Improved Spatial and Temporal Supra-Regional Recharge Estimation for Flanders

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Abstract

The spatial and temporal variability of groundwater recharge are key factors that need to be quantified to determine the sustainability of groundwater resources. In response to the need for better estimates of groundwater recharge, the Department of Hydrology and Hydraulic Engineering, Vrije Unversiteit Brussel, began an initiative in 2002 to estimate groundwater recharge rates for the supra-regional area of Flanders using the WetSpass spatially distributed water balance model (Batelaan and De Smedt, 2007). This model was developed to simulate long-term average recharge depending on land cover, soil texture, topography and hydrometeorological parameters. The model simulates recharge iteratively connected to a groundwater model, such that the recharge estimate is also influenced by the groundwater depth and vice versa. The application of the model shows that the resulting recharge has a spatial complex pattern, depending to a large extend on the soil texture and land cover. Moreover, shallow groundwater levels in valleys cause negative recharge conditions as a result of evapotranspiration by abundant phreatophytic vegetation (Batelaan and De Smedt, 2007). The aim of this present study is to improve and extend the methodology of groundwater recharge in terms of spatially but especially temporal resolution. In a first step the attention will go to temporal recharge variability estimation, sensitivity and calibration of 67 river gauging stations distributed over Flanders, which were selected for base flow separation analysis; the watershed belonging to the gauging stations are derived and the WetSpass model will be applied and tested for the 67 catchments.