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Holocene soil erosion and sediment storage in a meso-scale catchment in Germany: A quantitative approach

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Landscape perturbations by climate change and/or human impact are the major triggers for Holocene soil erosion, especially since the introduction of farming and pastoralism in the Neolithic period. Since then there has been a shift from naturally induced towards man induced soil erosion. However, to get insight into the long-term process of sediment reworking and to better understand the causes of past soil erosion, quantitative temporal and spatial investigations are necessary. For the reconstruction of past soil erosion, colluvial and alluvial sediments, as well as truncated soil profiles represent important natural archives. These archives can be used to spatially quantify sediment redistribution, while the dating of the sediments shed light on the timing of past soil erosion, as well as on the intensity of the process of sediment redistribution, by calculating sedimentation rates.
In this study we present colluvial and alluvial archives from a meso-scale catchment (97 km2) in Northern Bavaria, Germany. In order to reconstruct the erosion and sedimentation history of the catchment in time and space, colluvial and alluvial sediment records were intensively investigated. A detailed chronostratigraphy of the sediments was established by optical stimulated luminescence (OSL) dating, which helps to reconstruct past sediment fluxes. Based on these data, we present a sediment budget and discuss the problematic interpretation of the temporal variation of sediment fluxes and its causes.