

Late Pleistocene Palaeohydrology of the Moksha River (the Volga Basin)

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Introduction

- The relicts of large meandering palaeochannels are found in the river valleys of the East European Plain. Channel widths of macromeanders are few times larger than the recent meanders of the same rivers.
- Large 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.



Study area

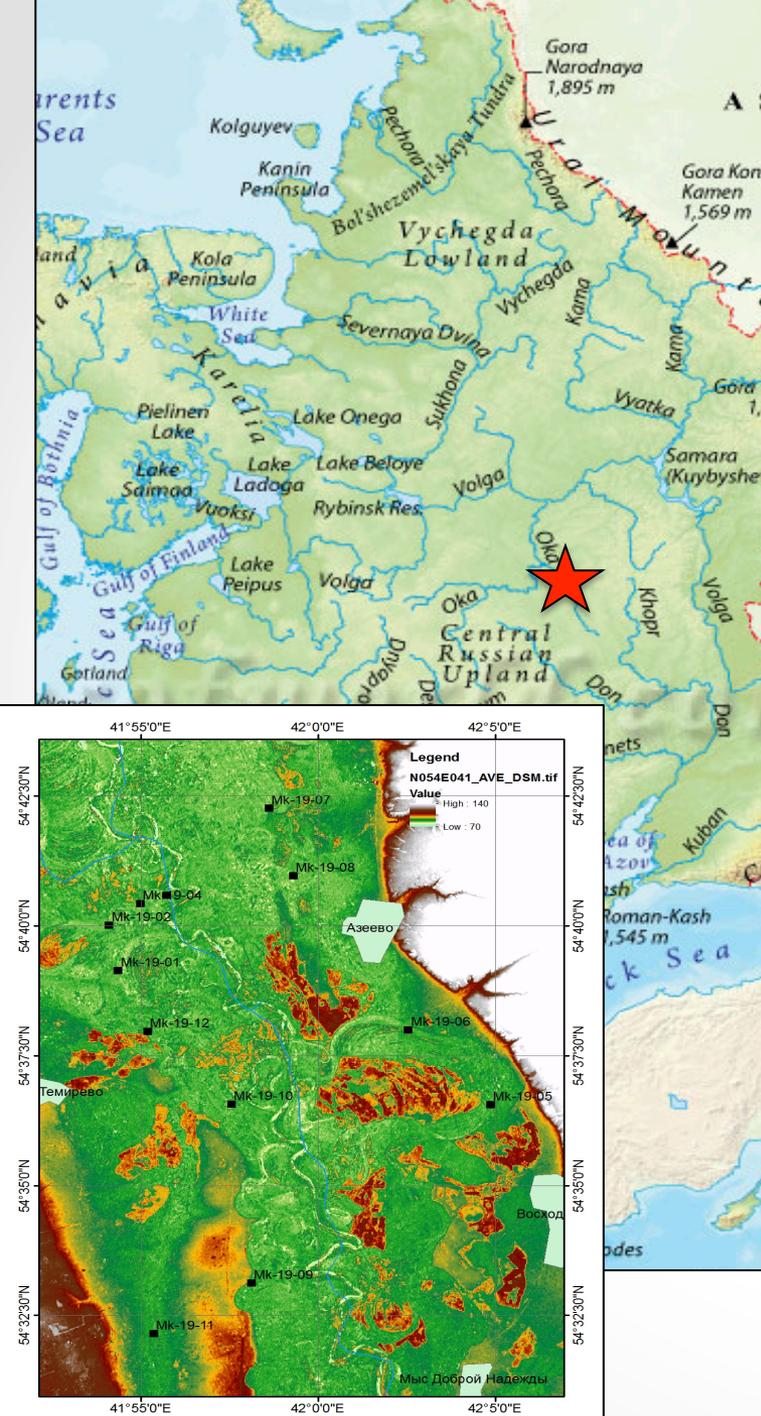
The Aim of the Study

- The main aim of this study is the reconstruction of palaeohydrology and history of the Moksha River valley development in Late Pleistocene.



Study Area

- The study area is characterized by a number of well-preserved paleochannels (macromeanders).
- **Key site in Moksha River valley:**
- The Moksha River valley was studied in its lower part.
- Wide floodplain (up to 6 m height) and two levels of terraces (9-11 m and 18-22 m height) are presented on the studied part of the valley.
- The width of the valley in this area is about 14-16 km, but sometimes it can reach 20-22 km and more.
- The width of the floodplain is about 12-14 km.



Methods

Field methods:

- mechanical coring;
- examination of exposures;
- sampling for different analysis: radiocarbon (mostly AMS), spore-pollen, grain-size;
- geomorphological mapping.

