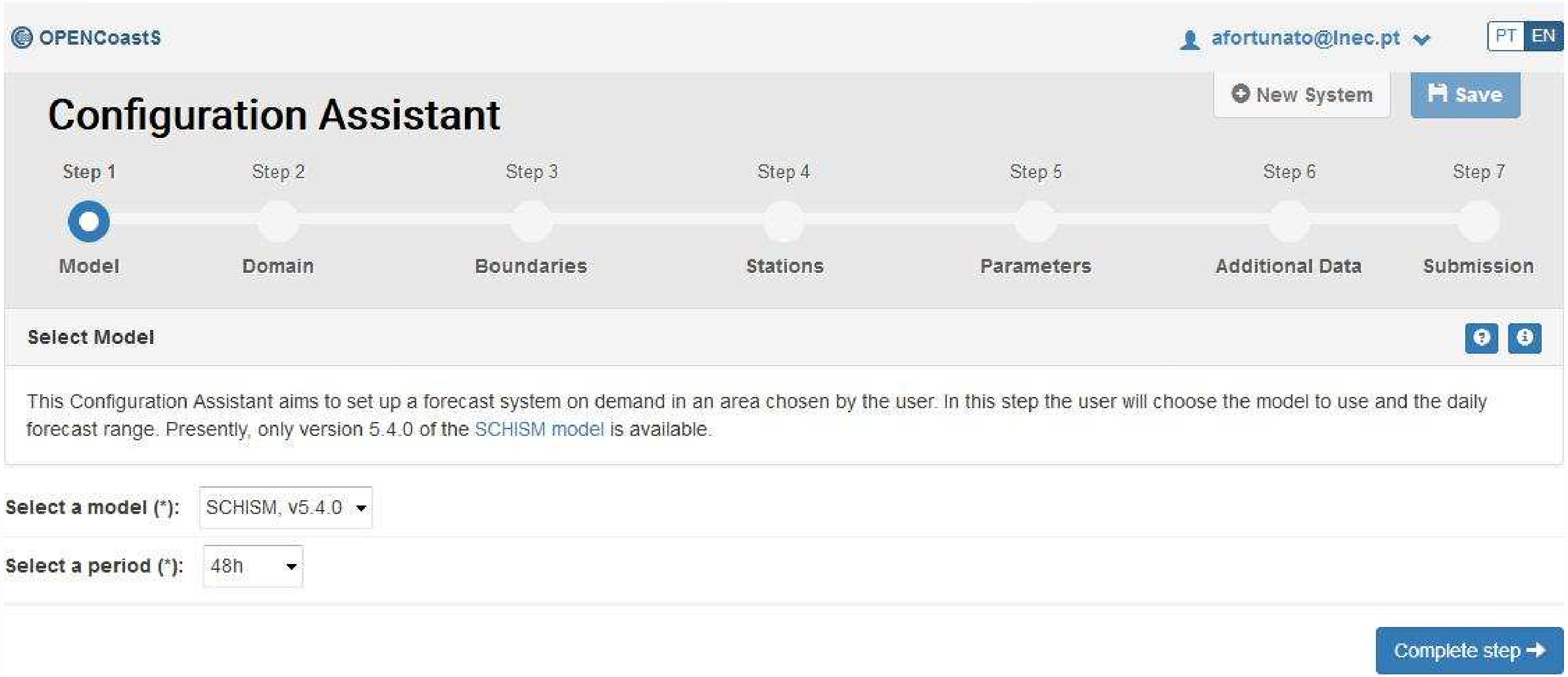
The interface components

3. *Outputs viewer*
    - *Provides access to the outputs files*
    - *Shows scalar and vector maps through a Web-GIS*
    - *Shows time series and data-model comparisons*



