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Implications of projected climate change for groundwater recharge in North Jordan.

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Extensive pumping from the Basalt limestone aquifer complex in North Jordan (up to 110 MCM/yr) has led to diminished groundwater levels due to low recharge rates (65 MCM/yr) and climate change. This unbalanced water cycle dramatically affects the ecosystem of the entire area.
This paper investigates groundwater response to climate change through statistical downscaling of global circulation models.
Statistical Down Scaling Model (SDSM) has been chosen to downscale and project the forecast data for significant stations based on HADCM3 model. Calibration and validation of two model scenarios was carried out using NCEP predictors. The model was calibrated using data from 1970-2005 then validated against data from 2006 - 2017 giving a clear trend of temperature increase and rainfall decrease.
Downscaling outputs indicated a 23% decline in precipitation by the year 2080 with 1.7 and 2.4° C increase in maximum and minimum temperature, respectively. The models indicate that the predicted recharge for the year 2050 is 37% less than current rates. Continuous over-pumping and recharge decrease will cause a 40–90% reduction of the saturated thickness by the same year. The study stressed the need for implementing a long term strategy to reduce the impacts of climate change on water resources.
Key words: North Jordan, Basalt limestone aquifer, climate change, Statistical Downscaling, groundwater recharge