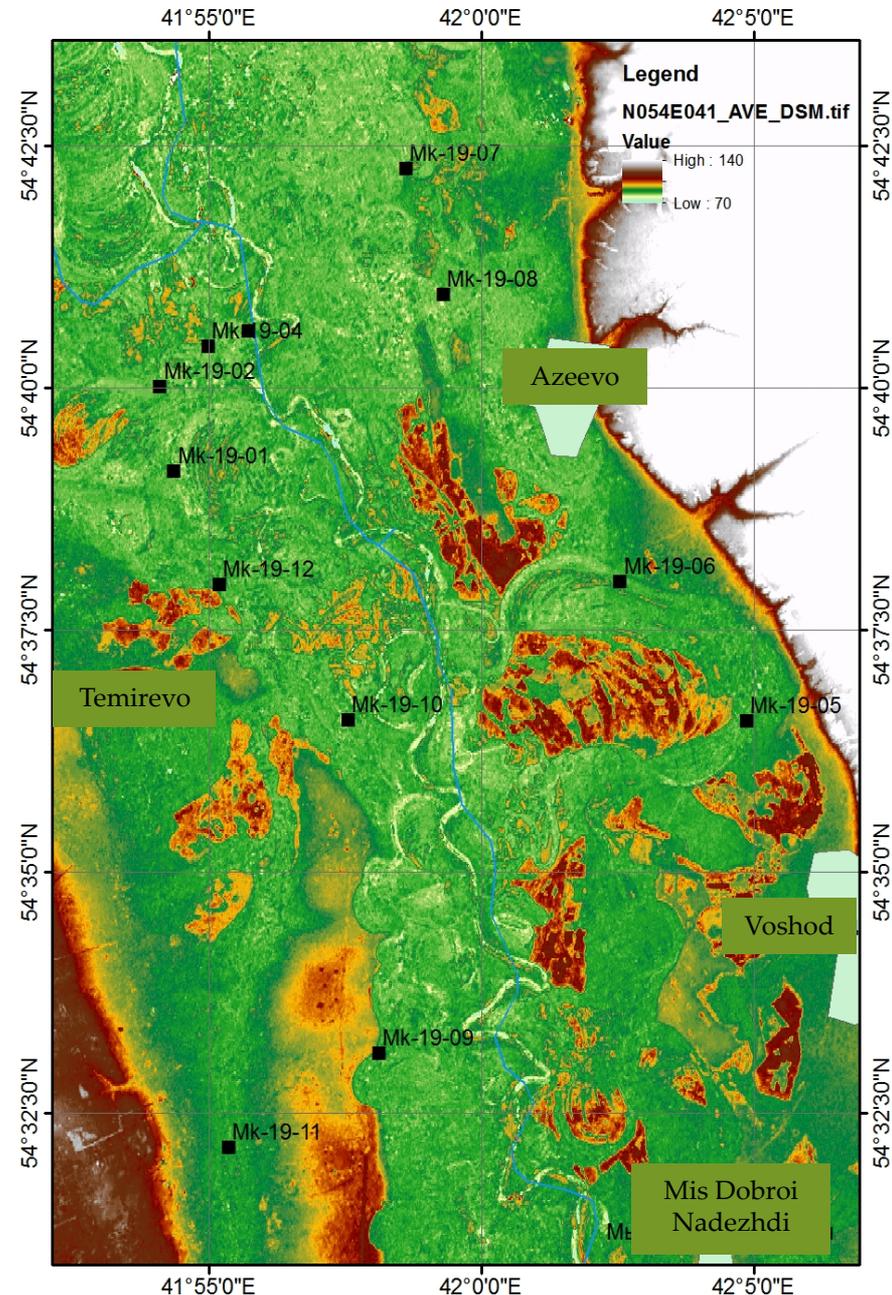
Laboratory methods:

- radiocarbon (AMS) dating;
- spore-pollen analysis;
- grain-size analysis.



Moksha River

- The Moksha River is a meandering channel.
- Large and small (modern-size) meandering palaeochannels spread widely on the floodplain surface.
- Small palaeochannels have the same parameters as the modern river channel: their width is about 100-150 m, wavelength is between 300-400 and 600-700 m.
- For the large palaeochannels (macromeanders) the mean parameters are the following: width is about 250-300 m, wavelength is about 1500-2000 m.
- These large palaeochannels are the signs of high flood activity epoch(s).

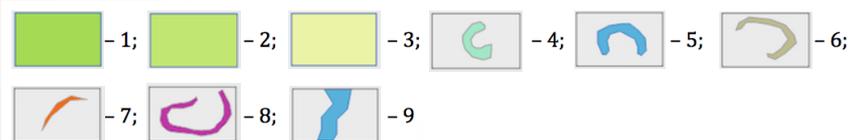


Results.

