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HyMeX and the Med-CORDEX experiment: new coupled regional projections and tailored impact analysis.

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Since early' 90s, many research projects analyzed and focused on downscaling of global climate simulations over the Euro-Mediterranean region. Euro-Mediterranean region is considered as particularly vulnerable to climate variability and change, in particular, by its vulnerability to changes in the water cycle and natural ecosystems. The Mediterranean basin has quite a unique character that results both from orographic conditions and demographic trend. The region features an enclosed sea, which is connected to the Atlantic ocean only by Gibraltar strait, surrounded by very urbanized littorals and a complex topography from which numerous rivers feed the Mediterranean sea. This results in many interactions and feedback between ocean-atmosphere-land processes that play a prominent role in climate and, in turn, determine the impact on human activities. Based on previous stimulating initiatives and on new regional downscaling tools (Regional Coupled Systems), developed for the CIRCE-EU project, the Mediterranean climate research community proposed the Med-CORDEX initiative. MED-CORDEX is a coordinated action between CORDEX and HyMeX international programs. MED-CORDEX is a unique framework where research community will make use of both regional atmospheric and oceanic climate models and regional coupled systems for increasing the reliability of regional climate information. Here, we provide some examples of the Med-CORDEX initiative and relevance, presenting a quantitative analysis of the changes in the average seasonal cycle of key environmental parameters over the Euro-Mediterranean area, using a A1B scenario simulation performed with a coupled ocean-atmosphere regional climate model driven by the ECHAM5-MPIOM global simulation included in the IPCC-AR4. The analysis is focussed on surface temperature and on the hydrological cycle output from different simulations performed with a coupled regional system. The impacts of climate change is analysed and evaluated in key parameters related to the hydrological cycle.