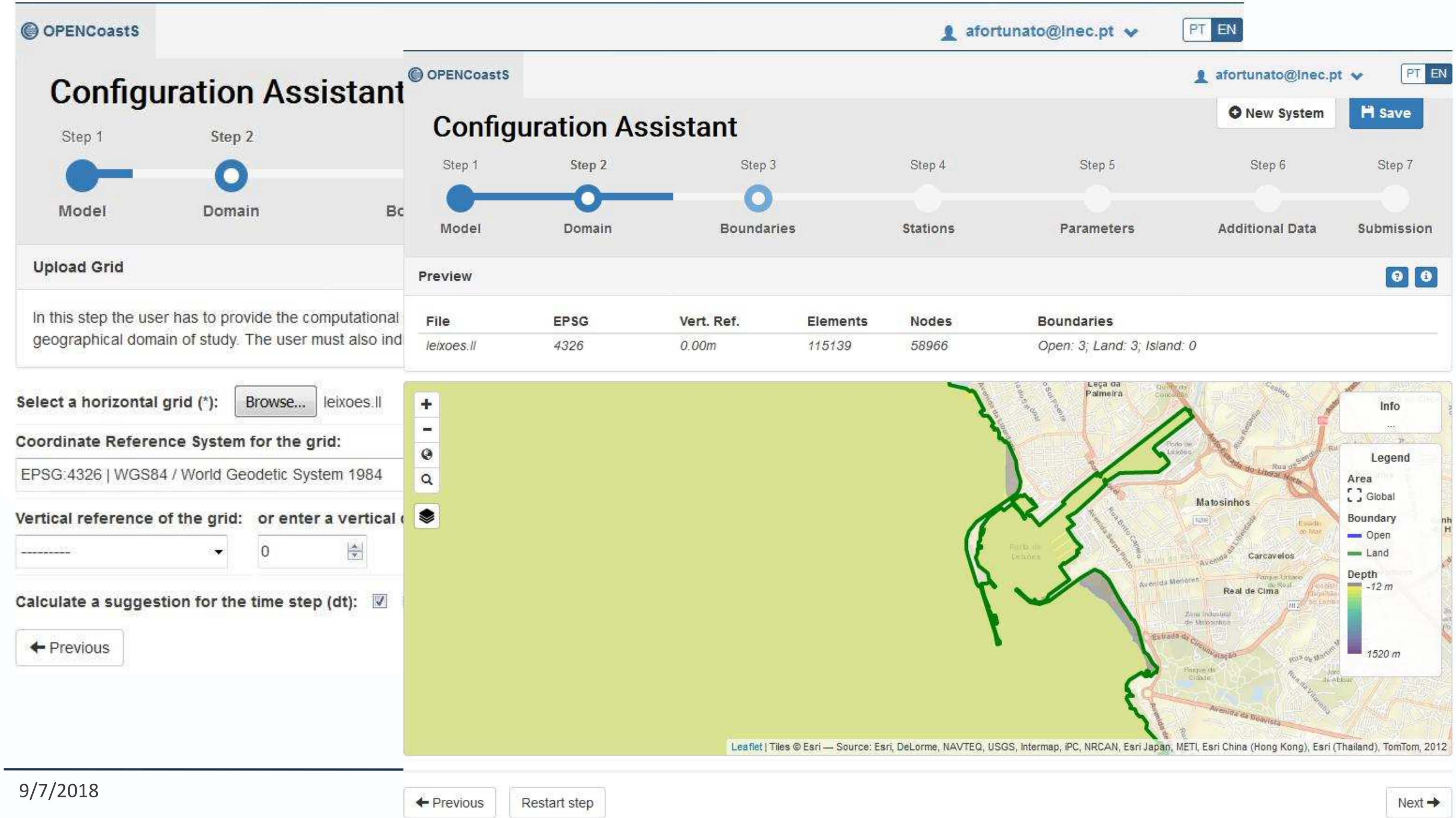
Generating a forecast system

- *Step 1: Select the model and the duration*



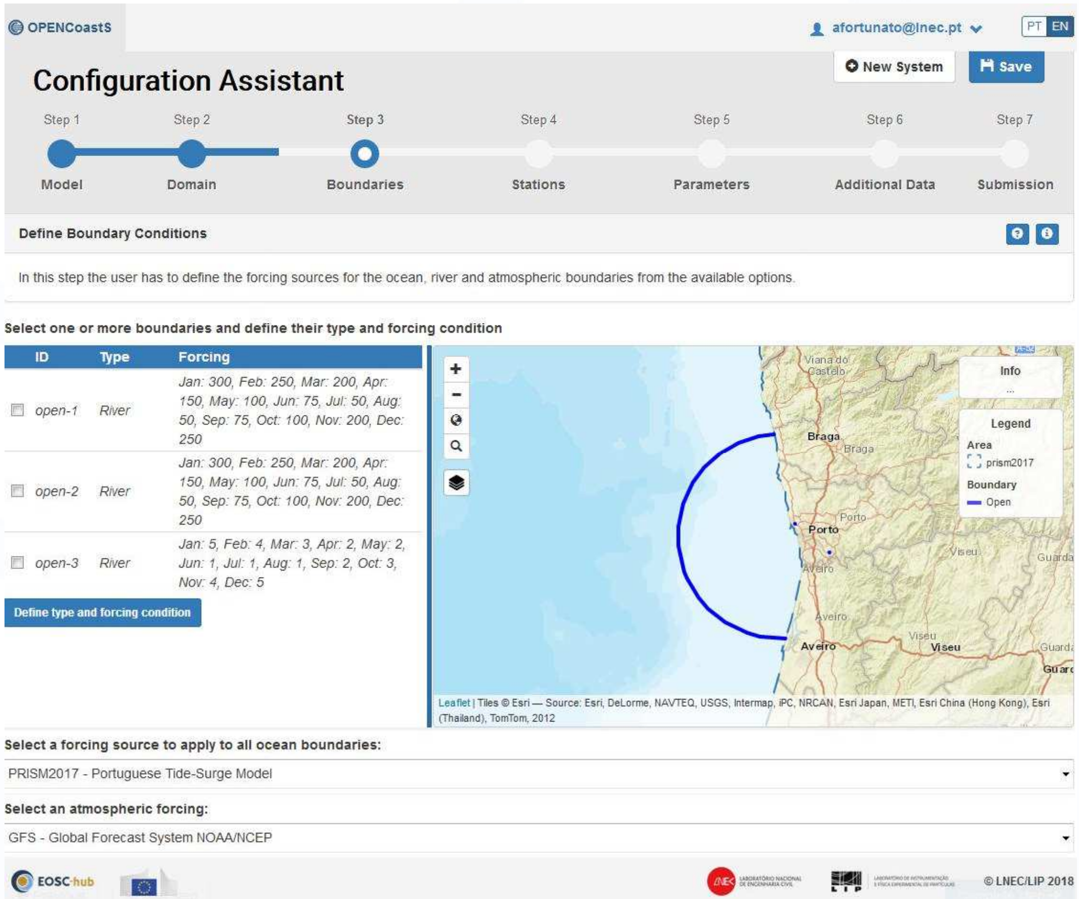
Generating a forecast system

- *Step 2: Upload and verify the grid*



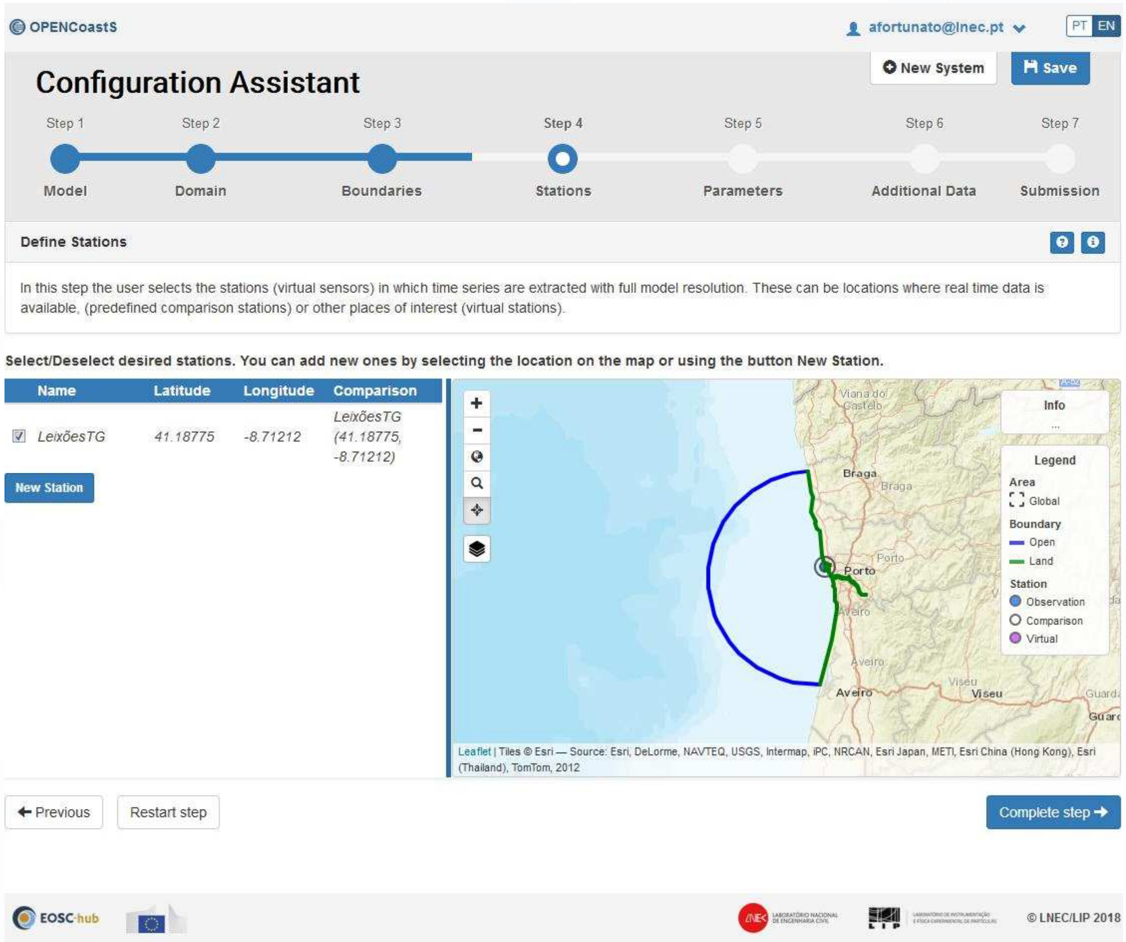
Generating a forecast system

- *Step 3: Specify boundary conditions*



