



Erosion and sediment yield monitoring and modelling of an alpine catchment in a scaling context

H.M. Habersack (1) and St. Schober (1)

(1) Institute for Water Management, Hydrology and Hydraulic Engineering, Department for Water – Atmosphere – Environment, BOKU-University of Natural Resources and Applied Life Sciences Vienna, Austria (helmut.habersack@boku.ac.at / Fax: +43 1 36006 5549)

The aim of this paper is to discuss the sediment budget of an Alpine catchment in a scaling context. Over a period of three years the spatio-temporal development of the sediment budget was analysed by means of monitoring and modelling in the Alpine Sölk-basin in Austria. At the outlet of the basin a reservoir is situated where sedimentation problems lead to the necessity of an improved sediment management. Alternatives were discussed by the company, beginning from flushing sediments to optimised management strategies for the whole catchment. There the total sediment budget plays a central role. On a scaling perspective the boundary conditions and major processes of a catchment, like the geomorphological setting, are given by longterm developments. On the basis of field mapping these effects are discussed with respect to sediment availability. Within these longterm processes, short-term unsteady sediment supply, erosion, transfer, deposition and remobilisation processes determine reservoir sedimentation and management. An intensive field monitoring program, including bedload and suspended sediment measurements, supplies data for the subsequent rainfall-runoff-erosion and sediment transport modelling (input, calibration and validation data). Results show that landuse, channel regulation and avalanches are of great importance for sediment supply and that catchment management (beside managing the reservoir itself) has to address these. Concerning scaling the so called River Scaling Concept is described and it is shown how natural and anthropogenic discontinuities limit scaling with respect to sediments.

Finally the possible effects of landuse changes (afforestation of former meadows) and global warming (assumed by an increasing tree line) on the sediment budget are discussed by means of a numerical model.