



Sediment sources and fluvial transport during thermally and pluvially generated peak runoff in a glacier-fed mountain catchment in Nordfjord, western Norway

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Continuous and year-round monitoring of runoff, solute and suspended sediment transport is carried out (since 2005) in the Erdalen catchment in Nordfjord, using five stationary stations. Erdalen is a typical U-shaped and glacier-fed valley in the mountain landscape of western Norway characterised by steep valley-fjord systems. Two outlet glaciers of the Jostedalbreen ice cap are covering the uppermost parts of Erdalen.

The runoff regime in Erdalen is complex, with peak runoff occurring during snow melt in spring, glacier melt in summer and heavy rainfalls in fall. Peak runoff in spring and summer is mainly thermally determined whereas runoff peaks in fall are pluvially induced.

Different sediment sources are activated during different periods of the year. Runoff peaks in fall appear to be most relevant with respect to fluvial sediment transport. Heavy rainfalls can cause debris flows and saturation overland flow with connected wash processes at slopes, and related to this significantly increased sediment supplies from slopes into channel systems.

Altogether, fluvial sediment transport and fluvial mechanical denudation in Erdalen seem to be supply-limited and the annual suspended sediment yield can vary significantly. Annual suspended sediment yields are to a high extent determined by the annual number of heavy rainfall events as well as by air temperatures in July and August determining the range of runoff peaks in summer, and by the total amount of wintry snow storage controlling the range of peak runoff in spring.

The contemporary mean annual suspended sediment yield in Erdalen is similar to the mean chemical denudation rate in this valley.