THE UBEST OBSERVATORY: AN INNOVATIVE HPC-BASED PORTAL FOR WATER QUALITY MANAGEMENT IN COASTAL REGIONS

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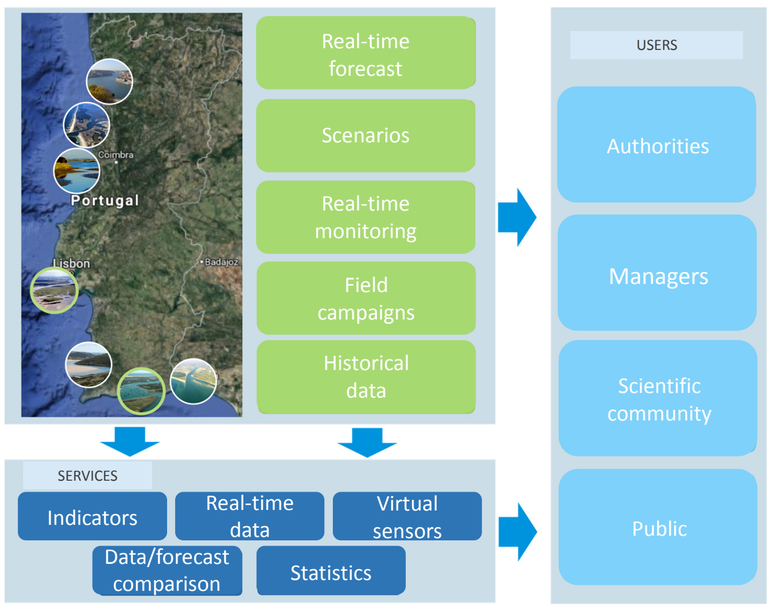
Motivation, concept and architecture

Coastal observatories support both the daily and long-term management of coastal systems, by providing :

- continuous surveillance of coastal zones;
- anticipation of events of contamination;
- tuning of management plans (e.g., climate change).

Herein we propose and implement an innovative water observatory – the **UBEST coastal observatory** - an operational framework that provides integrated data-model approaches to reach the continuous surveillance of the water quality status in coastal systems.

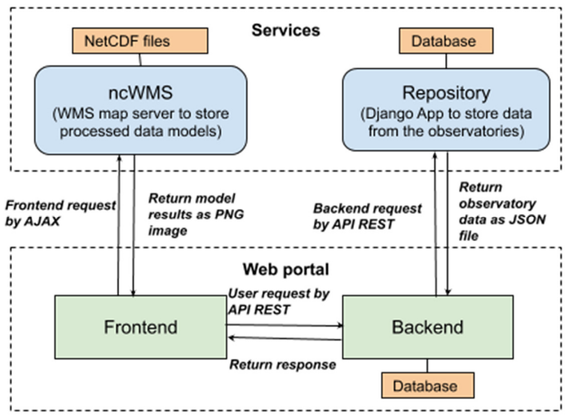
Its usage is demonstrated herein for the Tagus estuary and Ria Formosa coastal lagoon, Portugal.



***UBEST coastal observatory**. Comprehensive web-portal that integrate historical and real-time observations, forecasts, scenarios analysis and indicators.*

