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Seismic Stratigraphic Records evidence Past Ice-Sheet Dynamics in Northern Eurasian Lakes: Key Results from Lakes Ladoga and Levinson-Lessing

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Sedimentary processes occurring in Northern Eurasian Lakes have been documented in unprecedented detail during two seismic campaigns, in the framework of the Russian-German project PLOT - Paleolimnological Transect. The first seismic campaign took place on Lake Ladoga (NW Russia), where 1500 km of high-resolution, multichannel seismic reflection profiles were collected in 2013, unrevealing the preglacial and postglacial history of the lake. The nature of the material that composes the uppermost seismic units has been tied to information from sediment cores retrieved during the same expedition. Of particular interest are giant (kilometer-scale), single to composite, sedimentary mounds, whose internal architecture indicates a complex history of deformation that we relate to the past glacier dynamics in the lake. A strong reflector marks the top of the giant mounds and corresponds to an un/disconformity. Our age-depth model indicates a hiatus between this strong reflector and the overlying unit of ca. 65 ka. The second seismic campaign took place on Lake Levinson-Lessing (Taymyr Peninsula), in 2016. About 70 km of high-resolution, multichannel seismic reflection profiles were acquired, allowing us to capture the complete lacustrine sedimentary infill ($\sim$145 m) down to the basement and to unravel its tectonic history. The deepest seismic unit strongly contrasts with the well-stratified overlying units by its high-amplitude, chaotic facies, and has been interpreted as till/sand deposits, presumably a moraine. This is supported by south-oriented parallel structures recognized in the southern part of the lake, which can be regarded as push-moraines formed during the advance, readvance, and/or retreat of an ice sheet that had inundated the area. From interpretations of a core collected in 1996 (PG1228) and from the overall thickness of sediment overlying the unit, we suggest an Early Weichselian age for the formation of the unit. During the same expedition, seismic data were also gathered on Lake Taymyr (Taymyr Peninsula), but acoustic penetration was limited to 30 m due to gas blanking. Here, we present the key results of the seismic campaigns conducted in Lakes Ladoga and Levinson-Lessing, with respect to the glacial history of the lakes.