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Fluvial sensitivity to Late Quaternary climate changes in NW Romania

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Fluvial archives became increasingly important for the reconstruction of past environments, as they record a sum of climate, vegetation, hydrologic and anthropic changes. This is especially important for the Late Quaternary, when climate and human activities had recorded large spatial and temporal variations.
Here we present a tale of fluvial behavior during the last ca. 24.000 years in NW Romania, based on 1) absolute ages and fluvial architecture of sediments exposed in 8 openings located along the Someşu Mic River, and 2) depth-age models, grain size, LOI and gastropods assemblage analysis on 2 cores located upstream from Ştiucilor Lake, a natural lake along a small tributary of the Someşu Mic River, formed by salt disolution on top of a narrow diapiric anticline.
During the Late Glacial (LG), Ştiucilor Lake was more extended then is today, with a high input of coarse materials (sands) from the slopes; and dramatically reducing its size in the Early Holocene, a transition marked by the abrupt occurrence of Holocene gyttja on top of LG sands, 1 km upstream from the present lake. Further upstream, at ca. 4 km from the present day edge of the lake, clays and sandy clays were deposited during the Bolling – Allerod (BA), followed by fine - medium sands of Younger Dryas (YD) age. On top of these sands, clays, sandy clays and gyttja occur, suggesting a returning to a less energetic sedimentary environment in the Holocene. In both cores, the sediments become lacustrine, with clays and fine sands, attesting the expansion of the lake's surface, followed by large fluctuations during the Holocene.
The river fed by this stream – Someşu Mic, was a coarse gravel, shallow braided river before the Last Glacial Maximum and until the YD. The channel metamorphosis into a narrow, incised, meandering one, occurred ca. 1500 years after the beginning of the Holocene. However, sedimentological evidences suggest that this transition from braided to meandering channel was not a straightforward one, with a phase of few hundred years during the Early Holocene when the river became a slightly incised braided/wandering channel, with finer in-channel materials.
The conservative response of Someşu Mic river to the climatic amelioration, without channel type change during the BA and delayed reaction during the Early Holocene, is probably the consequence of the higher general slope of the valley which maintain an increased solid discharge. This threshold is surpassed only in the Holocene, when deciduous forest arrived in the area and imposed a compact belt at mid altitudes, causing a drastic reduction of solid discharge. Contrary, the small tributary seems to be highly responsive to all important climatic changes during the LG and the Holocene. The two cases confirm the variable sensitivity (depending on geologic and hydrologic factors) of fluvial systems to climate changes and highlight the complexity of their temporal and spatial response to these changes.