Geophysical Research Abstracts, Vol. 8, 08756, 2006
SRef-ID: 1607-7962/gra/EGU06-A-08756

Application of the AISUWRS model concept to the integrated water management of a medium sized city in Germany

L. Wolf(1), J. Klinger(1), C. Schrage(1), H. Hötzl(1), U. Mohrlok(2)

(1) Department of Applied Geology, University of Karlsruhe, Kaiserstr. 12, 76128 Karlsruhe, Germany

(2) Institute for Hydromechanics, University of Karlrsuhe, Kaiserstr. 12, 76128 Karlsruhe, Germany

The European Union funded project AISUWRS (Assessing and Improving the Sustainability of Urban Water Resources and Systems) finished at the end of the year 2005. The overall scope of the initiative was to assess and improve the sustainability of urban water resources and systems with the help of computer tools.

This was achieved by the development of a chain of different models to describe and link urban water supply, urban drainage including sewer leakage, the unsaturated zone and urban groundwater systems. The uppermost model applied in the AISUWRS system is the Urban Volume and Quantity model (UVQ) developed by CSIRO, Australia. Its main input parameters are climate records, water consumption characteristics (e.g. water use for laundry or typical contaminant loads through toilets) and urban sealing coefficients. The model calculates water flows and contaminant loads through the wastewater and stormwater systems and assesses direct recharge to groundwater. This information is fed into the specially developed Network Exfiltration and Infiltration Model (NEIMO), which estimates the amount of wastewater exfiltration from or groundwater infiltration into sewers. Leakage rates are based on defect distributions observed by CCTV investigations or, where no CCTV data are available, the application of characteristic curves taking into account pipe material and age. The output is then forwarded to specially developed unsaturated zone models calculating water flows and travel times to the groundwater table and the combined effects of sorption and decay of contaminants.

The city of Rastatt (SW-Germany) was chosen as one of four case studies in the AISWURS project and the entire model chain was applied to its urban water cycle. The results of the modelling exercise were compared with monitoring activities at specifically constructed test sites and groundwater observation networks. Different water management scenarios were modelled, such as decentralised rainwater infiltration, sewer rehabilitation and climate change. The modelling results indicate that the urban aquifer in Rastatt can easily be managed in a sustainable fashion and is not under severe pressure from the constant emissions of the urban drainage systems.

More information is available at www.urbanwater.de