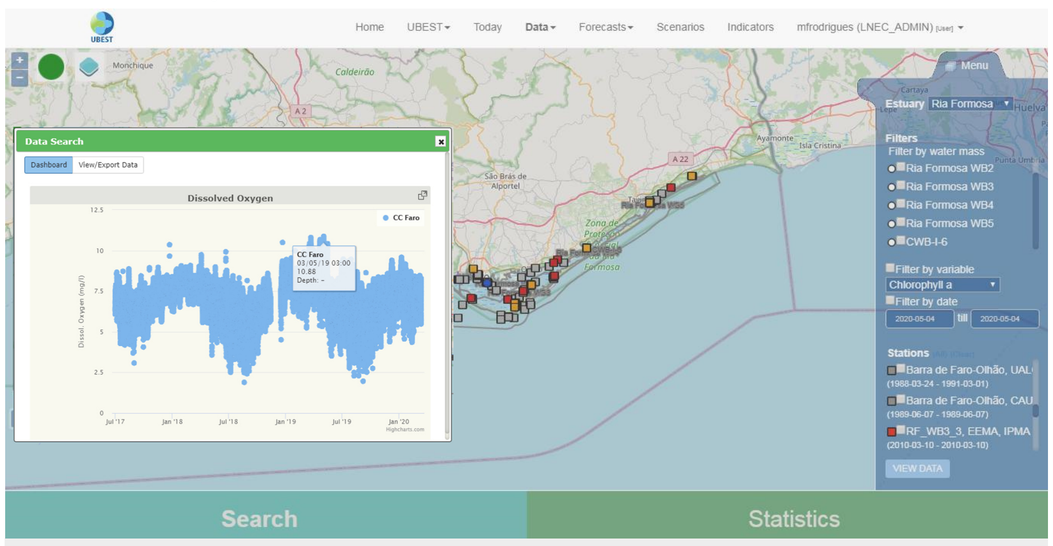
The UBEST observatory uses HPC at two levels:

- for high-resolution simulations of circulation and water quality forecasts and scenarios;
- to provide computational power to process data and model results through requests at the web-portal.

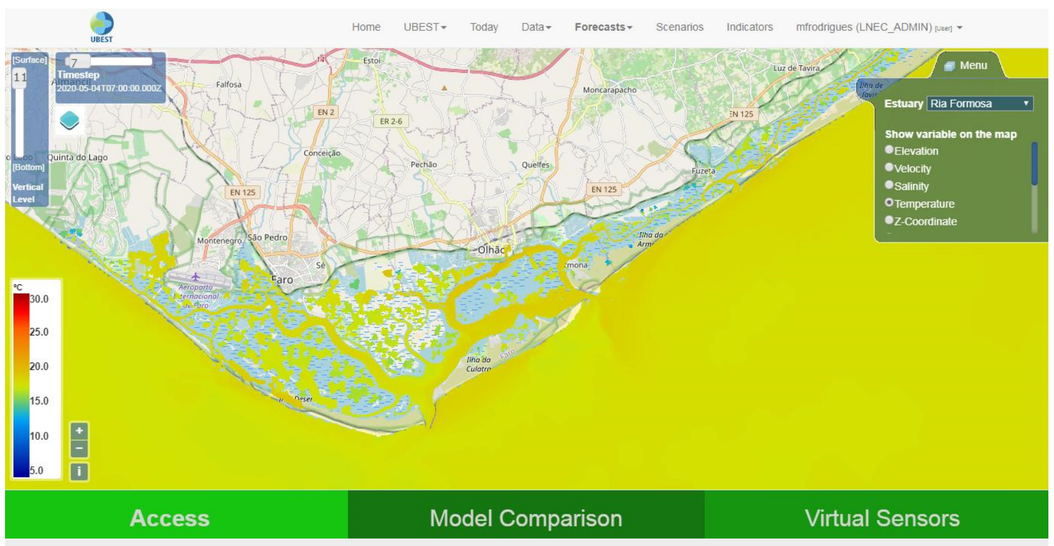


***Architecture**. User-friendly web-portal that provides detailed information about the water conditions in a given coastal system and the associated services.*

