

Chances and pitfalls of leaf wax biomarker analyses applied to fluvial sediment sequences - the example of a Holocene fluvial sediment-paleosol sequence from the upper Alazani River, eastern Georgia

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During the last decades, fluvial sediment sequences in many regions have intensively been studied to reconstruct Late Quaternary palaeoenvironmental and palaeohydrological conditions. However, up to now analyses of leaf wax biomarkers that are increasingly used to reconstruct paleoenvironmental and -climate conditions e.g. from lake sediments or loess-paleosol sequences were not systematically applied to Late Quaternary fluvial sediments. Given the ubiquitous distribution of fluvial sediment sequences on the earth's surface such investigations could potentially strongly enhance the knowledge about former environmental conditions in many regions.

For this conceptual study we exemplarily analysed leaf wax biomarker (long-chain n-alkanes, n-alkanoic acids) in a fluvial sediment palaeosol sequence from the upper Alazani River in eastern Georgia to discuss general possibilities and pitfalls: Generally, biomarker records from fluvial archives can be divided into i) a catchment signal recorded in the fluvial sediment layers and ii) a local in-situ signal recorded in the intercalated paleosols. This offers the great chance to reconstruct paleoenvironmental conditions in both the whole catchment and at the sampling site. However, potential pitfalls are, for example, that inherited catchment signals can bias the in-situ signal from paleosols, while intermediate sediment storage in the catchment prior to sediment deposition and postsedimentary processes may alter the original catchment signal in the fluvial sediment layers. Thus, when applying leaf wax biomarker analyses to fluvial sediment sequences one has to be careful: The interpretation of the biomarker record strongly depends on the specific geomorphological and sedimentological conditions of the investigated site and of the catchment area.