



Progress Report

Name of Case Study

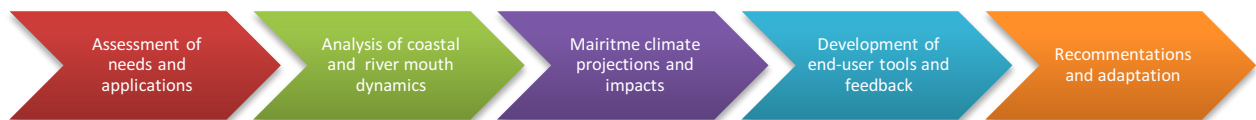
Climate change impacts in fluvial, coastal and transition zones in Mediterranean environments altered by human activities: Guadalfeo and Adra river mouths

Authors

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Brief introduction on the decision to be taken by the client

This study aims to provide the clients/end-users with a framework for the use of climate services. The results from this work will help them in the planning of knowledge-based and integrated actions for coastal and transition zones adaptation to climate change. These may include, among others, nourishment projects, the design of infrastructures such as dykes for river and beach protection and the operational planning of reservoirs.



Preliminary results following the workflow

Assessment of needs and applications – In order to identify the end-users’ needs, we set up a series of interviews to get the input and co-design the main results expected from this work.

We met with people from the following entities:

- Provincial Coastal Service of Granada. Ministry of Agriculture and Fisheries, Food and Environment
- Port Authority of Motril (Granada)
- Coastal Demarcation of Andalucía – Mediterranean. Ministry of Agriculture and Fisheries, Food and Environment
- Management Service of the Rules-Béznar reservoirs’ system. General Secretary of the Environment and Climate Change. Andalusian government (Junta de Andalucía).

- Hydrological Service of the Andalusian Mediterranean Basin. Regional Delegation of the Environment and Land Planning in Málaga. Andalusian government (Junta de Andalucía)

The different end-users are concerned regarding the erosion problems in several coastal areas and expressed their interest in our work regarding the climate change scenarios and variations in storms' frequency and intensity as well as flooding mitigation and adaptation recommendations.

To improve our knowledge regarding the use of climate services and their usability by end-users and decision makers, the member of the team Andrea Lira Loarca attended the *ERA4CS Summer School on Climate Services from the user's perspective* on September 10-14th, 2018 in Pisa, Italy. This summer school was organized by JPI Climate and the Institute of Geosciences and Earth Resources CNR. This summer school has helped us to understand better the end-users perspective and their needs for climate services.

From the inputs of the interviews and the summer school we have designed a methodology for the analysis of storm events and flooding in coastal areas involving the use of different model projections (weather data), wave propagation models to obtain maritime data, simulation techniques, among others.

Analysis of coastal and river mouth dynamics – We have performed an assessment of the current state of the coastal dynamics in the Gualdalfeo and Adra river mouths.

This step included the use of downscaling and statistical techniques and stochastic analysis and simulation, among others. The development of this techniques and their application on the coast of Granada led to the following presentations:

- *Lira-Loarca, A., Cobos M., Magaña, P., Millares, A., Baquerizo, A., 2018. An Integrated Statistical Modeling Framework of Maritime Data in a Climate Change Context: Application to MSc. Teaching, in Proceedings of the 10th International Conference on Education and New Learning Technologies EDULEARN18. Palma de Mallorca, Spain. 2-4th July, 2018.*
- *Lira-Loarca, A., Cobos M., Baquerizo, A., Losada, M.A., 2018. A multivariate statistical model to simulate storm evolution, in Proceedings of the 36th International Conference on Coastal Engineering ICCE. Baltimore, USA. July 30th – August 3rd, 2018.*
- *Lira-Loarca, A., Cobos M., Baquerizo, A., Losada, M.A., 2018. Multivariate forecasting of extreme wave climate and storm evolution, in Proceedings of the International Conference on Time Series and Forecasting ITISE. Granada, Spain. 19-21st September, 2018.*

The study of the erosion and sediment dynamics of the river basin of the Guadalfeo and Adra rivers led to the following presentations:

- *Arjona, S., Millares, A., Baquerizo, A., 2018. Reservoir sedimentation impact downstream in a semi-arid basin with greenhouses cultivation, in Proceedings of the 9th International Conference on Fluvial Hydraulics RIVER FLOW. Lyon-Villeurbanne, France. 5-8th September, 2018.*
- *Millares, A., Moñino, A., Arjona, S., Baquerizo, A., 2018. Suspended sediment dynamics by event typology and its siltation effects in a semi-arid snowmelt-driven basin, in Proceedings of the 9th International Conference on Fluvial Hydraulics RIVER FLOW. Lyon-Villeurbanne, France. 5-8th September, 2018.*

Maritime climate projections and impacts – We have started researching the different European models within EURO-CORDEX for the Mediterranean Region. In order to gain knowledge of the different models and its use towards the analysis of sea level rise and the modeling of maritime data and its impacts due to climate change, the member of the team, Andrea Lira Loarca, has attended the *CLIVAR-FIO Summer School on Past, Present and Future Sea Level Changes* and *UNESCO/IOC-ODC Training Course on Ocean Forecast Systems* in Qingdao, China from June 25th until July 7th, 2018.