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Late Quaternary geomorphological evolution of Dwuhyurtochnoe lake, Kamchatka.

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Lacustrine deposits have been used increasingly during the recent time to discover paleoclimate changes at different regions. Beringia, as a bridge between Asia and North America is of special interest. However, paleolimnological research within the joint German-Russian project “KALMAR” is one of the first attempt to reconstruct climate fluctuations in Kamchatka based on lake records. Dwuhyurtochnoe lake was one of the targets of paleolimnological research. Geological studies at the lake surroundings were aimed to reconstruct the geomorphological evolution of the area as well as to discover non-climatic events, which could affect the lake paleoecosystem and distort the climate signals. Dwuhyurtochnoe lake is situated in central part Kamchatka peninsula at the eastern foot of Sredinny Ridge, 80 km WNW of Shiveluch, which is the northernmost active volcano on Kamchatka. The lake occupies a wide U-shaped river valley excavated by repetitive glacial advances during the Late Quaternary. LGM glaciers formed the end moraine situated 15 km downstream the present-day lake. A retreat of the LGM glaciers released steep slopes from the ice loading and triggered a large landslide that jammed the valley. Landslide deposits blocked subsequent glacial advance (probably about 15 kyr BP) resulting in the formation of a second end moraine in front of main landslide body. This moraine ridge dammed the valley and led to Dwuhyurtochnoe lake creation after a final deglaciation. Since then gradual evolution of lake ecosystem was interrupted several times by volcanic ash falls. Tephrochronological investigation revealed as much as 25 distinctive tephra layers of different composition and thickness included in the Holocene soil-pyroclastic sequences around the lake. Being well dated these ash layers can constitute a stratigraphical framework for

palaeolimnological research. However, ash deposition could also significantly affect the lake ecosystem and create short-term non-climatic signals at the paleorecord. But the most considerable event occurred here about 2.5 - 3 kyr BP. A whole-Kamchatka strengthening of volcanic and tectonic activity seems to be manifested at this area as well and provoked a big avalanching of SE scarp of lake valley. The landslide entered the lake and led to significant disturbance of the lake system. Series of smaller landslides followed the main event; the youngest of them occurred at ca. 2 kyr BP. All these events add complexity to the lake evolution trend via changing water salinity and transparency, biotic species diversity and abundance, etc. and it should take into account when reconstructing Holocene climate based on the lacustrine record.