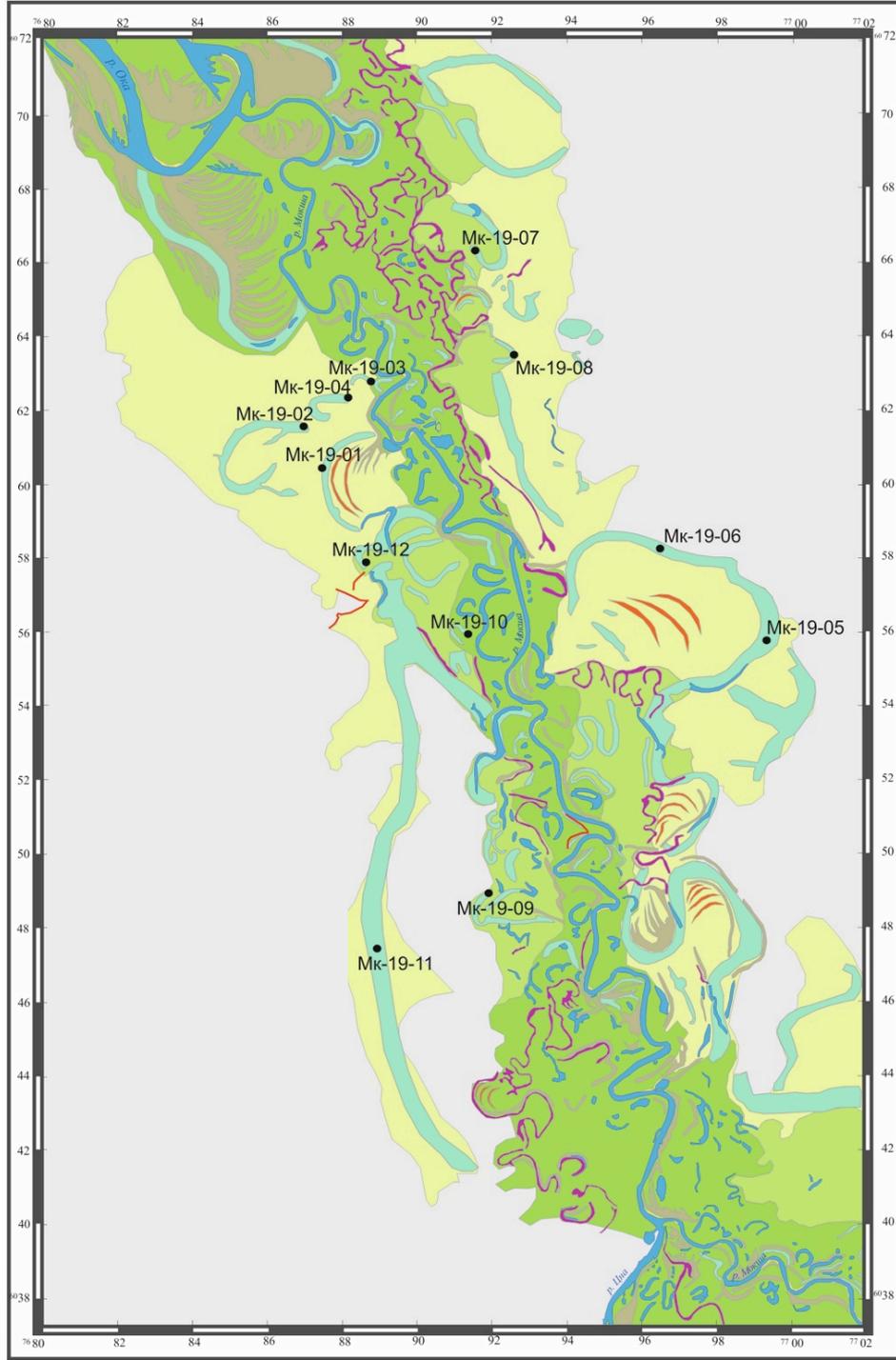
Moksha River Valley

*Geomorphological map of the floodplain
on the key site of the Moksha River Valley*

