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# Mediterranean Coupled Models comparison: response of the thermohaline circulation to climate change

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Within the framework of the EU CIRCE project, 5 regional coupled ocean-atmosphere models dedicated to the study of the future climate of the Mediterranean region have been developed. The five models simulated the same period 1951-2050 following the A1B hypothesis, for the GHG and aerosols concentration, after year 2000.
One of the main goals of such coordinated modeling effort has been the assessment of the uncertainty issue. In particular during this presentation will be shown the first comparison analysis performed on the five oceanic components of the coupled systems. Such a comparison has been mainly focused on the strength and hydrological properties of the Mediterranean thermohaline circulation.

As the Mediterranean thermohaline circulation is sustained by the atmospheric forcing but is also controlled by the narrow and shallow Strait of Gibraltar, the analysis has been concentrated on the different ways the models reproduce the exchange flow through the Strait. Examining the simulated net flow through the Strait of Gibraltar for the past and present periods, it emerges that all the models simulate a mean flow close to the observations, except one that simulates a quite lower value. Moreover, all the model display a similar seasonal variability for the inflow, outflow and net transports during the past, present and future periods. However, due to the different representation of the Strait of Gibraltar a less good agreement has been found for the inflow and outflow mean values. Such differences are reflected in the hydrological water characteristics in the Mediterranean basin. However, for the future period (2021-2050) all the models predict a decrease, respect to the previous period, both in the inflow and the outflow, but these variations are different among the five simulations. Nevertheless in all the simulations the net inflow is predicted to increase. Concerning the future net heat flux it is observed a less clear indication from the five models.
A comparison of the main processes affecting the climate variability of the Mediterranean thermohaline circulation in the five models has been also analyzed, and will be discussed during the presentation.