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Paleohydrology of the lower Vychegda River (Northern Russia) in the Late Glacial and the Holocene.

During the maximum stage of the Last Glacial the valley of the Northern Dvina and Vychegda Rivers was dammed by the ice. Fine lacustrine aleurites with the age 34,200+/-290 years BP (KI-6410) found at the lower 40 km of the Vychegda River valley mark this stage. The lacustrine sediments are overlaid by fine sands, which form a high Late Glacial alluvial- deltaic terrace of the dammed Vychegda River. After the ice retreat about 18,000-20,000 years ago the river incised into alluvial- deltaic deposits. Up to 12 steps of erosional - accumulative terraces and three main systems of paleochannels can be identified. The old meandering - braided paleochannel is mainly situated at the altitudes 12-14 m above the low water level, its width is 1,100 m and meander length is 7,000 m. The channel was abandoned due to river incision about 9,000- 10,000 years ago (according to radiocarbon dates MSU-1454, KI-6404, 6405, 6406, 6407). The second system of meandering paleochannels is situated at the altitudes 9-11 m above the low water level, its width is 500 m and meander length is 3500 m. The channel was abandoned due to river incision about 6000 years ago (KI-6408). The lowest system of meandering paleochannels is situated at the altitudes up to 7 m above the low water level within the river floodplain, its width is 700 m and meander length is 4,500 m. The omega-shaped meanders of this channel were developed during the period 4,500 - 2,500 years ago (KI-6401, 6402, 6409, 6393, 6394). After 2,000 years ago the most curved meanders were cut off, and the modern-type sinuous channel, 800 m wide with meander length 6,000 m was formed. The paleohydrology of the Vychegda River for the last 34,000 years was reconstructed from the grain size of channel deposits, paleochannel morphology and paleolandscape features. The river flow reached its maximum 9,000 - 12,000 years ago, when mean annual discharge was 1,300 m³/s. The major part of the flow (75%) passed within the spring flood. According to the calculations for such a flow annual precipitation not less than 400 mm is necessary, including 270 mm of winter precipitation. In the Holocene, 6,000 - 8,000 years ago, the river flow reached its minimum (mean annual discharge was only 570 m³/s) due to the annual precipitation decline till 350 mm (only 110 mm for the winter). During the time interval 2,500 - 4,500 years ago the mean annual discharge increased to 960 m³/s when annual precipitation was 580 mm (180 mm during the winter). The stage of the humidity increase lasts till recent time: the present day precipitation is 700 mm (230 mm for the winter) and mean annual discharge is 1,160 m³/s. The work was funded by RFBR grant 97-05- 64708.