



Changes of clay mineral assemblages in Lake Hovsgol (Mongolia) in the course of their transportation and sedimentation

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As known, clay minerals of lake sediments sensitively indicate climatic and environmental changes. Composition of clay mineral assemblages depends on petrography and weathering pattern of parental rocks in lake catchments. Lake Hovsgol, the second large basin in the Baikal Rift Zone, differs from the first one by extremely small drainage area: its ratio to the lake surface is 1.8 (compare with 17 of Lake Baikal). This peculiarity of lake Hovsgol defines the amount of clay minerals deposited in bottom sediments and the value of their transformation in the course of transportation

We studied a number of short sediment cores (up to 1.75 m long) obtained from different parts of the lake in the framework of the Hovsgol Drilling Project, 2001-2007. Regularities of modern clay minerals transportation were studied in 80 samples from river mouths and piedmont slopes around the lake. Their mineral composition was determined by X-ray powder diffraction and IR-spectroscopy. For X-ray, we prepared the oriented mounts by transferring the suspension of bulk sample in distilled water onto a glass slide. Slides, dried at room temperature, then were solvated for about 24 hours with ethylene-glycol vapor in an evacuated desiccator. Measurements were conducted on an automated powder diffractometer with CuK radiation, graphite monochromator.

The comparative analysis of clay minerals and their crystallochemical parameters were performed by the original method of modeling X-ray diffraction profiles, based on the calculation of the interference function of the one-dimensional disordered crystals with finite thickness and using a specially developed optimization procedure. Quantitative estimations of the composition of minerals such as quartz, plagioclase, carbonate were made by IR-spectroscopy. Samples were prepared using the KBr pellet method.

It was established that the mineral association in bottom sediments includes illite, smectite, chlorite, chlorite-smectite, muscovite, kaolinite and quartz, feldspar, amphibole, carbonates. Except these minerals which were also identified in the samples collected in drainage basin partly weathered biotite was observed. The total amounts of minerals in some drainage basin samples are higher than in bottom sediment. The quantitative distribution of clay mineral on the bottom depends on the type of parental rocks and their location in drainage basin. For instance, on the eastern shore of the lake where granites and basalt prevail feldspar weathers to smectite and we can observe that in the cores located near this shore more smectite is found than in the cores near the western side where carbonate rocks are widespread.

The studying of drainage basin rocks and products of their weathering allows us to understand the clay mineral formation and their alteration during the process of transportation and deposition in lake bottom sediments. The comparison of clay minerals from watershed with these of bottom sediments helps us to evaluate the role of authogenic and diagenetic formation. The work was supported by RFBR, project 08-05-00680.