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EFFECTS OF CLIMATE CHANGE ON THE GROUNDWATER SYSTEMS OF THE GROTE NETE CATCHMENT, BELGIUM

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Modeling the impact of climate change on the hydrology of river basins has been the center of attention in the past decade and is essential to adopting integrated water management strategies for water supply and flood mitigation. However, the effect of climate change on groundwater systems has only recently gained some interest. In this paper the effects of climate change on the groundwater systems of the Grote Nete catchment, Belgium, covering an area of $525km^2$, was modeled using meteorological data outputs from GCMs. A greenhouse (wet), NACCT (cold) and a dry climate scenario were used for the analysis. Classical, low, central and high estimates with three wind-speed variants were adopted for each scenario to cover model and emission uncertainties at 80% confidence interval. General hydrologic conditions, such as groundwater recharge, evapotranspiration, and runoff were simulated using the WetSpass model in conjunction with MODFLOW. Discharge areas, intensities as well as recharge intensities were obtained from a calibrated steady-state groundwater model.

Results show that, for the overall year, as well as the winter season, slow and fast discharge coefficients for all the greenhouse scenarios remained nearly constant relative to the present situation. This signifies an increase in the total discharge (combined groundwater and runoff), as the precipitation in these scenarios is higher than the actual situation's precipitation. In the summer the slow discharge coefficients showed a decrease. Both discharge areas and intensities as well as recharge intensities showed an increase. In this scenario wet winters and drier summers are expected relative to the present situation. Results obtained for NATCC (cold) scenarios depicted an oppo-

site picture of the greenhouse scenario, thus relatively drier winters and wetter summers are expected. The dry scenario showed a decrease in slow and fast discharge coefficients, discharge intensities and areas, and recharge intensities. As a result drier conditions for the whole year are expected.