Geophysical Research Abstracts, Vol. 7, 03312, 2005
SRef-ID: 1607-7962/gra/EGU05-A-03312
© European Geosciences Union 2005

Self forming river processes and assessment techniques of dynamic channel evolution in Alpine gravel bed rivers

E. Formann, H. M. Habersack, St. Schober

Department of Water – Atmosphere - Environment

Institute of Water Management, Hydrology and Hydraulic Engineering,

BOKU - University of Natural Resources and Applied Life Sciences, Vienna.

Muthgasse 18, 1190 Vienna, Austria (erik.formann@boku.ac.at / Fax: +43-1-36006-5525 / Phone: +43-1-36006-5545

The Austrian part of the River Drau was historically characterized as partially braided, aggrading channel system with a large sediment supply from the Alpine sources before the 20th century. However, high floods at the end of the 19th century and especially in the 1960´s required to find solutions for flood control and minimizing river bed aggradations. In order to achieve these objectives a variety of regulations and bank protection measures have been performed. These local and sectional measures caused together with catchment-wide changes like torrent control structures in tributaries, land use changes and also intensive gravel dredging, a deficit of sediment load, which lead to economical and ecological problems. The long term development for the river degradation processes was determined from a river scaling concept, which includes temporary and spatial aspects. The EU-LIFE Project “Auenverbund Obere Drau” realized extensive restoration measures to improve the ecological integrity of the river-ecosystem, to stop the riverbed degradation and to ensure flood protection. In order to be able to monitor the achievement of the defined goals of the project, the changes of river morphology, flow field and substrate before and after the restoration measures were investigated during an intensive monitoring program. These measurements included a GPS – Echosounder system for exact real time documentation of the channel geometry, a two dimensional flow velocity meter to measure different flow velocities and flow directions, an underwater videocamera and volumetric samples to

document sediment changes. Furthermore hydraulic conditions were simulated with a two-dimensional hydrodynamic model. The analyses of the morphological changes were performed with several digital elevation models, which were generated by means of the statistical method Kriging. The monitoring results offered a very high variability in erosional- and depositional processes and especially in self-forming development. Therefore some existing numerical models are tested and verified for the field data sets. The objectives are the analyses of geotechnical processes, especially the mass bank failures, so these effects may be included in assessment techniques of channel evolution. The aim is an adapted numerical model for predicting channel evolution and bank erosion in order to provide a basis for decision making for restoration measures in the future.