



Assessing the potential of grain size end member analyses to discriminate intercalated fluvial and colluvial sediments

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Fluvial and colluvial sediments are valuable gearchives of the Holocene landscape evolution in loess-covered landscapes of Central Europe being very sensitive towards external factors: Whereas fluvial sediments of large and medium river catchments mostly contain climatic information, the formation of colluvia on the slopes is mostly caused by human activity. In this context, the intercalation area between fluvial overbank and colluvial slope sediments is of special interest: In case of a good connectivity between slopes and floodplain it can be possible to establish a relative coupled chronology of the reactions of river and slopes towards external factors that is independent of dating errors. However, due to their optical similarity the discrimination of loess-borne colluvia and overbank sediments in the field it is often difficult, what prevents the establishment of secure intercalated stratigraphies. Furthermore, due to their similar sediment properties also geochemical methods (e.g. XRF-element analyses) or rock magnetic analyses (e.g. magnetic susceptibility) are not always capable to discriminate both types of sediment. In contrast, grain sizes contain information about the different transport mechanisms of fluvial and colluvial sediments, since these processes with their characteristic transport energies lead to different grain size sorting. Thus, grain size data should allow the discrimination of intercalated fluvial and colluvial sediments in loess-covered landscapes with similar geochemical properties.

Here we present the results of stratigraphical investigations that were carried out along a catena in the intercalation area between fluvial overbanks and colluvial sediments at the western margin of the floodplain of the Weiße Elster River in the Altenburg-Zeitz-loess area in Central Germany. Besides field stratigraphies, fluvial and colluvial sediments were discriminated using rock magnetic measurements and statistical end member analyses of grain size data with the R-package EMMAgeo. It could be shown that statistical end member analyses significantly improved the discrimination of both sediment types. Therefore, in the future this method could be applied in case of geochemically very similar fluvial and colluvial sediments to establish well-based intercalated fluvial and colluvial stratigraphies.