Geophysical Research Abstracts,
Vol. 10, EGU2008-A-00619, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-00619
EGU General Assembly 2008


# The Role of Datasets in assessing fluvial-geomorphic Dynamics of a subarctic Catchment under changing climatic Conditions

**E. Lotsari**, P. Alho and J. Käyhkö
University of Turku, Finland (eslots@utu.fi / +358 40 7212495)

Climate change is expected to affect hydrological cycles in Subarctic Finland. Due to the changes in precipitation, snow cover and evaporation, river discharges may experience significant seasonal and annual alterations. Earlier spring floods and more frequent autumn floods may alter erosion processes on riverbed and riverbanks. Higher discharge increases sediment transport leading to higher input of material into lower reaches of rivers. As a result, the geometry of channels may change drastically and evolve towards new, perhaps unexpected equilibria.

Based on earlier studies, most of the suspended material in our study catchment Tana (Teno), running on the border river between Finland and Norway, is transported during spring floods. Therefore, individual flood events and periods of high water level are believed to play an important role in shaping the river. However, in order to understand fluvial processes and floods under changing climate, observing mere fluvial river processes will not be adequate: we need to acknowledge and understand the watershed parameters affecting hydrological processes by: (1) depiction of watershed characteristics, for example by morphometric indexes, (2) analysis of hydrological properties, i.e. precipitation and evapotranspiration, and (3) assessment of subsequent erosion and sedimentation processes. Several watershed characteristics, for example geomorphology, vegetation, soil properties and anthropogenic characteristics affect in combination the routings of the precipitated water and also the lapse time to hydrographic peak discharge in the main channel. Higher complexity in the watershed characteristics means more variability in the through-flow of water in the watershed.

The Geographic Information Systems (GIS) provide useful tools for research of peripheric watersheds and floods of northern Finland. Our case study in one of Tana sub-catchments, river Pulmankijoki, has revealed that results are highly dependent on the accuracy and quality of the digital datasets used in the analyses e.g., soil, land cover and precipitation, and perhaps most importantly, the accuracy of digital elevation model (DEM). The datasets produced based on the DEM (slopes, river network and drainage divides) are applicable not only in morphometric and erosion analyses, but also in watershed modelling. The hydraulic modelling results of single flood events and modelling of present and future sedimentation are conditional on the quality of the raw datasets gathered from the area. Therefore, in predicting future floods under changing climatic conditions it is important to recognize and acknowledge the significance of data accuracy in every step of research from data collection to flood level prediction.