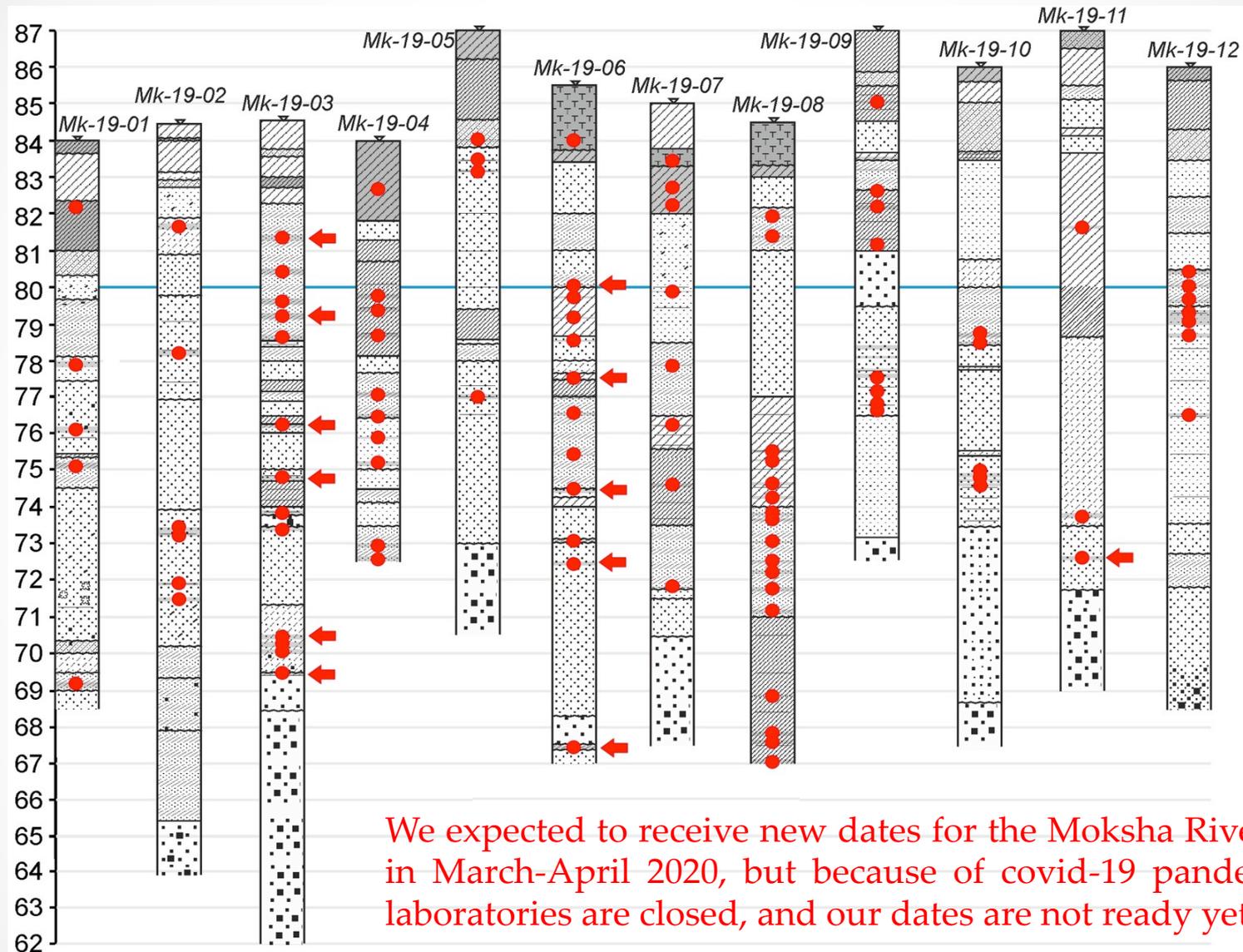
Symbols



1 – Late Holocene floodplain; 2 – Early Holocene floodplain; 3 – Late Pleistocene high floodplain; 4 – palaeochannels; 5 – oxbow lakes; 6 – levees; 7 – scroll bars; 8 – floodplain channels; 9 – modern river channel.



Results. Moksha River Valley



- Places of AMS-sampling (red dots).
- Red arrows show samples that are already in the laboratory.

Preliminary Results

- We studied both large and small palaeochannels to reconstruct palaeohydrology and history of the Moksha River valley development in Late Pleistocene.
- Large palaeochannels correspond to the time of high river runoff.
- The oldest ones of small palaeochannels were studied to know the time of lowering of the river runoff.
- We expected to receive new dates from the Moksha River valley in March-April 2020, but because of covid-19 pandemic the laboratories are closed, and our dates are not ready yet.
- Presumably, large palaeochannels were formed at the end of Late Glacial (after LGM) when river runoff was much higher than the modern one.
- This period of extremely high runoff was previously distinguished in many river valleys of East European Plain, where formation of large paleochannels is usually associated with Late Glacial (the end of MIS 2).
- Lowering of runoff on the central part of the East European Plain is usually associated with the beginning of the Holocene.

Thanks for your attention!



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