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1. Technical references

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* PU = Public

PP = Restricted to other programme participants (including the Commission Services)

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3. ABSTRACT

The Mediterranean Sea is a semi-enclosed oligotrophic basin located at mid-latitude characterized by a peculiar west-east trophic gradient mainly driven by the distribution of the sources of nutrients in the area (rivers, convective areas and atmospheric deposition) and the exchanges of water masses at the Gibraltar Strait. The basin is widely recognized as a hot-spot for climate change and the assessment of its effects on the marine environment and, in particular, in the coastal areas, is challenging because of the complex land-sea distribution which characterizes the area with the presence of islands, gulfs and peninsulas. Thus, a proper assessment of the current state and future evolution of the marine ecosystems in the basin under different emission scenarios requires the adoption of high-resolution data that considers the complexity of the region under examination.

In this task, state-of-the-art biogeochemical and physical high-resolution datasets, specifically produced for the Mediterranean Sea, have been used to assess current states and future changes of a set of biogeochemical and physical variables (defined as ocean monitoring indicators or OMIs) that have been identified in collaboration with RETURN WP2 Spoke 8. The selected ocean monitoring indicators are: temperature, salinity, dissolved oxygen, dissolved inorganic carbon (DIC), pH, and trophic index (TRIX). The areas where these indicators have been computed are the northern Adriatic Sea (Proof-of-Concept WP2 Spoke 8) and the Ligurian Sea (with a focus on the area of the Gulf of Genoa in collaboration with Return WP2, WP3 and WP5 Spoke 4).

The analysis of the OMIs in the target areas has revealed the existence, in the last 20 years, of significant trends related to warming, deoxygenation and acidification of seawater that, according to climate projections, will continue and intensify throughout the 21st century, in particular under emission scenario RCP8.5. All the projected changes will be stronger than those observed in previous analysis at the basin scale.

The analysis of the OMIs has shown that climate change will dramatically affect the coastal areas of the Mediterranean Sea with likely significant effects on marine ecosystems and, possibly, on related ecosystem services.