

{rokbox title=|Average SST anomalies :: Image: Authors|
thumb=|images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-evolution-mediterranean-sea-water-properties-under-climate-change-scenarios-in-the-med-cordex-ensemble-soto-navarro-et-al-2020-thumb.jpg|}images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-evolution-mediterranean-sea-water-properties-under-climate-change-scenarios-in-the-med-cordex-ensemble-soto-navarro-et-al-2020.jpg{/rokbox}

Javier Soto-Navarro, **G. Jordá**, A. Amores, W. Cabos, S. Somot, F. Sevault, D. Macías, V. Djurdjevic, G. Sannino, L. Li and D. Sein, 2020.

[Evolution of](#)

[Mediterranean Sea water properties under climate change scenarios in the Med-CORDEX ensemble.](#)

Climate Dynamics, volume 54, pages:2135–2165 (2020). DOI:
<https://doi.org/10.1007/s00382-019-05105-4>

Abstract: Twenty-first century projections for the Mediterranean water properties have been analyzed using the largest ensemble of regional climate models (RCMs) available up to now, the Med-CORDEX ensemble. It is comprised by 25 simulations, 10 historical and 15 scenario projections, from which 11 are ocean–atmosphere coupled runs and 4 are ocean forced simulations. Three different emissions scenarios are considered: RCP8.5, RCP4.5 and RCP2.6. All the simulations agree in projecting a warming across the entire Mediterranean basin by the end of the century as a result of the decrease of heat losses to the atmosphere through the sea surface and an increase in the net heat input through the Strait of Gibraltar. The warming will affect the whole water column with higher anomalies in the upper layer. The temperature change projected by the end of the century ranges between 0.81 and 3.71 °C in the upper layer (0–150 m), between 0.82 and 2.97 °C in the intermediate layer (150–600 m) and between 0.15 and 0.18 °C in the deep layer (600 m—bottom). The intensity of the warming is strongly dependent on the choice of emission scenario and, in second order, on the choice of Global Circulation Model (GCM) used to force the RCM. On the other hand, the local structures reproduced by each simulation are mainly determined by the regional model and not by the scenario or the global model. The salinity also increases in all the simulation due to the increase of the freshwater deficit (i.e. the excess of evaporation over precipitation and river runoff) and the related increase in the net salt transport at the Gibraltar Strait. However, in the upper layer this process can be damped or enhanced depending upon the characteristics of the inflowing waters from the Atlantic. This, in turn, depends on the evolution of salinity in the Northeast Atlantic projected by the GCM. Thus a clear zonal gradient is found in most simulations with large positive salinity anomalies in the eastern basin and a freshening of the upper layer of the western basin in most simulations. The salinity changes projected for the whole basin range between 0 and 0.34 psu in the upper layer, between 0.08 and 0.37 psu in the intermediate layer and between – 0.05 and 0.33 in the deep layer. These changes in the temperature and salinity modify in turn the characteristics of the main water masses as the new waters become saltier,

warmer and less dense along the twenty-first century. There is a model consensus that the intensity of the deep water formation in the Gulf of Lions is expected to decrease in the future. The rate of decrease remains however very uncertain depending on the scenario and model chosen. At the contrary, there is no model consensus concerning the change in the intensity of the deep water formation in the Adriatic Sea and in the Aegean Sea, although most models also point to a reduction.

Keywords: