

GC31B-0460 Isotopic Content of Ground Ice in the Lower Kolyma River Valley (Eastern Siberia)

Back to: [Session: Environmental, Socioeconomic, ...](#)

Wednesday, December 17, 2014 08:00 AM - 12:20 PM
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The report deals with the results of isotopic investigations in ground ice of Quaternary sediments in the Lower Kolyma River Lowland. The field works were undertaken in 2012 and 2013. Analyses of oxygen ($\delta^{18}\text{O}$) and hydrogen (δD) stable isotopes were obtained using the Picarro Isotopic Liquid Water Analyzer (Biogeosciences group, ETH-Zurich, Switzerland). The ground ice samples were collected both from four boreholes (BH) drilled on the right limit of the Kolyma River valley and from one section (S) in the Duvanny Yar exposure.

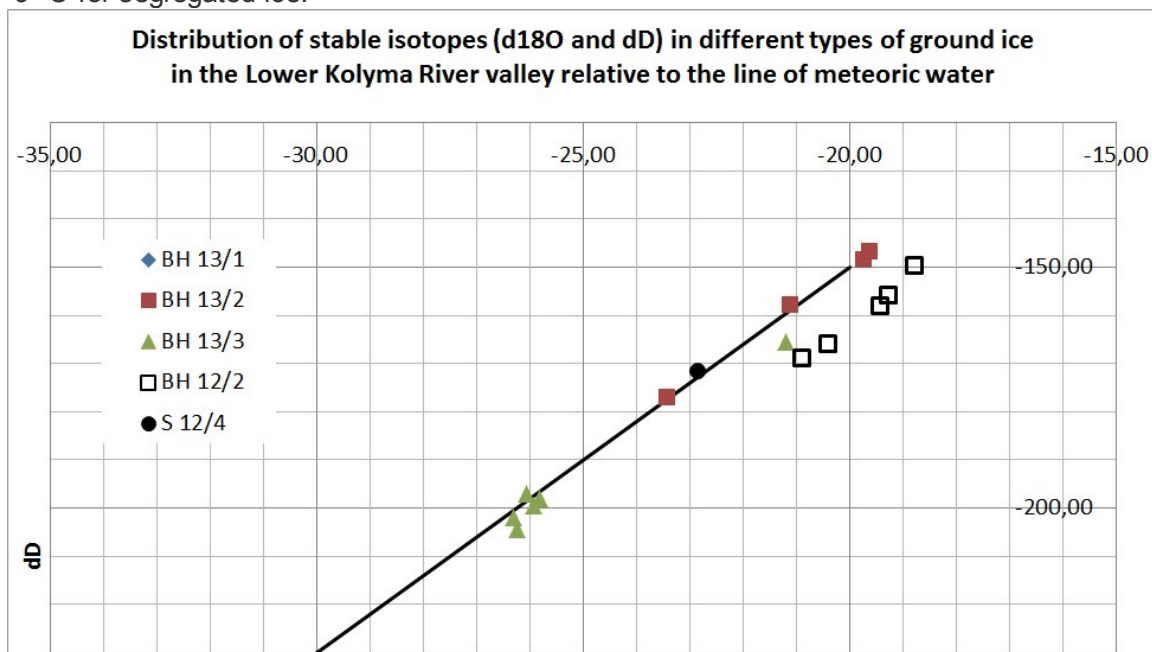
Late Pleistocene wedge ice (Ice complex) was recovered by the BH13/1 located on a yedoma relics towering over the low thermokarst plain (N68°30.7' E161°29.6') and S12/4 in the Duvanny Yar exposure (N68°37.8' E159°08.6'). Isotopes $\delta^{18}\text{O}$ and δD range from -31.413 to -34.05 and from -244.934 to -260.57, correspondingly.

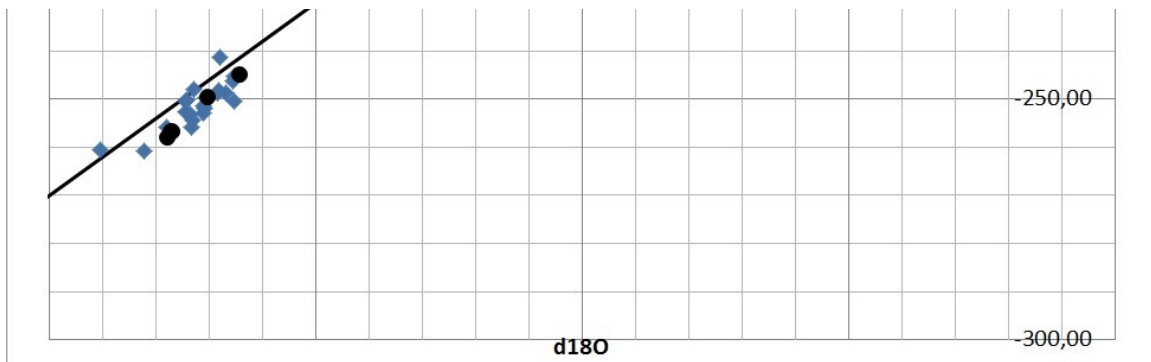
Modern wedge ice was recovered by the BH13/3 located on the joint Kolyma and Panteleikha Rivers floodplain underlain by river-bed sediments (N68°36.8', E161°21'). Isotopes range from -25.83 to -26.32 ($\delta^{18}\text{O}$) and from -197.09 to -204.47 (δD).

Oblique segregated ice layers adjacent to a modern ice wedge were recovered by the BH12/2 on the annually flooded thermokarst plain (N68°30.8' E161°30'). Isotopes range from -18.778 to -20.897 ($\delta^{18}\text{O}$) and from -149.883 to -168.901 (δD). The δD contents are the lowest here, resulting possibly from mixed (ice wedging and segregation) mechanism of ice lenses formation.

Segregated ice was recovered by the BH13/2 on the Schuch'e lake alas (N68°44.77', E161°23.3') and S12/4 in the transition layer of the Duvanny Yar. Isotopes range from -19.63 to -23.43 ($\delta^{18}\text{O}$) and from -146.77 to -177.23 (δD).

Preliminary results are as follows: 1) all samples are distributed near the line of meteoric water providing evidence for atmospheric origin of ground ice in the region; 2) isotope distribution exhibits a clear distinction between Late Pleistocene wedge ice, modern wedge ice, segregated ice adjacent to a modern ice wedge, and segregated ice; 3) the excess shows evidence of far remoteness of the region from the sources of atmospheric moisture; 4) mean annual air temperatures reconstructed by $\delta^{18}\text{O}$ constitute, on average, ca. -26°C for the Late Pleistocene wedge ice, -10°C for modern wedge ice, and, with certain reservation, -9°C for segregated ice.





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