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Mass transport on the slope of Kukuy Griva of Lake Baikal: results of the TTR-Class@Baikal expeditions in 2014 and 2015

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A large submarine landslide area of Lake Baikal was studied in 2014 and 2015 during two recent expeditions of the Training-Through-Research Class@Baikal project onboard RV “G.Yu. Vereshchagin”. The sliding, discovered in 2009, affects the north-western slope of the so-called Kukuy Griva, an elevation situated within the underwater delta front of the Selenga river. Selenga is the largest river flowing to the Baikal Lake and the very high sedimentation rates occurring in this area result in broad mass transport processes along the slope.
In 2014 a number of sparker seismic lines were acquired and several gravity cores were collected in order to map the distribution of the individual slump bodies. Seismic imaging revealed the presence of two main sedimentary units within the uppermost 200 meters. These units are characterized by differently expressed bedding and by different degree of inner deformation. Three seismic-facies within the upper unit and two seismic-facies within the lower unit were described and interpreted in terms of genesis. This interpretation outlined two periods in the Quaternary history of mass transport processes on the Kukuy Griva slope.
Recent sliding events were observed particularly in the upper part of the slope. Typically these displaced bodies do not extend over large surfaces and are not characterized by significant inner deformations. In addition, to the north of Kukuy Griva a large well-expressed landslide head scarp was mapped. The buried landslides in the lower units are characterized by relatively large individual bodies comprising highly deformed sediments and covered with well-stratified non-deformed sediments. The different characteristics of the slide bodies that are confined in the upper and in the lower sedimentary units, likely result from variations in sedimentation rate and in the composition of the supplied sediment during the glacial periods. Eventual fluctuations in the lake water level can also explain these differences.
In 2015 the slope of Kukuy Griva and its foot were investigated using a chirp profiler. High resolution data of the uppermost 40 meters of the sedimentary section revealed a more detailed picture of the evolution of the slope. A group of gas-related acoustic anomalies, with semicircular shape in planar view, was also mapped. These are located at short distance from the foot of Kukuy Griva nearly downhill from the large head scarp. We suggest that displaced material act as local seal allowing occasional gas seepage only on the outskirts and therefore increasing gas saturation of the deposits around buried slump body.