



Groundwater recharge variation under climatic variability in Ajlun area and the recharge zone of Wadi Arab well field – Jordan

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Pumping of 75 MCM/yr from Ajlun area and Wadi Arab well field has led to diminished groundwater levels in North Jordan and dramatically affects ecosystem services. Climate change compounds these issues by reducing recharge and increasing the ecosystem's hydrological demand. This paper investigates groundwater recharge response to climatic changes in North Jordan by modeling climatic parameters for the time frame 2015 - 2050. Water budget components were modeled through the J2000 hydrological model considering a groundwater recharge of 47 MCM/yr. Statistical downscaling of global circulation models indicated a decline in precipitation of around 30% by the year 2050 with 2.5 and 2 °C increases in maximum and minimum temperature, respectively. Recharge for the year 2050 was recalculated based on the downscaling results to be 27% less than current recharge. Continuous over-pumping with recharge reduction will cause a 30–70% reduction in saturated thickness by the same year. Modeling groundwater resilience under the new conditions showed a severe impact on the study area especially in the central parts which are expected to comprise a semi dry aquifer by 2050.