Geophysical Research Abstracts
Vol. 18, EGU2016-4395, 2016
EGU General Assembly 2016

An expert system supporting decision making process for sustainable groundwater use in main alluvial aquifers in Slovenia

Petra Souvent (1), Goran Vižintin (2), Sašo Celarc (3), and Barbara Čenčur Curk (4)

(1) Ministry of the Environment and Spatial Planning, Slovenian Environment Agency, Ljubljana, Slovenia (petra.souvent@gov.si), (2) University of Ljubljana, Faculty of Natural Sciences and Engineering, Ljubljana, Slovenia (goran.vizintin@guest.arnes.si), (3) BRON d.o.o. - Ljubljana, Slovenia (saso@bron.si), (4) University of Ljubljana, Faculty of Natural Sciences and Engineering, Ljubljana, Slovenia (barbara.cencur@geo.ntf.uni-lj.si)

The expert decision support system for groundwater management in the shallow alluvial aquifers was developed to assist the decision makers to quantify available groundwater for a given alluvial aquifer and provide additional information about quantity of groundwater available for water rights licensing. The system links numerical groundwater flow models with the water permits and concessions databases in a complex decision support system. Six regional stand-alone groundwater models are used in the process of the assessment of groundwater quantitative status as well as for assessing availability of groundwater resources during the period of maximum water consumption and minimum groundwater recharge. Model runs have been realized in a steady state and are calibrated to a medium-low hydrological field conditions, because water quantities for all already granted as well as to-be granted water rights have to be ensured in any time for several years.

The major goal of the expert decision support system is therefore to provide control mechanisms in order to verify the water rights licensing for the sustainable use of groundwater resources. The system enables that the water quantity data from water permits and concessions in conjunction with the results of numerical groundwater modeling are used in the managing process of granting new water rights to users in terms of their long-term access to groundwater (sufficient quantity of groundwater) and in relation to the water rights of other users (co-impact of groundwater pumping). Also, groundwater access must be managed in such a way that it does not cause unacceptable local impacts (pumping must not lower the water level for more than 2/3 of water body in the medium-low hydrological conditions).