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Holocene to contemporary source-to-sink fluxes in a valley-fjord system in western Norway: Erdalen and Bødalen site project (SedyMONT-Norway)

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The focus of this ESF-NFR funded Norwegian Individual Project (2008 - 2013) (http://www.ngu.no/sedymont) within the European Science Foundation (ESF) SedyMONT (http://www.sedymont.eu) (EUROCORES TOPO-EUROPE) Programme (http://www.esf.org/topoeurope) is on Holocene, subrecent and contemporary sedimentary fluxes and budgets in the Erdalen and Bødalen valley systems in Nordfjord, western Norway. The innovative approach of this international research project is the integrated quantitative study of longer-term (Holocene), subrecent and contemporary source-to-sink fluxes and process rates using a novel combination of advanced methods and techniques.

With respect to the main aims and objectives of ESF SedyMONT, the following main aims of the Erdalen and Bødalen site project can be stressed:

- Analyse how the inheritance of the landscape due to the influence of the Last Glacial Maximum (LGM) has affected process rates over time (paraglacial system),
- Document changes in process rates over different timescales by combining quantitative knowledge on Holocene process rates with newly generated data on subrecent and contemporary process rates.

High-resolution monitoring of denudative surface processes in Erdalen and Bødalen, in combination with repeated analyses of surface water chemistry, atmospheric solute inputs and granulometric and shape analyses of suspended sediments provide high-resolution data to analyse and quantify present-day sedimentary and solute fluxes as well as sediment sources, denudation rates, and meteorological and topographical / landscape morphometric controls of denudative processes. In addition to standard methods for monitoring bedload transport, innovative techiques like horizontally installed impacts sensors and biofilm analysis are applied in combination with advanced flume experiments (for calibration of field data) to analyse channel stability / mobility and to estimate bedload transport rates in both valleys.
The volume and composition of lake sediments are studied using echo-sounder, georadar and different coring techniques. Investigations on volumes and architecture of storage elements (talus cones, valley infills, deltas) using different geophysical methods like georadar and seismic refraction surveys are carried out to improve the quantitative knowledge on Holocene process rates and sediment budgets. Detailed geomorphological mapping is performed and interpreted in combination with digital elevation models and data.

The process and denudation rates in Erdalen and Bødalen are compared with rates in the other SedyMONT test sites (Alps) (http://www.sedymont.eu) and with denudative process rates in other cold environment catchment systems worldwide through the SEDIBUD Programme (http://www.geomorph.org/wg/wgsb.html).