

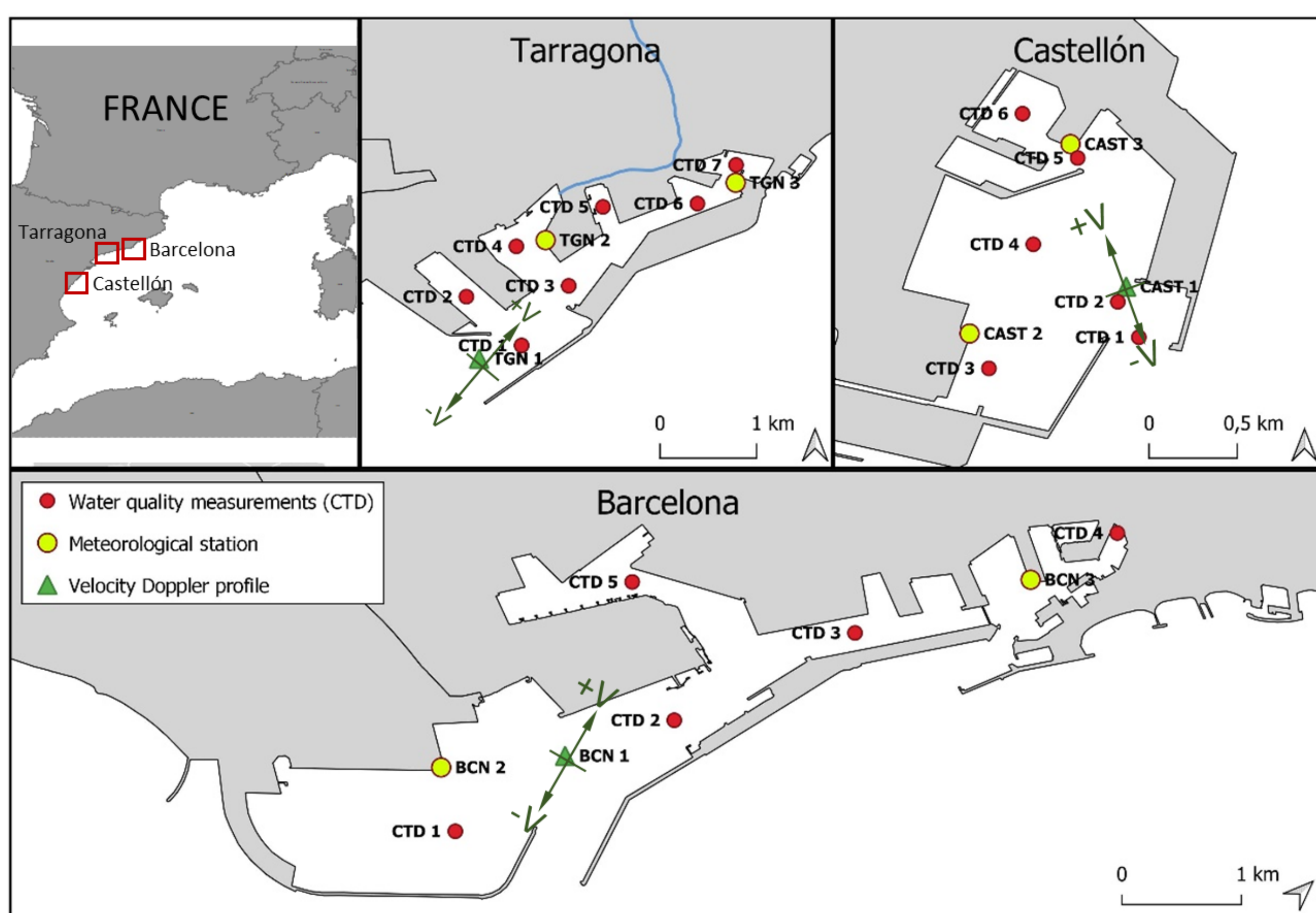
1. Abstract

This paper analyses the summer circulation patterns in restricted coastal domains. It considers harbours environments because they are more impermeable than, for example, the bays. The research is carried out in Barcelona, Tarragona and Castellón harbours (east and north-east of Spain) and based on field data acquired between April and September 2019. These data include information of wind, sea level, 1DV currents and temperature parameters. The research characterizes the hydrodynamics at the mouth of each harbour and allows to estimate circulation patterns according to its physical characteristics. The availability of simultaneous data on harbours with different mouth number, dimensions and shapes allows to analyse and suggest a general knowledge about the hydrodynamics differences and similarities.

To read the first draft of the paper, please click → on the icon

2. Study area

- NW Mediterranean Sea
- Semi-enclosed sea and sharp gradients not often found in open seas
- Local high and low atmospheric pressure systems influenced by the orography
- Wind classified as low and medium-low (Sánchez-Arcilla et al., 2008)



3. Aim

Propose a hydrodynamic characterization of Barcelona, Tarragona and Castellón harbours based on the field data analysis and considering the geometrical characteristics of each one.

4. Results

- Wind → high correlation between the three harbours in the direction but not in the intensity
- Sea level → in **Barcelona** and **Tarragona** the most important meteorological tidal variations coincide mainly with changes in atmospheric pressure. In **Castellón** those variations are related with changes in the wind conditions.
- Currents → positive estuarine circulation in **Tarragona** and **Castellón** and negative in the case of **Barcelona**.
- CTD → the thermocline in **Castellón** is more pronounced
- Temperature → The results suggest that the sudden increase of temperature in **Tarragona** are due to the outflow of warmer water from inside the harbour.

