



Using the EURO-CORDEX regional climate model ensemble to assess climate change impacts on water scarcity in Mediterranean river basins.

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The Mediterranean is likely to experience increased pressure on the water resources due to decreasing precipitation and rising temperatures. However, assessment of hydrological quantities in Mediterranean basins is often hampered by the lack of observational data. To overcome the issue of data scarcity the hydrological relevant variables total runoff, surface evaporation, precipitation and air temperature are taken from climate model simulations directly in this study. The ensemble applied in this study consists of 22 simulations, derived from different combinations of four General Circulation Models (GCMs) forcing different Regional Climate Models (RCMs) and two Representative Concentration Pathways (RCPs) at ~12 km horizontal resolution provided through the EURO-CORDEX initiative. Four river basins in the Mediterranean (Adige, Ebro, Evrotas and Sava) are selected as study areas and the climate change signals for the future period 2035–2065 compared to the reference period 1981–2010 are investigated.

Decreased runoff and evaporation indicate increased water scarcity over the Ebro and the Evrotas, as well as the southern parts of the Adige and the Sava, resulting from a temperature increase of 1–3° and precipitation decrease of up to 30%. Most severe changes are projected for the summer months indicating further pressure on the river basins already at least partly characterized by flow intermittency. The widely used Falkenmark indicator is presented and confirms this tendency and shows the necessity for spatially distributed analysis and high resolution projections. Related uncertainties are addressed by the means of a variance decomposition and model agreement to determine the robustness of the projections. The study highlights the importance of high resolution climate projections and represents a feasible approach to assess climate impacts on water scarcity also in regions that suffer from data scarcity.