



## 21st century projections for the Mediterranean Sea

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This presentation will focus on the long-term evolution of air-sea fluxes from the perspective of the ocean processes. Changes in the ocean properties will obviously have a feedback on the atmosphere and particularly on the generation and evolution of Mediterranean storms, but this issue is not examined here.

Regarding mean values, all global and regional projections show a warmer Mediterranean Sea by the end of the 21st century. A vast majority of the projections also show a drift towards higher relative salinities. The warming derives from the projected decrease (in absolute value) of the surface heat losses to the atmosphere. The salinification would be a consequence of an increase in the freshwater deficit of the basin, which in turn derives from both a projected increase in the evaporation and a projected decrease in the precipitation averaged over all the catchment areas of the basin. We will briefly examine the impact of the expected changes on the thermohaline circulation of the Mediterranean Sea (and the related fluxes through the Strait of Gibraltar), on the frequency and intensity of ocean heat waves and on mean sea level rise.

Next we will examine changes in the storminess from the perspective of their impact on sea level and waves. Results indicate that the frequency of extreme sea level events would decrease, though there are also some evidences of a slight increase in their magnitude. Overall, the analysis indicates a progressive decrease in the return levels of storm surges under all climate scenarios that is not fully explained by the small negative trend obtained for the atmospherically induced mean sea level. The evolution of the mean and extreme wave regimes also points towards a decrease in the wind storminess.