The first data about the concentrations REEs in waters from weathering zone of Berezitovoe gold deposit (Priamurye, Russia)

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The Beresitovy gold deposit located in the northeastern Amur gold province in the downstream basin of the Khaikta River. In 2007, two mining companies: Berezitovy Mine Ltd. and High River Gold Mines Ltd., started to mine this deposit. Geologically, the deposit is localized in a southeast part of the North Asian craton, in a zone of its joint with formations of northern frame Tukuringra-Dzhagdinsky terrein Mongolo-Ohotsky zone. Two formations of sediments (granites and ore–metasomatic rocks) occur in the deposit. Main minerals bearing REEs are allanit, monatsit - (Ce), chervandonit - (Ce).

In this study we present the preliminarily results of investigation the content and distribution of REEs in the bedrock and water from weathering zone of deposit. Our data indicate that the content of REEs in bedrock of Berezitovoe deposit can reach up to 230 ppm and the content of LREEs is at about 90% of total REEs. All types of bedrock display of strong negative Eu amonalies.

The surface water of area is enriched in total REEs (1, 4 ppm), although the content of LREEs is higher in 8-10 times then HREEs. Drainage water is yellow, dark -yellow color with TDS up to 10 g/l and pH varies from 3, 0 to 4, 5. This water belongs to Mg-K-SO_4 type and content a huge amount of REEs (up to 16, 1 ppm). The concentration LREEs is higher then HREEs as well. It is established that drainage water is a selective accumulation of middle REEs.

Comparison of REEs content in bedrocks, ore and surface water is appeared the similarity of their profiles.

Speleothem record of permafrost in Siberia and aridity in Mongolia during the last 450 kyr

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We have used speleothems from six caves along a north-south transect in Eastern Siberia and the Mongolian Gobi Desert (60°22′N - 42°50′N) to track the evolution of permafrost and desert aridity. The studied caves are located in various climate zones: from the southern boundary of continuous permafrost, through the discontinuous/island permafrost, to the dry Gobi Desert.

More than 90 horizons of 22 speleothems were dated by U-Th method. The youngest speleothem age in the northernmost cave was 404 ± 32 kyr, corresponding to interglacial Marine Isotopic Stage (MIS) 11, while eleven other horizons in six speleothems from this cave were older than the ~500 kyr U-Th dating limit. These results suggest that MIS-11 in Eastern Siberia was warmer than today, causing brief permafrost degradation at 60°N, followed by re-establishment and continuous permafrost since then. Between 56°N and 52°N speleothem ages clustered into the warmest intervals of interglacial MIS-11, 9, 7, 5 and 1, showing intermittent melting of the permafrost. This data provides constraints on glacial-interglacial migrations of the southern boundary of continuous permafrost in Eastern Siberia during the last 450 kyr. No speleothem deposition younger than 500 kyr was found in the Gobi Desert, showing that arid conditions prevailed during this entire period.

The year-round monitoring of $\delta^{18}O$ and δD values of cave water and atmospheric precipitation in the city of Irkutsk and nearby cave shows that $\delta^{18}O$ and δD values of rain and snow are in direct relationship with temperature throughout the year, and $\delta^{18}O$ and δD values of the cave water reflect the weighted annual average of precipitation. Ongoing work is making use of these observations to create stable isotope records of the Siberian speleothems.