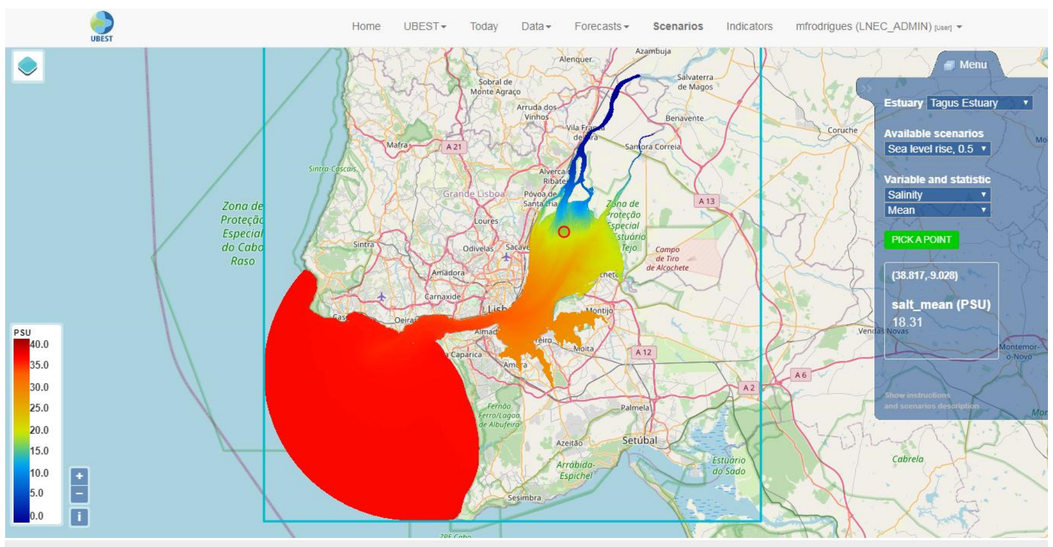
UBEST Web portal



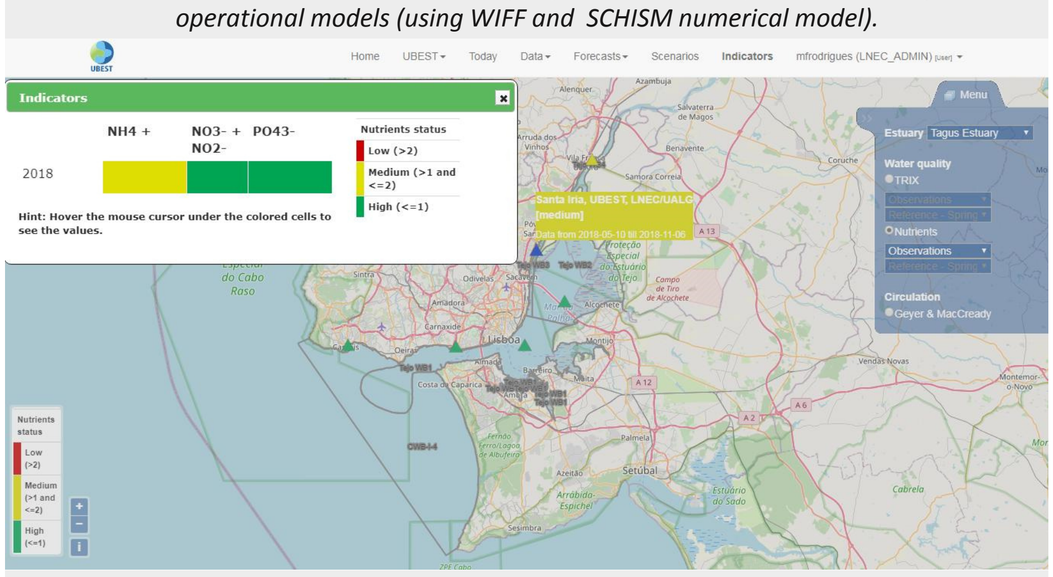
***Data**. Access to historical and real-time data of physical, chemical and biological variables.*



***Forecasts**. Access 48-hour predictions of physical and water quality variables from operational models (using WIFF and SCHISM numerical model).*



***Scenarios**. Presents the system's susceptibility to climate change or anthropogenic pressures scenarios through hindcast model simulations results*



***Indicators**. Synthesized information using indicators for the circulation and water quality status (e.g., nutrients status, TRIX)*

Challenges and future work

Challenges still remain for a broad application of the UBEST observatory concept, namely:

- availability of computational resources for the daily water quality predictions and indicators at fine spatial scales -> possible **integration with high-performance or distributed computing environments such as the EOSC**;
- capacity to build up a multidisciplinary team of coastal scientists and IT experts to adapt UBEST for their coastal system -> development of a **UBEST e-service** that allows any user to interact with a web on-demand platform to build his/her own system.

Acknowledgments

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