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Geomonitoring for understanding of sediment transport in an Alpine river catchment

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This study explores the relationship between channel changes, sediment transport and flood magnitude for an approximately 65 km2 large drainage basin (Grosse Entlen) located at the northern border of the Central Swiss Alps (Luzern area). In the study area, the retreat of the Alpine glaciers at the end of the Last Glacial Maximum (LGM) caused base level to lower by approximately 125 m. The fluvial system adapted to the lowered base level by headward erosion under forming a gorge.
In order to estimate the sediment flux, the river bed was periodically surveyed over an approximately 20-month period by measuring topographic cross-sections on four different sites along the channel with a total station. In addition to this, local erosion and deposition volumes were quantified for an approximately 2000 m2 large riverbed-area using differencing high-resolution digital elevation models that were extracted using digital photogrammetric techniques using an unmanned aerial vehicle.
Water discharge data from a gauging station in the drainage area is used to associate the significant changes in river bed morphology with a specific flood event. Significant changes of river bed morphology occur mainly in summer after heavy thunderstorms. The recurrence period is estimated to be about 1-2 years.