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Policy implications of changes in water availability in Europe

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The likely alteration of the hydrologic cycle due to climate change will modify water supply conditions in many regions. Water policy will have to face serious environmental and economic problems due to limited water availability in many regions across Europe and the range of adaptive measures needs to be evaluated. This contribution presents a comparative study of risks of water scarcity across European regions under a range of water policy options. The study was carried out within the BASE European project. The BASE (Bottom-Up climate adaptation strategies towards sustainable Europe) project "supports action for sustainable climate change adaptation in Europe by making experiences and scientific information about adaptation meaningful, transferable and easily accessible to decision-makers at all levels"(http://base-adaptation.eu/). The study is based on a regional assessment of current and future water availability in Europe under different assumptions. The assessment was made using the WAAPA model. The model was built from the river network inferred from the Hydro1K digital elevation maps. Storage volume for regulation was taken from the World Register of Dams of the International Commission on Large Dams. Hydrologic scenarios were taken from the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP), where the forcing from five global climate models under the Representative Concentration Pathways scenarios was applied to several hydrologic models. The estimation of water availability was performed by determining the maximum amount of water that can be supplied at any point of the river network satisfying a minimum reliability requirement. Water availability is the combined result of natural processes, which are conditioned by greenhouse gas emissions, and policy, which determines the available hydraulic infrastructure to manage water and establishes water supply conditions. Policy scenarios were devised by identifying several water management practices in different regions of Europe. The main result of the work is a set of local water availability estimates in over a thousand sub-basins across Europe and an assessment of associated uncertainties. The results can be applied to design future European water policy with the aim to ensure future sustainability of water resources under strong socioeconomic forcing while maintaining the strategic ecological and social services of water.