

Short communication

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Tver proglacial lake (Tver region, Russia): myth or reality

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ABSTRACT. In this study we aimed to find a Tver proglacial lake in the Upper Volga low land at the Late Valdai that it have been reconstructed by D.D. Kvasov. Our field studies did not verify previously reconstructed lake terraces at 135 – 140 and 120 – 125 m a.s.l., though at 140 m a.s.l. we found the Volga River terrace near Seslavie (Tver region, Russia). According to OSL data from this terrace, the Volga River has existed in the Upper Volga lowland ever since the LGM.

Keywords: proglacial lake, Volga River, river terrace, OSL-dating

1. Introduction

D.D. Kvasov (1975) reconstructed the Tver proglacial lake as part of the Upper Volga proglacial lake system. This proglacial lake occupied a vast depression from Yakshino village (located between Staritsa and Tver, Tver region, Russia) to Kaliazin (Yaroslavl region, Russia). Kvasov (1975) suggested that the Late Valdian ice sheet dammed the northward-flowing Volga River, which led to the formation of proglacial lakes in the Volga River basin, including the Tver proglacial lake. This lake's drainage channel was located in a valley near Pereslavl-Zalessky; the height of runoff threshold was 140 – 145 m a.s.l.

In the Volga River valley, N.E. Dik (1938) first described a terrace on 135 – 140 m a.s.l., and Kvasov (1975) later proposed that this terrace could be marks of the highest lake level stand. Kvasov also wrote that accumulation of lacustrine sediments in Tver proglacial lake was limited due to its shallow depth. Another river terrace was described by A.I. Spiridonov (1938) at 120 – 125 m a.s.l. Kvasov (1975) was attributed it to a lake terrace of a lower lake level stand. This lake was smaller and occupied only the Kimry-Kaliazin Volga area. The lake's drainage occurred through the present-day Volga River channel.

However, in recent years we were able to collect new data that to casts doubt on the existence of such large proglacial lakes in the Upper Volga Lowland in the Late Valdai (Utkina, 2017; 2020; Panin et al., 2020; 2022)

2. Materials and methods

Field studies were carried out in the Volga River valley near the Seslavie village (about 40 km

upstream from Tver), a few kilometers downstream from Yashkino village – the maximum distribution of the Tver proglacial lake. Outcrops and boreholes were made using the Pride Mount 80 mechanical corer; their location was predetermined by using information from Russian geological foundation's archives. In addition, field studies near Kablukovo (25 – 30 km downstream from Tver) on 132 – 136 m a.s.l. surface and in Novoselki (near Uglich, Yaroslavl region) on 120 m a.s.l. surface were also carried out. OSL dating of two samples was conducted in the Nordic Laboratory for Luminescence Dating at Risø, Denmark.

3. Results

The Volga River near Seslavie has a valley with an obvious terrace staircase (Fig. 1). The highest terrace is located at 139 – 141 m a.s.l., the same as the proglacial lake terrace position as suggested by Kvasov (1975). This terrace consists of medium sand with pronounced basal facies in the bottom. We interpret these sediments as alluvial deposits. OSL dating of two samples collected from sediments of this terrace report ages of 21.1 ± 1.2 ka (Risø-198632) and 20.4 ± 1.3 ka (Risø-198633). The Volga River valley near Seslavie in some cases has steep slope with a pronounced edge above the highest terrace. Possibly, that led Kvasov to thinking that the edge of this slope is the Tver proglacial lake shoreline.

The relief of the 132 – 136 m a.s.l. surface near Kablukovo (25 – 30 km downstream from Tver) is hilly. Our filed studies (Baranov, 2021) show that sediments that comprise this surface consist of brown-red and grey loam with pebbles. We interpret these deposits as glacial (till). Sometimes a thin layer of aeolian pale silt covered them. No lacustrine deposits of proglacial lake were found on this surface.

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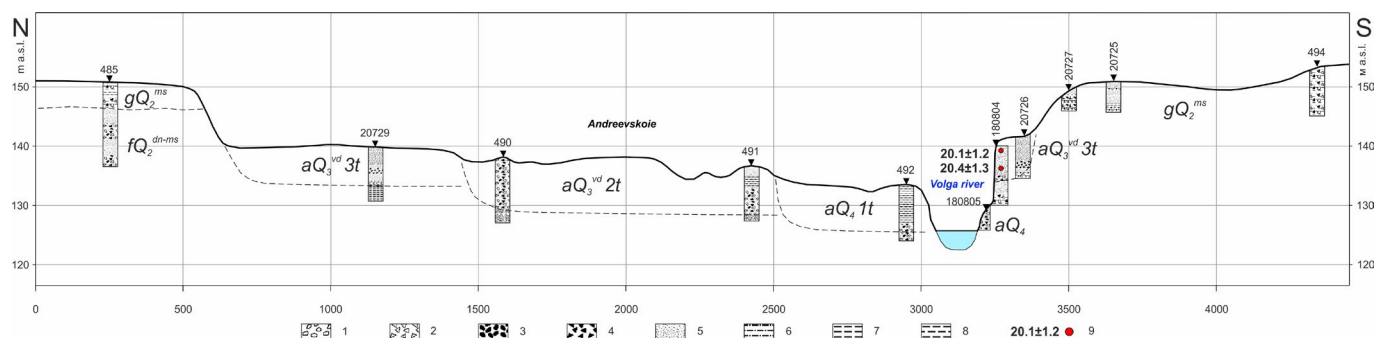


Fig.1. Cross section through the Volga River near Soslavie village.

Legend: 1 – pebbles, 2 – rubbles, 3 – gravel, 4 – gruss, 5 – sand, 6 – loamy sand, 7 – silt, 8 – loam, 9 – OSL data.

A hilly relief also characterizes the 120 m a.s.l. surface in Novoselki (near Uglich). It is comprised by pale silt with a thickness of 1 – 1.5 meters. Red-brown loam with gravel, pebbles and boulders (till) was found underlying these sediments.

4. Discussion and conclusions

We were unable to locate the high lake level terrace on 135 – 140 m a.s.l. in the Upper Volga lowland. Geological structure of boreholes and outcrops studied at this level tells us that these landforms are of different genesis. In Soslavie area, the studied landform was found to be a river terrace formed (as established by OSL) in the LGM. Near Kablukovo, we studied an interfluvial area of glacial plain without a trace of large proglacial lake existence. We can therefore conclude that the Volga River has drained the Upper Volga lowland since the LGM.

In case if the waters of Tver proglacial lake lower level stand (120 – 125 m a.s.l.) drained in the direction of the present-day Volga River, lacustrine deposits must be accumulated somewhere near Uglich. However, geological studies of hypothetical lake terrace located at 120 m a.s.l. in Novoselki found no trace of lacustrine deposits. Geomorphological data says that it is an interfluvial glacial surface.

Thus, based on our data we can establish that:

1. the Tver proglacial lake did not exist at levels of 140 – 145 m a.s.l. and 120 – 125 m a.s.l. in Upper Volga lowland;
2. the Volga River has drained the Upper Volga lowland since the LGM.

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Conflict of interest

Authors declare no conflict of interest.

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