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Denudational processes, source-to-sink fluxes and sedimentary budgets under changing climate and anthropogenic impacts in selected drainage basin systems in central Norway and eastern Spain

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Climate change, human activities and other perturbations (like, e.g., fires, earthquakes) are likely to influence existing patterns of weathering, erosion, transport and deposition of material across defined landscape components and units. While it is still a challenge to develop an improved understanding of how such changes interact and affect slope and fluvial processes, the connectivity within landscapes and between slope and fluvial systems, as well as contemporary denudation rates, source-to-sink fluxes, and sedimentary budgets, this kind of quantitative analyses promise to be an efficient framework to assess the impact of environmental changes and disturbances to sediment dynamics and to evaluate landscape sensitivity. The current knowledge on drivers and rates of contemporary sediment dynamics and denudation forms the basis for understanding and predicting the consequences of ongoing and accelerated environmental changes.
Ongoing GFL research activities on drivers and quantitative rates of contemporary sediment dynamics and chemical and mechanical denudation in selected drainage basin systems in central Norway and eastern Spain are presented.
The upper Driva drainage basin in central Norway (Oppdal) is situated in a cold climate and mountainous environment, has year-round discharge with a nival runoff regime, and the temporal variability of sediment transfers, runoff and fluvial transport are largely controlled by thermally and/or pluvially determined events. Our investigations include detailed geomorphological and permafrost mapping combined with the detailed statistical analysis of meteorological data and the continuous observation and year-round monitoring of sediment transfers, runoff and fluvial transport using a range of different techniques in different selected tributary systems of the upper Driva drainage basin.
The Pou Roig and Quisi catchment systems in eastern Spain (Calpe) are located in a Mediterranean, partly mountainous and/or anthropogenically affected environment. Sediment transfers, the intermittent runoff and fluvial transport are almost entirely controlled by pluvial events. Our investigations in this study area include detailed geomorphological mapping combined with the detailed statistical analysis of meteorological data and the observation and monitoring of sediment-transfer, runoff and fluvial transport events using a combination of different observation, monitoring and sampling techniques.
Our results on controls and the spatio-temporal variability of chemical and mechanical denudation within the two study regions contribute to an advanced understanding of key drivers and rates of contemporary sediment dynamics and denudation in different morphoclimatic environments, and provide the basis for improved predictions of possible effects of climate change and anthropogenic impacts on contemporary denudation rates in different morphoclimatic regions.