

# Prognosis of future groundwater recharge in the Federal State of Lower Saxony (Germany) under changed climate conditions

Frank Herrmann, Ralf Kunkel & Frank Wendland  
*Research Centre Jülich, Institute of Bio- and Geosciences –  
Agrosphere (IGB-3), Jülich, Germany*  
[f.herrmann@fz-juelich.de](mailto:f.herrmann@fz-juelich.de)

Nicole Engel, Lena Heidt & Udo Müller  
*Landesamt für Bergbau, Energie und Geologie (LBEG), Hannover, Germany*

KEY WORDS groundwater recharge, climate change

## ABSTRACT

According to current climate projections, the Federal State of Lower Saxony, Germany is at risk for changes in the hydrological budget. These changes are expected to have direct impacts on the long-term water availability for e.g. agricultural productivity and drinking water supply. In the southeastern part for instance agricultural production is only possible by means of field irrigation using groundwater, especially during dry summers. It can be foreseen that the future management of water resources has to consider appropriate adaptation measures in order to feed the water demand of the different sectors.

The main target of a research project carried out jointly with LBEG is the prognosis of the possible impact of climate change on groundwater availability and irrigation needs in Lower Saxony. For this purpose, the water balance model GROWA has been enhanced to the mGROWA-model (Herrmann et al., 2013) which is able to simulate runoff components (e.g. groundwater recharge) in daily time-steps and with high spatial resolution (100 m grid).

The mGROWA-model will be briefly introduced and its application to Lower Saxony will be presented. The first simulation performed based on climate data from the past (1971-2000). Special attention will be paid to the simulated temporal variable water content in the root zone and thus to percolation water fluxes and irrigation needs. Finally, the future groundwater recharge (until 2100) is forecasted using climate data of the RCM WETTREG (2010).

## References:

Herrmann, F., Chen, S., Heidt, S., Elbracht, J., Engel, N., Kunkel, R., Müller, U., Röhm, H., Wendland, F. (2013): Zeitlich und räumlich hochaufgelöste flächendifferenzierte Simulation des Landschaftswasserhaushalts in Niedersachsen mit dem Model mGROWA. Hydrologie und Wasserbewirtschaftung (submitted for publication).