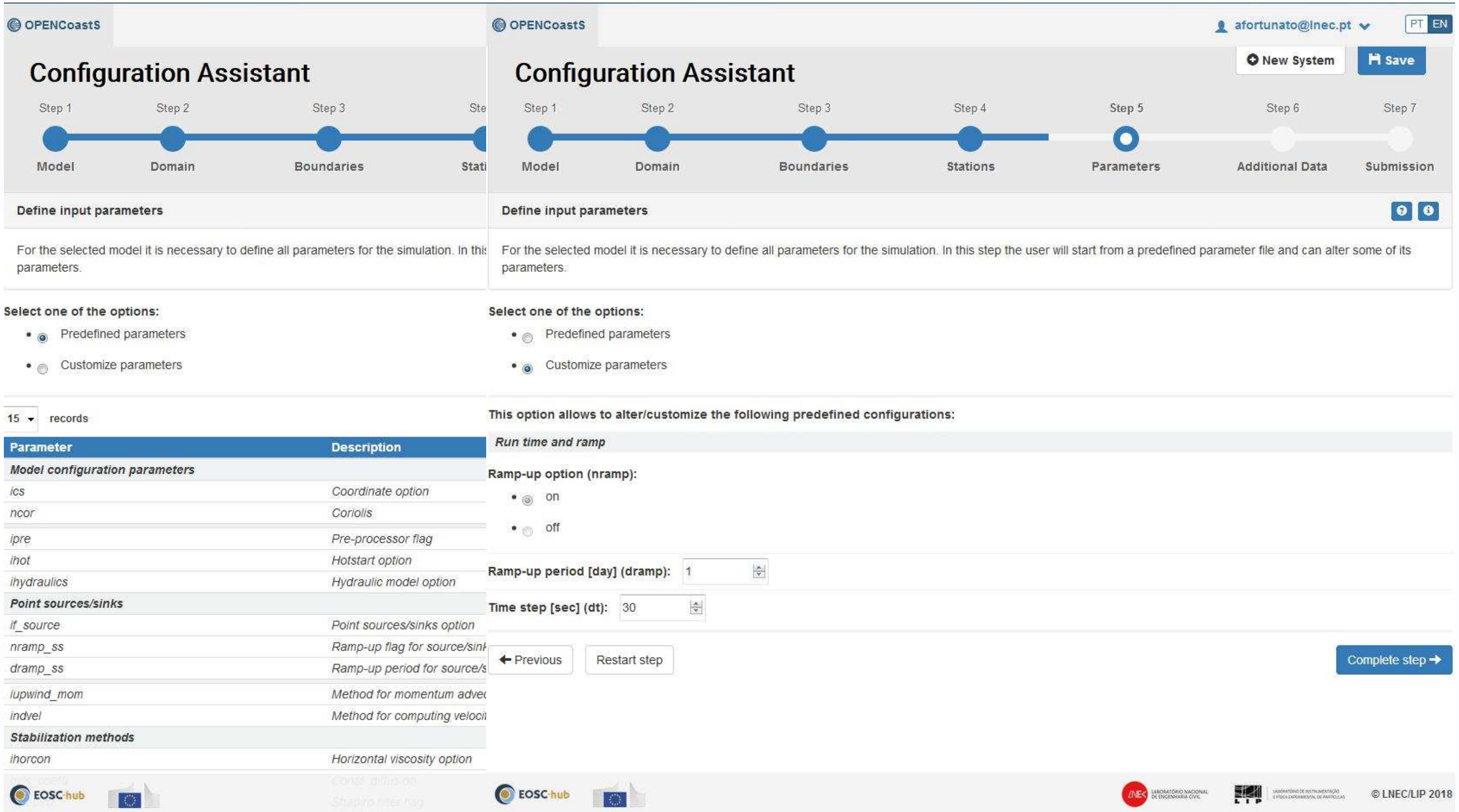
Generating a forecast system

- *Step 4: Define output stations*



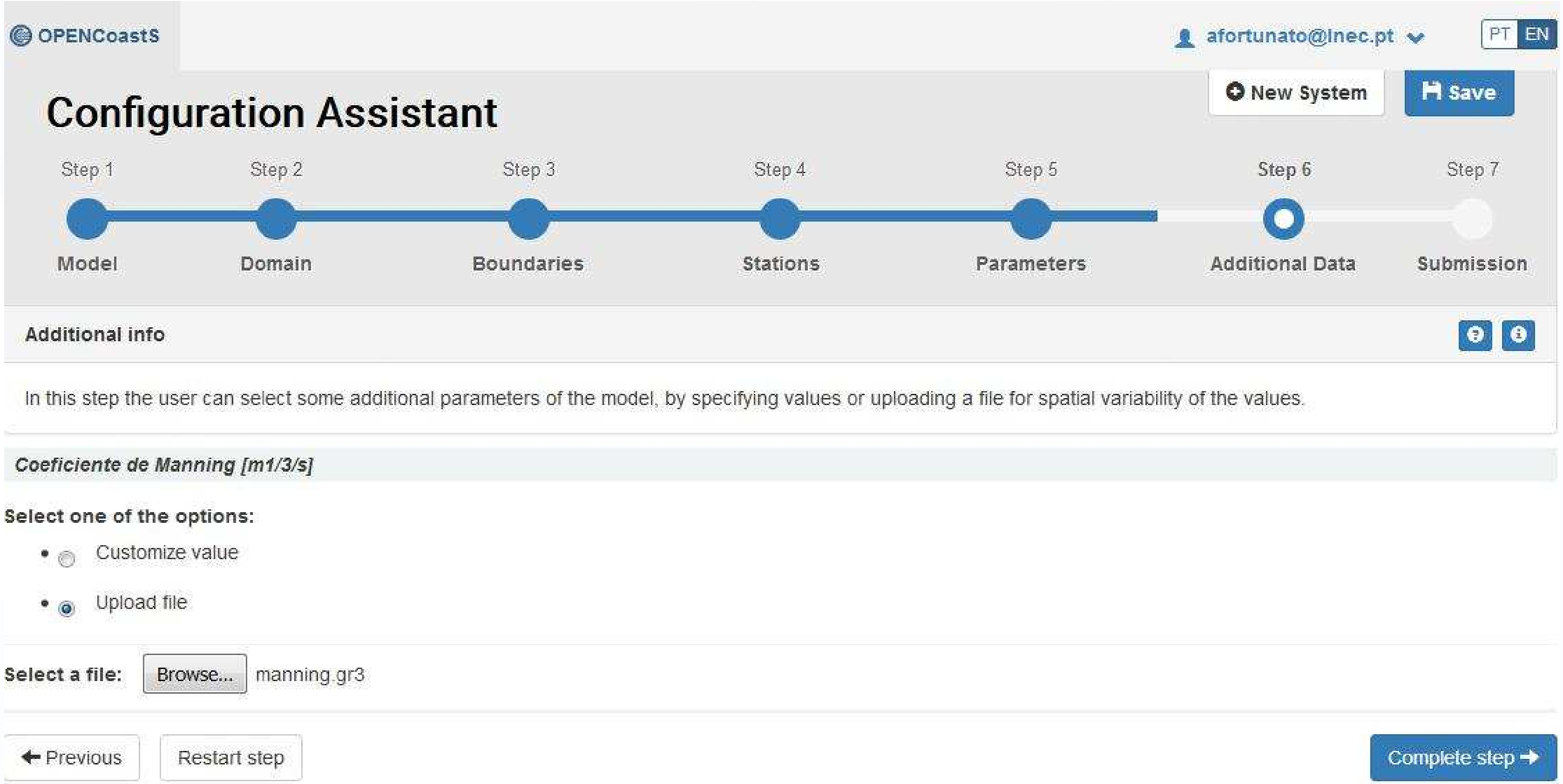
Generating a forecast system

- *Step 5: Define physical and numerical parameters*



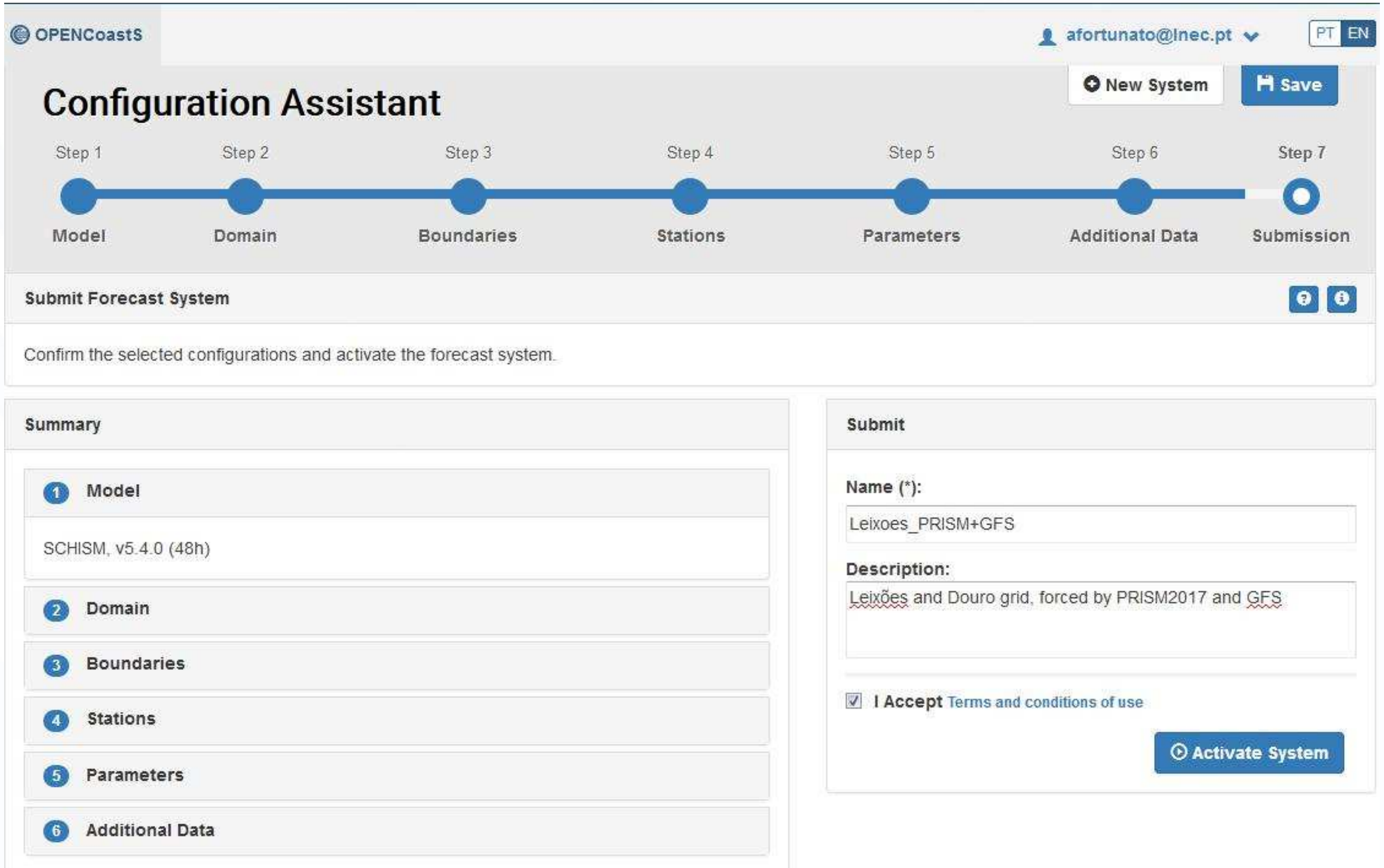
Generating a forecast system

