

# Challenges in retrieving and using climate services' data for local-scale impact studies: insights from the SCORE project

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The demand for tailored climate data by different users is growing worldwide together with the awareness of the challenges posed to society and the environment by climate change. The extreme weather events intensification, sea-level rise, and coastal erosion are urgent challenges to be addressed by European coastal cities. The overarching scope of the H2020 SCORE (Smart Control of the Climate Resilience in European Coastal Cities) project is to develop a framework for the definition and uptake of integrated Ecosystem-Based Approaches (EBA) and smart digital tools by establishing a network of 10 coastal city 'living labs' (CCLs) to increase the climate resilience of European coastal cities. To achieve this, the first steps are focused on i) the identification and selection of reference datasets for the historical baseline characterization and the projections for the next decades, ii) the downscaling of climate projections in order to produce a dataset of environmental parameters with the suitable temporal and spatial resolution for the project CCLs' application needs, and iii) the development of statistical tools for data analysis, modeling and testing to assess the occurrence of major coastal hazards and the future evolution trends of the coastline. For this purpose, open, free, and reliable climate data are needed.

Based on some essential requirements, a procedure to select, from the main European climate services, fit-for-purpose climate and marine data of interest for SCORE users has been set up. Moreover, a step-by-step procedure on how to access and handle these data has been provided. One of the main issues encountered while exploring the vast range of different climate services and datasets available consists in the articulation of the users' needs. In particular, the best coverage in terms of variables of interest for modeling and Spatio-temporal resolution must be ensured, while guaranteeing a good users' experience in terms of easy accessibility and the provision of information on (meta)data quality, standards, and conventions. The fragmentation of marine data repositories during the previous decades, along with their limited historical temporal coverage are other main challenges encountered. In addition, notwithstanding the availability of datasets downscaled from global to regional models, the spatio-temporal resolution of most part of datasets requires undertaking some statistical or physical downscaling procedures for their use in local impact studies.

We thus construct our analysis on those databases and services which are officially available through and/or supported by EU institutions like, e.g., the Copernicus Climate Change Service (C3S) and the Climate Data Store (CDS), the Copernicus Marine Environment Monitoring Service (CMEMS) portal or the European Marine Observation and Data Network (EMODnet) initiative. The various criteria defined to select the most appropriate climate services and related datasets for the SCORE activities will be presented as well as a few case studies as examples of possible climate information communication strategies, to help the end-user practically understand and tackle the challenges when interacting with the dataset-interface and in data handling procedures.

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