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Groundwater availability in the alluvial aquifer of Mura valley, Slovenia

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The impact of climate change on water resources is a critical issue for society and economy. An extent of climate change and impact on water resources, particularly on public water supply was studied in the frame of South-East European project CC-WaterS. The main water supply problems are related to the significant change of groundwater quantity and quality observed in the last decades as an effect of land use practices and are very likely linked to climate change.
Slovene test are is alluvial aquifer of Mura valley, which is located in the western edge of Pannonian basin with continental climate with mean annual temperature (1971-2000): 9.6 °C and mean annual precipitation 787 mm.
Temperature and precipitation daily data were obtained from three RCMs models, based on EOBS data base (RegCM3, ALADIN and PROMES) for two periods: 2021-2050 and 2071-2100. RCM predictions were adjusted to local observations by the quantile mapping method approach. The increase in air temperature was the strongest in the warm part of the year, particularly in the summer. Precipitation data manifested a high degree of ambiguity in the future periods, but the model simulations agreed on a general trend pointing to less precipitation in the summer. Model data also indicated trends in the direction of longer duration of dry spell and greater maximum daily rainfall. Monthly potential evapotranspiration was calculated according to Thornthwaite formula. Water balance for both future periods was calculated with GROWA model. Results have shown decrease of groundwater recharge in the future, which is also a socio economic issue, since already now there is a great competition for water, mainly among public water supply and agriculture, especially in summer months. Several scenarios for groundwater use were studied taking into account demands for public water supply (decrease of water consumption because of public awareness of water valuableness, more private wells for other use), industrial use, agricultural use (irrigation, cattle breading) and others.