



Holocene to contemporary fluvial sediment fluxes and budgets of two glacier-fed valley-fjord systems in the Nordfjord area, western Norway

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This PhD project is part of the NFR funded Norwegian Individual Project within the ESF SedyMONT (Timescales of sediment dynamics, climate and topographic change in mountain landscapes) TOPO-EUROPE program. Two neighboring glacier-fed valley-fjord systems (Erdalen & Bødalen) with a different topographic inheritance from Pleistocene glaciations are compared. It is of special interest how the different valley morphometries have influenced Holocene to contemporary sediment fluxes and budgets. To understand the spatial and temporal sediment flux variability during the Holocene the main focus lays on i) quantification and analysis of storage element volumes for estimation of Holocene sedimentation rates and sediment yields, ii) analysis of the spatial and temporal sediment flux variability, iii) analysis of the linkages between sediment transfer and storage, iv) analysis of controlling factors for postglacial, sub-recent and contemporary sediment fluxes and v) construction of Holocene to contemporary sediment budgets for Erdalen and Bødalen. The analysis of sedimentary fluxes and budgets as well as their controls at different timescales (Holocene to contemporary) is a basis for the assessment of complex landscape responses of Holocene to recent changes in temperature, precipitation and runoff. For constructing sediment budgets at a small-catchment scale (50-100 km²) it is necessary to integrate the temporal and spatial variations of supply of material from sediment sources, sediment transport and storage and to identify, how far the different system components are coupled to each other.

Both valleys are instrumented with a year-round monitoring system (runoff, suspended and solute transport) for analyzing fluvial sediment fluxes. The results enable to link sediment transport and runoff (events) and the spatial and temporal variability of sediment transport processes. In addition, glacier sediment supply and its spatial variability in Erdalen and Bødalen is monitored and analyzed to look at its role for the entire sediment budget for the two valley-fjord-systems. Geophysical methods (Georadar, Geoseismic) are applied for calculation of the total valley infills and for interpretation of the stratigraphic architecture, with the goal to define the controlling factors for the postglacial sediment storage within the two glacially eroded valleys. Lake sediment investigations are focused on i) quantifying the contemporary sedimentation rates, ii) the role of proglacial lakes as sediment trap/temporary storage element within the sediment routing system and iii) the detection and analysis of sediment sources. Sediment cores are retrieved in the lake Sætrevatnet Bødalen as a representative example of the two valleys Erdalen and Bødalen.