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Climate scenarios for the Mediterranean basin with a regional coupled system.

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Climate change assessment and impact studies demand realistic prediction of atmospheric fields, which can be either derived from global-scale simulations through down-scaling procedures, or obtained by running regional climate models which use global-scale fields as boundary conditions. In particular nested limited-area atmospheric models have proven their ability to resolve small features that are missed by large-scale simulations.
At present fully coupled regional climate models are being developed, so that the interactions among the distinct components of the climate system (i.e. ocean, atmosphere, biosphere) are explicitly simulated. Such models are expected to improve our skill in predicting reliable scenarios in complex regions such as the Mediterranean area, which is subject both to the influence of global scale dynamics (e.g. disturbances in the mid-latitudes, strength and meridional extension of the Hadley circulation), and to the effects of local physical processes (complex topography, local evaporation).
We developed a Regional Earth System Model for the Mediterranean basin. The system consists of the RegCM (atmospheric model), the MITgcm (ocean model), coupled via OASIS3. In order to taking into account all the components of the water cycle, in particular river-runoff, we have developed and included a catchment-river module.
Here, we present the simulations performed for the XX and XXI centuries within the framework of the CIRCE EU project. We have performed coupled and stand-alone simulations using ERA40 Reanalysis as well as ECHAM5-MPIOM IPCC AR4 simulations as lateral boundary condition.