- *Step 6: Define space-dependent parameters*



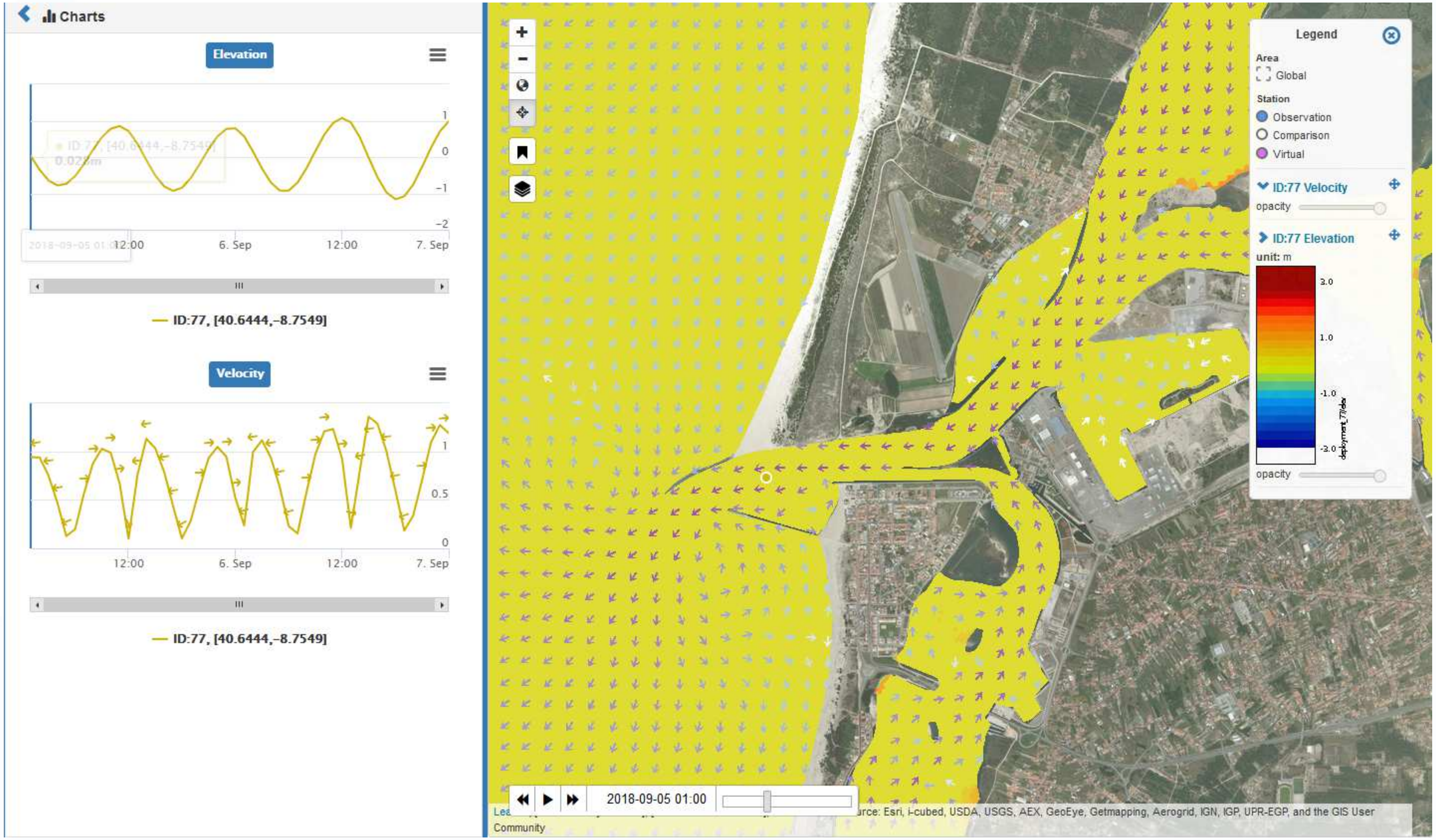
Generating a forecast system

- *Step 7: Review and submit*

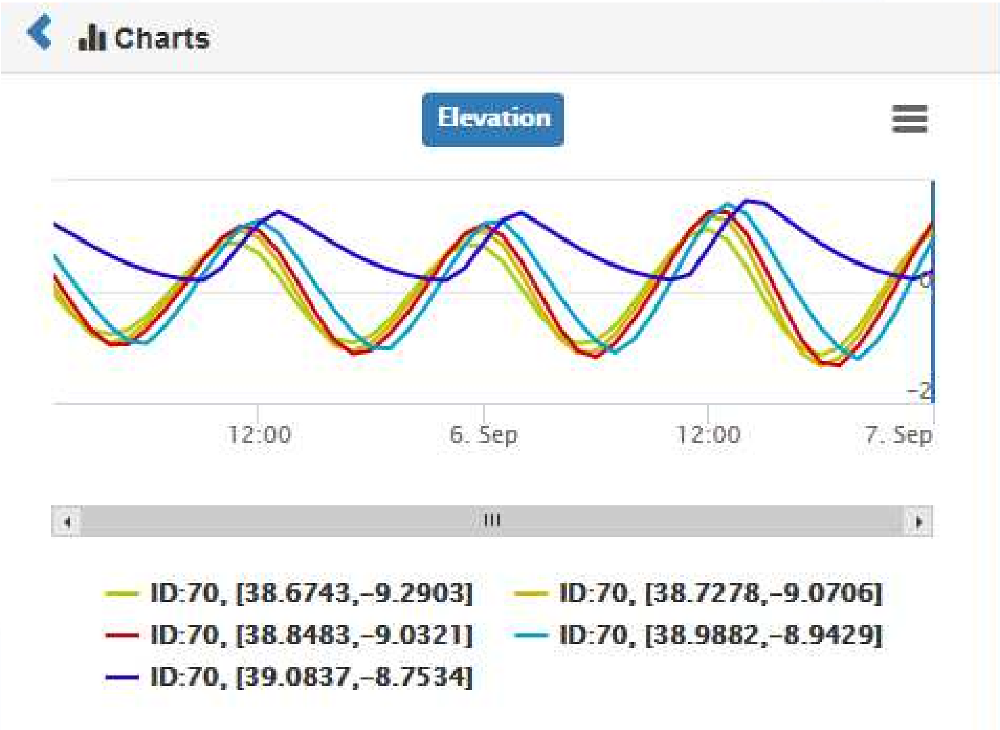


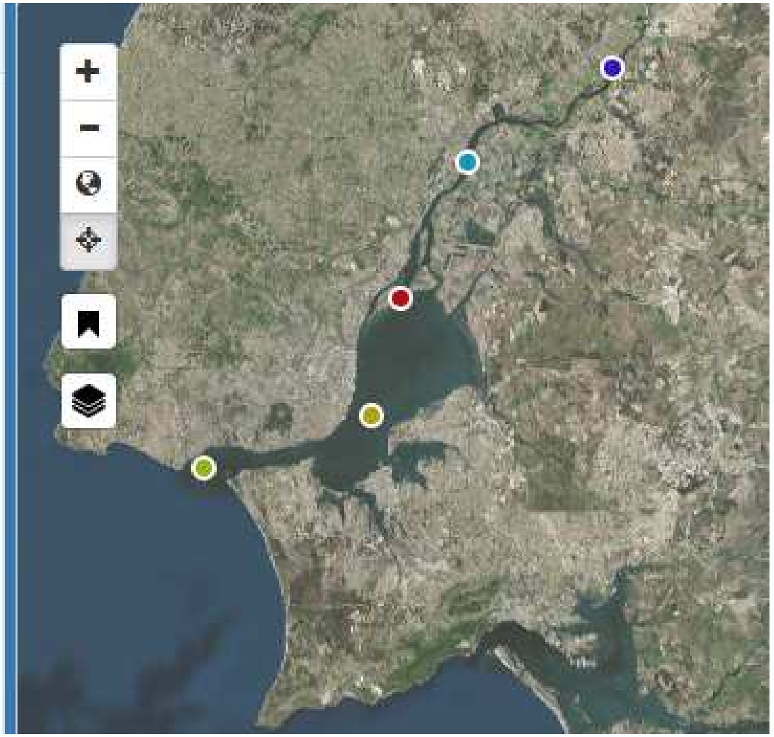
Example: flow in the Arade estuary

Example: flow, elevation and time series in the Aveiro lagoon



