Geophysical Research Abstracts, Vol. 7, 02526, 2005
SRef-ID: 1607-7962/gra/EGU05-A-02526

GLOWA-Danube: integrative Global Change scenario simulations for the upper Danube catchment - first results

U. Strasser, R. Ludwig and W. Mauser

Dept. for Earth and Environmental Sciences, Ludwig-Maximilians University (LMU), Luisenstr. 37, D-80333 Munich, Germany (u.strasser@iggf.geo.uni-muenchen.de / 0049-89-21806675)

GLOWA-Danube (www.glowa-danube.de) is a joint research initiative funded by the Federal Ministry of Education and Research (BMBF) to develop integrative techniques for the examination of the sustainability of water resources management alternatives in the Upper Danube watershed under Global Change conditions (e.g. climate change, change in population structure or change in agriculture). For this purpose the Global Change decision support system DANUBIA was developed which comprises predictive models to simulate the relevant natural and socio-economic processes: DANUBIA includes submodels for meteorology, hydrology, hydrogeology, biology and glaciology as well as actors-based models for farming, economy, water supply, private water use and tourism. The first version of the system was developed by an interdisciplinary team of researchers from 10 different universities, 2 research institutions and 1 commission. DANUBIA is raster-based, object oriented and implemented in JAVA on an inexpensive LINUX-cluster. Related land surface and socio-economic processes are described at a spatial resolution of 1 km and a temporal resolution of 1 hour. The main challenge in developing DANUBIA comes from (1) the steep gradients and pronounced lateral flows in the mountainous watershed of the Upper Danube, (2) the sensitivity of the watershed to Global Change concerning climate, vegetation and land use, (3) the complex political and administrative structure including 5 countries, 2 German states and 2000 water suppliers, and (4) the development of scenarios for future development in climate, economy and demography. For validation, the system was running continuously for the years 1995-2000. Then, we performed both virtual humid (5 times 2002) and dry (5 times 2003) scenario experiments with measured me-

teorological data to show up the boundaries of the effects which could be caused by a potential change of temperature and precipitation, respectively. The paper presents these effects on the four topics water supply, land use, tourism and water management. For the latter, recurrence periods were calculated with a synthetically prolonged series of meteorological data with included trends. Both data and results of the system can be visualized by means of an interactive online tool. The results show that with the nowadays available technology from information science and a coordinated dialogue between the experts from the various disciplines it is feasible to approach the higly integrative questions of Global Change effects on our environment.