



New data of catastrophic changes of hydrographic network of the Lake Ladoga' basin in the Late Glacial – Holocene: palaeoseismological origin

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According to modern concepts, the formation of the Vuoksa River, a third tributary of Lake Ladoga, is associated with the catastrophic water breakthrough of Lake Saimaa across the boundary ridge Salpausselkä-I of about 5700 years ago [Saarnisto, 1970]. It is known that on the background of intensive general uplift of the territory during the entire post-glacial period, including the Holocene, there were strong earthquakes on the territory of Fennoscandia (Mörner, 2003) and, in particular in Finland, adjacent to the Karelian Isthmus (Kuivamäki et al., 1998). A place with seismic deformations earlier discovered in the basin of the Vuoksa River (Nikonov et al., 2014). It was established that three seismic events happened here during the Holocene. This place of deformations is associated with activation of the ancient fault zone "Vuoksinsky", extending over several tens of kilometers from the Finnish border in SE direction in the form of several subparallel branches. It was suggested that earthquake was the reason of breakthrough of Saimaa Lake to the Vuoksa River valley because its riverbed inherits this activated fault zone. Strong seismic event was trigger that led to the violations of the integrity of the substrate (forming the gap) and/or to the overflow of the waters through the Salpausselkä -I barrier.

Looking for possible seismic deformations in the rock framed valleys of the Vuoksa River, and in loose sediments on its borders we have screened a part of the valley from the town of Imatra (the outflow of the Vuoksa River) till the town of Kamennogorsk on the length of about 50 km. Seismogenic deformations are widespread in the rocks in the upper reaches of the valley, on the site of the former thresholds on the Vuoksa River in the borders of city Imatra. They embrace: vertical longitudinal tear with displacement of the lateral wings to several tens cm; transverse cracks with the offset of adjacent blocks and with the fragmentation of bedrock. This set of deformations determines the shear ensemble caused by the postglacial seismic activity of an ancient fault zone. We studied the complex of terraces of the River Vuoksa, including levels with relative height of 15 m; 6-6,5 m, 3-3. 5 m. Results of our investigations will be oresented during the conference. There are definite signs of catastrophic water breakthrough of Lake Saimaa and the formation of the modern valley of the Vuoksa River as a result of strong seismic effects ca 5700 years ago. This event led to the transfer of the waters of Lake Saimaa to Lake Ladoga and caused the restructuring of the water regime of Lake Ladoga.

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