



## **Integrating field measurements and flume experiments for analysing fluvial bedload transport and channel morphodynamics in steep mountain streams**

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Fluvial bedload transport, temporal storage of material and channel morphodynamics have high importance for sedimentary budgets of steep catchments and steep mountain streams. In addition, headwater catchments and steep mountain streams can be relevant sediment sources for lowland river systems.

Since 2004 extended and interdisciplinary field investigations on fluvial bedload transport and channel morphodynamics have been conducted in a number of selected stream segments in supply-limited fluvial systems in the inner Nordfjord (Erdalen and Bødalen drainage basins) in western Norway. A range of different methods and techniques have been used. Field studies in the Erdalen drainage basin (79.5 km<sup>2</sup>) and the Bødalen drainage basin (60.1 km<sup>2</sup>) have included (i) continuous channel discharge monitoring, (ii) frequently repeated surveys of channel morphometry and granulometric analyses, (iii) different tracer techniques (painted stones, magnetic tracers), (iv) Helley-Smith and other basket measurements, (v) horizontally installed impact sensors, (vi) underwater video filming and (vii) extended biofilm analyses, including also controlled biofilm growing experiments with fixed baskets in selected channel segments. Additional field studies with impact sensors were carried out in selected transport-limited fluvial systems in the Coast Mountains of British Columbia (Canada) in 2010 and 2011. The field studies have been combined with flume experiments for calibration of field measurements, especially for the calibration of the measurements that have been carried out with impact sensors in Norway and Canada.

As a key achievement, the entire range of different bedload component grain sizes can be covered by the applied combination of techniques. The flux of bedload material can be quantified and is related to the spatio-temporal variability of sediment supply / availability within the drainage basins and to temporal sediment storage within the channel systems.