Example: tidal propagation in the Tagus estuary





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Summary

- Innovative platform to generate on-demand ocean forecasts is publicly available (opencoasts.ncg.ingrid.pt)
- Forcings (FES2014 and GFS) allow worldwide applications
- Limited physics: 2D barotropic shallow water flows

EOSC-hub Perspectives

- 3D baroclinic physics (SCHISM)
- Improved viewer
- Improved and extended NE Atlantic model for boundary conditions (PRISM2018)
- Atmospheric forcings from METEO-FRANCE
- Coupled wave-current model (SCHISM-WWM), including forcing by WW3
- Perform 72 hour forecasts
- Migrate to larger computational resources
- Open code at the end of the project (2021)

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Hands-on course

- This afternoon, from 18:00 to 19:00
- Please register as an OPENCoastS user at https://opencoasts.ncg.ingrid.pt/
- Please register for the course at https://docs.google.com/forms/d/e/1FAIpQLSeESZ0hi2Pea3WN9PblPD9hKyO_wL1ZiwG1zPGWFzMPuCqU8A/viewform
- Bring your own triangular grid – limited to 150,000 nodes (or use one of ours)

Thank you for your attention!

Acknowledgments:

SCHISM (model)

GFS (atmospheric predictions)

FES2014 (tidal predictions)

EMODnet (tidal data)

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