



## The influence of types of sediments and landforms on the evolution of anabranching and meandering rivers in postglacial and loess landscapes of Europe

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Meandering and anabranching rivers shaped postglacial and loess areas of Europe since the Late Pleniglacial. These landscapes inherited landforms and sediments left by the glaciations and loess formation, however, the influence of this inheritance on the evolution of the rivers is not fully understood. The main goal of this study is to determine the influence of deposits and landforms inherited from the glaciations and loess formation on processes forming meandering and anabranching rivers. The following research tasks were realized: i) identification of types of floodplain sedimentary architecture, ii) determination of grain-size properties of sediments forming alluvial fills, iii) determination of differences between channel planform changes of postglacial and loess rivers since the Late Pleniglacial, and iiiii) creation of a model describing the influence of inherited sediments and landforms on the evolution of anabranching and meandering rivers in postglacial and loess landscapes of Europe.

This research work is based on data collected from literature on the evolution of 60 rivers of western, central and eastern Europe. During the literature review, attention was paid to sedimentary structures preserved in channel and floodplain sediments, types and grain-size of deposits forming alluvial fills, and channel planform changes since the Late Pleniglacial. Data regarding periods of river incision and increased deposition were also collected.

The inheritance of landforms and sediments from the last glaciation (glacial till, sands and gravels), and a deposition of loess at the forefront of glaciated areas drive the major differences between the evolution of anabranching and meandering rivers of postglacial and loess landscapes of Europe. Point bar accretion forms meandering rivers in postglacial zone whereas oblique accretion influences the formation of meandering courses in loess areas. Anabranching rivers of postglacial zone evolved through the formation of crevasse channels, meandering anabranches, and switch from multi- to single-thread planform in periods of low water levels. Anabranching rivers of loess zone formed sustained bifurcations and soft avulsions. The inherited landforms (such as e.g. ice-marginal valleys and subglacial tunnels in postglacial areas) influenced the rivers' evolution by the formation of bifurcations and multi-channel river confluences.

The most distinct differences between channel planform changes in postglacial and loess areas were found in the period of the last 4000 years, characterized by increased humidity and

deposition. Meanders of postglacial zone formed alluvial islands in their courses or were transformed into anastomosing rivers. Anabranching rivers in ice-marginal valleys sustained their multi-channel courses until the major hydro technical works in the 19th century. Anabranching rivers of loess zone evolving in small catchments evolved into meandering courses. Low-energy meandering rivers turned into wetlands. Rivers evolving in large valleys with high stream power formed in loess areas maintained meandering planforms throughout the Holocene. Further research on rivers on subarctic zone, and large rivers of Europe (i.e. the Danube River) is required to develop the understanding of processes forming rivers in both zones.