

Water resources sensitivity to the isolated effects of land use, water demand and climate change under 2 degree global warming

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One of the key impacts of global change are the future water resources. These water resources are influenced by changes in land use (LU), water demand (WD) and climate change. Recent developments in scenario modelling opened new opportunities for an integrated assessment. However, for identifying water resource management strategies it is helpful to focus on the isolated effects of possible changes in LU, WD and climate that may occur in the near future. In this work, we quantify the isolated contribution of LU, WD and climate to the integrated total water resources assuming a linear model behavior. An ensemble of five EURO-CORDEX RCP8.5 climate projections for the 31-year periods centered on the year of exceeding the global-mean temperature of 2 degree is used to drive the fully distributed hydrological model LISFLOOD for multiple river catchments in Europe. The JRC's Land Use Modelling Platform LUISA was used to obtain a detailed pan-European reference land use scenario until 2050. Water demand is estimated based on socio-economic (GDP, population estimates etc.), land use and climate projections as well. For each climate projection, four model runs have been performed including an integrated (LU, WD and climate) simulation and other three simulations to isolate the effect of LU, WD and climate. Changes relative to the baseline in terms of water resources indicators of the ensemble means of the 2 degree warming period and their associated uncertainties will reveal the integrated and isolated effect of LU, WD and climate change on water resources.