

Simulation and prognosis of the impacts of climate changes on groundwater recharge under local conditions

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Abstract Climate changes mainly occur to the Earth's temperature and precipitation, which increase water resources stress in many regions. The purpose of this study was to simulate the effects of potential climate changes, especially the changes of temperature and precipitation intensity, on groundwater recharge rate, because the infiltration rate is influenced by hydraulic conductivity, current water content, properties and texture of the soil, through implementation of different scenarios using the simulation program PCSiWaPro[®] which is combined with a stochastic weather generator (WettGen). Precipitation and evapotranspiration of the soil-plant system are considered in the program as source and sink of water balance. The simulation results using PCSiWaPro[®] indicate the role of land use and land cover on groundwater recharge rate. The initial and boundary conditions of the models are crucial in the simulation results. In general, the results show an increased surface runoff, which leads to a decreased groundwater recharge.

Key words groundwater recharge; climate changes; water balance; numerical methods; transient simulation