



# 4<sup>th</sup> European Climate Change Adaptation Conference 28–31 May 2019 Working together to prepare for change



## Water observatories as supporting tools to climate change adaptation in coastal ecosystems

M. Rodrigues<sup>1</sup>, A. Cravo<sup>2</sup>, A.B. Fortunato<sup>1</sup>, A. Oliveira<sup>1</sup>, R. Martins<sup>1</sup>,  
J. Jacob<sup>2</sup>, J. Rogeiro<sup>1</sup>, A. Rosa<sup>2</sup>, D. Santos<sup>1</sup>, P. Freire<sup>1</sup>, A. Azevedo<sup>1</sup>  
<sup>1</sup>National Laboratory for Civil Engineering, Portugal; <sup>2</sup>University of Algarve, Portugal



### Motivation

Climate change represents a major threat to the world's coastal ecosystems. Water observatories support both their daily and long-term management, by allowing the:

- continuous surveillance of coastal zones;
- anticipation of events of contamination;
- tuning of management plans.

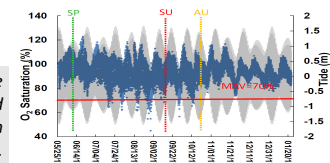
In project UBEST we demonstrate the use of water observatories to understand the biogeochemical buffering capacity of the Tagus estuary and of the Ria Formosa relative to climate change.



### Monitoring

Physical, chemical and biological data:

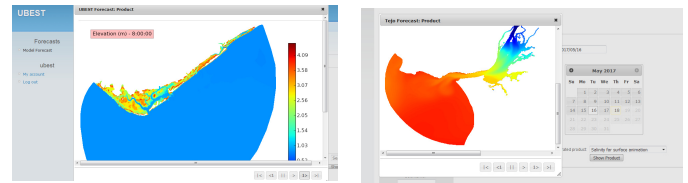
- historical data (1980-present);
- data from specific field campaigns (Ria Formosa – 2017; Tagus estuary – 2018);
- online in-situ probe.



**Online monitoring in the Ria Formosa.** Online observations of salinity, temperature, pH, dissolved oxygen, turbidity and chlorophyll-a. The station is in operation since May 2017.

### Forecasts

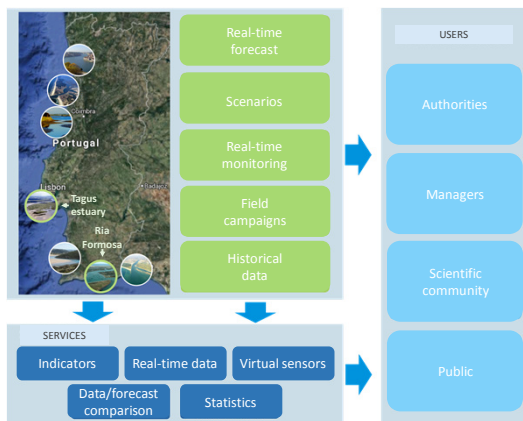
Daily forecasts of water levels and 3D currents, salinity, temperature and biogeochemical variables were deployed with the numerical model SCHISM, the WIFF forecast framework and the OPENCoastS service.



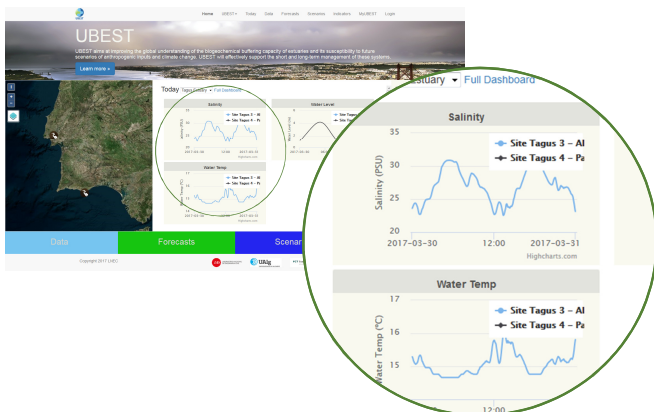
**Forecasts.** Forecasts of water levels in the Ria Formosa and salinity in the Tagus estuary.

### Water observatory

Comprehensive web-portals that integrate historical and real-time observations, forecasts, scenarios analysis and indicators.



### UBEST Web platform



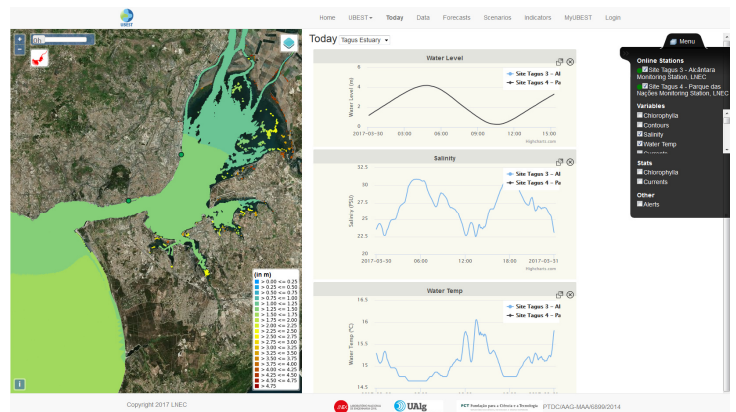
**UBEST Web platform.** Home page for access to Data, Forecasts, Scenarios and Indicators dashboards.

### Scenarios analysis

Analysis of the biogeochemical buffering capacity under present conditions and for scenarios of climate change (e.g. sea level rise) and anthropogenic pressures (e.g. wastewater discharges).

### Indicators

Classification metrics that allow the continuous assessment of the physical (e.g. estuarine circulation) and trophic conditions (e.g. nutrients status).



**Today dashboard.** Comprehensive dashboard that summarizes the forecasts, observations and alerts for the current day.

### Acknowledgments

This study was partially funded by Fundação para a Ciência e Tecnologia project UBEST (PTDC/AAG-AA/6899/2014), Lisboa2020 Operational Program INCN project (LISBOA-01-0145-FEDER-022153) and EC H2020 project EOSC-hub (Grant Agreement No 777536).

