

## Hydrocarbon gases in Baikal bottom sediments: preliminary results of the Second international Class@Baikal cruise

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In July 2015 the research cruise in the waters of Lake Baikal was carried out onboard RV “G.Yu. Vereshchagin”. The expedition was organized by Lomonosov Moscow State University and Limnological Institute of Russian Academy of Sciences. The main purpose of the expedition was to study the modern sedimentation and natural geological processes on the bottom of Lake Baikal. One of the tasks of the cruise was to conduct gas-geochemical survey of bottom sediments. The samples of hydrocarbon gases were collected during the cruise. Subsequent study of the composition and origin of the sampled gas was carried out in the laboratories of Moscow State University. 708 samples from 61 bottom sampling stations were studied.

Analyzed samples are from seven different areas located in the southern and central depressions of the lake: (1) “Goloustnoe” seepage area; (2) Bolshoy mud volcano; (3) Elovskiy Area; (4) “Krasny Yar” Seep; (5) “St. Petersburg” Seep; (6) Khura deep-water depositional system; and (7) Kukuy Griva (Ridge) area. The results of molecular composition analysis indicate that hydrocarbon gases in bottom sediments from almost all sampling stations are represented mostly by pure methane. Ethane was detected only in some places within “Krasny Yar”, “Goloustnoe” and “St. Petersburg” seepage areas. The highest concentrations of methane were registered in the sediments from the “Krasny Yar” area - 14 457  $\mu\text{l/l}$  (station TTR-BL15-146G) - and from the “St. Petersburg” area - 13 684  $\mu\text{l/l}$  (station TTR-BL15-125G). The sediments with high concentrations of gases were sampled from active fluid discharge areas, which also can be well distinguished on the seismic profiles. Gas hydrates were obtained in the areas of “Krasny Yar”, “Goloustnoe”, and “St. Petersburg” seeps and in the area of the Bolshoy mud volcano. Isotopic composition  $\delta^{13}\text{C}$  was studied for 100 samples of hydrocarbon gases collected in areas with high methane concentration in bottom sediments. The average value is  $-53\text{‰}$ .

Overall bottom sediments of the Baikal Lake are very saturated in biogenic shallow methane. However, some evidences of thermogenic methane contribution can be recorded in the areas of focused fluid flows from deeper strata (e.g. mud volcanoes, seepage sites, etc.). Scrupulous examination of gas composition data results in understanding of scope of activity of individual structure and rough estimation of thermogenic gas flow input.