



Late Pleistocene Paleohydrological Extreme Events in Don River Basin

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The relicts of large meandering palaeochannels (macromeanders) are found in the river valleys of the East European Plain. These macromeanders are spread globally in the temperate climate zone of the Northern Hemisphere, however East European Plain is characterized by a great number of such paleochannels and their good preservation in topography of river valleys. Channel widths of macromeanders can be 10-15 times larger than the recent meanders of the same rivers. Large paleochannels were formed throughout the periglacial zone of the Last Glaciation. These periglacial rivers were formed under conditions of high spring runoff. Formation of large paleochannels is usually associated with Late Glacial (the end of MIS 2), however there are some evidences of formation of such landforms in earlier times (MIS 3).

The main aim of this study is establishing of absolute chronology of large paleochannels formation and periodization of the phase of extremely high river flow in Don River basin.

We studied a few key sites in Don River basin: Upper Don river valley near Epifan town (Tula region), Khoper and Vorona river valleys near Borisoglebsk town (Voronezh region) and Savala river valley near Savalskiy settlement (Tambov region, Russia). On these key sites rivers have wide floodplains with big paleochannels on their surface, which were the main subject of our study. These paleochannels are the signs of high flood activity epoch(s).

Hand and mechanical coring, examination of natural exposures, topographic profiling were made in field; samples for ¹⁴C and OSL dating were taken. In laboratory radiocarbon (including AMS) and OSL dating was made, for some samples spore-pollen analysis also was made. ¹⁴C dates were calibrated (IntCal13) using the online version of OxCal 4.3 program.

Data analysis shows the following results and conclusions. River incision was detected about 30-35 ka BP. Before LGM rivers had already been incised down to the modern river levels or deeper. LGM time (20-23 ka BP) was characterized by cryoaridic conditions, low runoff and accumulation in the river valleys. After LGM the high runoff epoch started, which was dated 13-19 ka BP. In that time large meandering palaeochannels (macromeanders) and modern wide high floodplains were formed in the river valleys. Our data shows that this epoch of high runoff was interrupted by a short low runoff period (~15-16 ka BP). So the Late Pleistocene epoch of high floods and large paleochannels formation had two periods – about 17-19 ka BP and 13-15 ka BP. Runoff in Holocene was lower than in Late Pleistocene. So the morphology of river valleys and geochronology of sediments indicate contrasting runoff variations being the characteristic feature of the Valdai (Weichselian) cold stage.

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