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Smart control of the climate resilience in European coastal cities

Review of the most suitable Climate Services for Coastal Cities Adaptation

Authors: Roberta Paranunzio[1], Iulia Anton[2], Tasneem Ahmed[2], Salem Gharbia[2], Leo Creedon[2], Luca Baldini[1], Filippo Giannetti[3], Carlo Brandini[4], Alberto Ortolani[4], Elisa Adirosi[1], Francesco Pilla[5], and Gregorio Iglesias[6]

1 National Research Council of Italy - Institute of Atmospheric Sciences and Climate (CNR-ISAC), Italy
2 Institute of Technology Sligo, Sligo, Ireland
3 Università Di Pisa, Pisa, Italy
4 Laboratorio Di Monitoraggio E Modellistica Ambientale Per Lo Sviluppo Sostenibile (LaMMA), Sesto Fiorentino, Italy
5 University College Dublin, National University Of Ireland, Dublin, Ireland
6 University College Cork - National University Of Ireland, Cork, Ireland

Climate services

The demand for tailored climate data and information by the public and diverse specific users (such as stakeholders, decision makers and scientists) is growing worldwide together with the awareness of the challenges posed to the environment and society by climate change. In this context, climate services play a crucial role in developing and disseminating customized climate information and tools to diverse stakeholders based on relevant standards and conventions

Approach for Dataset Identification and Selection

The identification and selection of fit-for-purpose climate and marine data for the baseline (historical) characterization and projection is based on some key requirements as follows.
Investigating users and CCLLs needs

- Availability of variables
- Accessibility
- Spatio-temporal coverage
- Spatio-temporal resolution
- Available documentation
- Data and metadata quality
- Standards and conventions

Coastal Climate services (CCS) using Sea-Level Rise (SLR) data and projections

Coastal climate services for coastal adaptation to sea level rise is scattered, only linked to local or national coastal zone management without a one-size-fits-all framework. The existing CCS from around the world (for instance : USA, Australia and France; Le Cozannet et al., 2017) employ regional sea level rise scenarios to inform planning and response to the impact of sea level rise for the coastal stakeholders. Though in the USA, for example, there is detailed regional sea level projections along with uncertainties disseminated through their latest sea-level rise technical report and made available to be visualised through interactive web applications, however such provisions are regional and do not exist for other regions of the world.

Some barriers in the development of CCS include difficulty in specifying user needs, challenges in choosing appropriate conceptual or modelling framework for the coastal hazards and the lack of salient sea level information. Besides there is a large thematic and geographical diversity in demand for CCS based on SLR projections, as in Europe leading to delays in the development of CCS . Another factor in the delay could be the time lag in the translation of scientific information to useable information to meet the user needs, especially in regions where the research community is the sole provider of CCS. For some regions of the world due to the lack of human, technical and financial resources as well as in the face of urgency from other impending risks, long term SLR projections are not considered.

CLIMATE SERVICES AND CLIMATE CHANGE ADAPTATION

What's the best way to use data from climate services in combination with other information to improve local (urban), national and transnational climate change vulnerability and risk assessments? Adaptation services providing complementary information to climate services for different are crucial.

INTEGRATION DIFFERENT SOURCES OF DATA

Integration between climate services' data, citizen-science low-cost sensors data and local data provided by local environmental agencies, weather services, and consortia is not trivial (i.e., in terms of format and standards requirements)

FRAGMENTATION OF DATA

Regarding marine data specifically, these have been, unfortunately, gathered and stored in fragmented ways across Europe during previous decades, focusing on specific purposes or user needs. The issue has been partially addressed by the Copernicus Marine Service (CMEMS).

COMPUTATIONAL CHALLENGES

The management of massive datasets and the algorithms involved in climate modeling and downscaling are complex and computationally demanding (finding the best compromise between spatiotemporal resolution and CPU performance)

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