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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 Northern Adriatic region and the Orbetello lagoon, although limited in size with respect to the Mediterranean region, perfectly summarize the complexity often observed in the area. They are in fact characterized by complex land-distribution, by the presence of several important human and industrial settlements, high biodiversity and several hot-spots for fisheries, significant air-sea interaction and freshwater input from the inland. Due to the complexities of the areas under investigation, a proper assessment of the future evolution of the climate and marine ecosystems of the regions under different emission scenarios requires the adoption of modeling tools with a fine spatial resolution (both vertical and horizontal) that consider and solve the interaction among the different compartments of the climate system.

In this task, we introduce newly developed configurations of state-of-the-art climate and biogeochemical modeling tools able to simulate the dynamics of the atmosphere, rivers, ocean and marine ecosystems of the Northern Adriatic region and Orbetello lagoon.

The newly climate and biogeochemical projections dataset produced for the Northern Adriatic region shows a significant warming in the area of both inland and ocean compartments. Moreover, climate simulations project drier conditions over the region, lower river discharges as well as a dramatic increase in the intensity of the rainy events, in particular in the coastal areas between Veneto and Friuli Venezia Giulia. The remarkable warming of the region will also affect the marine ecosystem dynamics: the high-resolution projections of the Northern Adriatic biogeochemistry shows in the future a significant deoxygenation, acidification and decline in the phosphate content of the euphotic layer of the basin. On the other hand, an increase in the nitrate concentration has been observed in some areas of the basin like the Gulf of Trieste, probably related to the changes in local circulation.

For the Orbetello lagoon, the model shows interesting capabilities of describing, with high temporal and spatial resolution, the evolution of key parameters related to the lagoon's trophic state and it is proposed as a decision support tool for lagoon management under climate change conditions.

As already observed on the Mediterranean scale, climate change will dramatically affect the coastal areas and lagoons with significant effects on marine ecosystems and, possibly, on related ecosystem services.

4. List of Figures