5. Future work

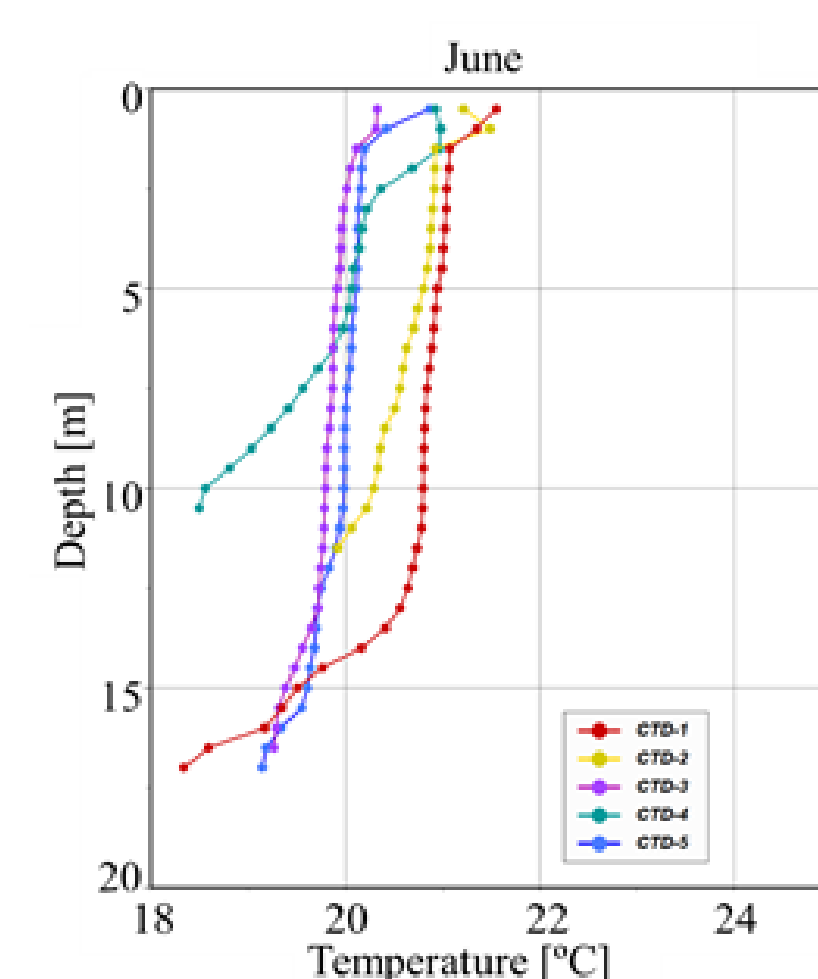
This is the first in a collection of articles based on observations and model results.

- Model validation and hydrodynamics description in Barcelona and Tarragona harbours (two and one mouth).
- Model validation and hydrodynamics description in Castellón harbour (no previous studies).
- Model uses for environmental management: applications in some harbours studied (e.g. Barcelona).

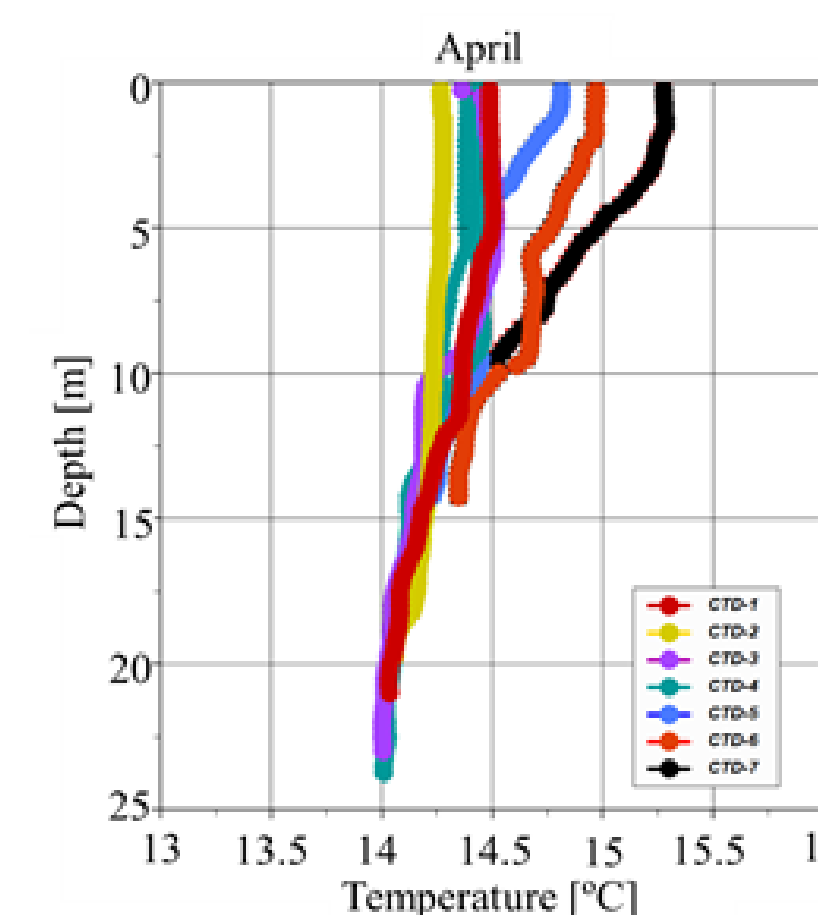
6. Acknowledgments

This work has been written in the framework of the SAMOA2 research project (Exp. 005/18), contract for the climate parameter measurement campaigns in ports for climate characterization and validation of prediction models. The lead author has been financed by the Secretaria d'Universitats i Recerca de la Generalitat de Catalunya and the European Social Fund (ESF).

Barcelona



Tarragona



Castellón

