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CLIVAR-SPAIN contributions: The VANIMEDAT-2 project: Generation of oceanographic scenarios for the 21st century for the Mediterranean Sea and the NE sector of the Atlantic Ocean

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The aim of this contribution is to present the VANIMEDAT-2 project, whose objective is to explore the sea level variability under climate change scenarios through the generation of oceanographic projections in the Mediterranean Sea and the NE Atlantic for the 21st century.. It is well known that Atmosphere-Ocean General Circulation Models developed in the framework of the IPCC (Intergovernmental Panel for Climate Change) do not properly account for regional scale variability; this is especially true for semi-enclosed basins such as the Mediterranean Sea, where the low spatial resolution of global models can neither resolve the exchanges through the Strait of Gibraltar nor the circulation within the basin. The characterization of future oceanographic scenarios is undertaken on the basis of two sets of numerical simulations. i) On one hand, a?3D (baroclinic) model is used to obtain future projections of temperature, salinity, currents and sea level. ii) On the other hand, a barotropic (2D) model is used to simulate the response of sea level to the mechanical atmospheric forcing of atmospheric pressure and winds, which are the main responsible for extreme events (combined with tides in the Atlantic sector of the considered domain). The ultimate product will provide a complete picture of the main hazards that can affect the shoreline in the 21st century, from the slow increase of mean sea level to changes in the extreme regime. In order to provide not only the mean projected state but also the uncertainties in the projections, an ensemble of simulations will be performed using different forcing conditions from several atmospheric models, large scale oceanic models providing the boundary conditions and different scenarios of green house gases and aerosols emissions. In this contribution we will show an overview of the main results obtained so far. In particular, we will focus on the evolution of the thermohaline properties of the Mediterranean Sea under a climate change scenario and its impact on mean sea level. As a complementary result, we will show the changes projected in the distribution of sea level extreme events due to the atmospheric mechanical forcing and in the sea surface temperature extreme events (hot and cold spells).