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Mineralogy and metallogeny of the North-Western Altai

PROGRAM
of field trip

18 – 23 June 2016

GENERAL INFORMATION

The North-Western Altai is a famous ore-bearing region in which a number of different types of mineralization have occurred. Because of its ore potential and significance, this part of Altai is known as Rudny Altai ("Ore Altai"). Since 1745 polymetallic, copper and gold ores have been mined from the deposits of this area.

The field excursion includes visits to the copper-polymetallic and gold mines, as well as to pegmatite veins with rare metal mineralization. During the trip we will also visit the Museum of Mining History in Zmeinogorsk, Stone-Carving Factory and the Museum of History of Stone-Carving Skill in Kolyvan.

The field trip area is unique due to diversity of topography and natural zones. The western part is steppe whereas the eastern part is mountainous, consisting of spurs of Kolyvanskiy Ridge known as Mountain Kolyvan. During excursion to Kolyvan deposit we will fully enjoy views of the Mountain Kolyvan. We also visit spectacular Kolyvanskoe Lake, where granite cliffs of fantastic shapes are scattered on the shores.

Expected weather conditions: Sunny and hot during the day (up to 30 ºC). There is a chance of rain. The nights are quite cool (10-15 ºC).

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Date: Saturday 18 June - Thursday 23 June 2016

Cost: 15000 RUB, including accommodation, transportation, meals, notebook, field guidebook in English. Tickets for the museums are also included. The final cost may be changed depending on the number of participants.

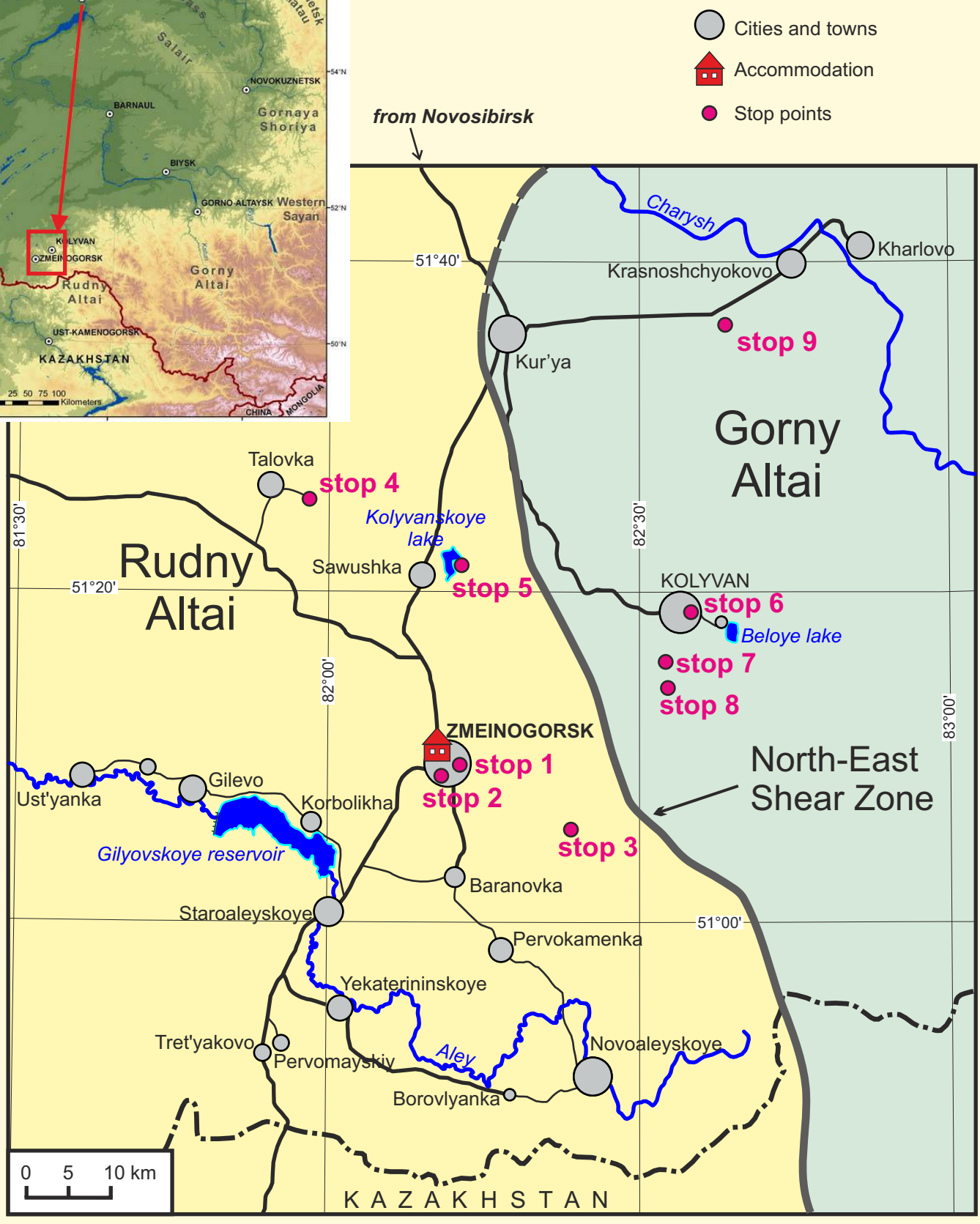
Accommodation: Hotel in Zmeinogorsk, double rooms.

Max./Min. number of participants: 25/15


Azurite, Stepnoye deposit


Mining pits at the Kolyvan deposit

STOP POINTS OF FIELD EXCURSION



PRELIMINARY PROGRAM

1st day (Saturday 18 June):
Departure from Novosibirsk (~ 8 00 a.m.), arrival to Zmeinogorsk (~ 18 00 a.m.). Check into the hotel.

2nd day (Sunday 19 June):
Stop 1. The Museum of The History of The Mining Industry named after Akinfiy Demidov in Zmeinogorsk.

In 1726 Akinfiy Demidov, the Uralian manufacturer, got the permission of Russian crown to mine ores and build factories in the Altai and after that the first copper-smelting plant in the region was put into operation. The museum counts about 17 thousand exhibits which reflect the history and development of the mining industry in the Altai. The museum is situated in the building which is unique by itself because it is an object of cultural heritage.

Stop 2. Zmeinogorskoe deposit (Au-Ag-Cu-Pb-Zn).

The deposit is composed of volcano-sedimentary rocks. The formation of major gold-silver-barite-polymetallic ore is related to the deposition on the floor of sea basin. At the same time the vein and stockwork ores are fragments of mineralization occured along feeding channels of the hydrothermal system. Over the 18-19th centuries the Zmeinogorskoe gold-silver-barite-polymetallic deposit was fully worked out to a depth of 200 m.

Stop 3. Lazurskoye deposit (Au-Ag-Cu-Pb-Zn).

This deposit is of the same type as the Zmeinogorskoe deposit. Only subsurface ores of oxidation zone was mined in the deposit until 1874. We will observe oxidized ores with beautiful azurite and malachite crystalline aggregates.

3rd day (Monday 20 June):
Stop 4. Stepnoye deposit (Zn-Cu-Pb-Ag).

The deposit has a complex genesis in which the major ore shoots formed in a similar manner as the other stratiform massive sulfide deposits associated with volcanic processes. However, these formations were hydrothermally reworked in fault zones. Polymetallic ores include impregnated (54 %), streaky (32 %), and massive (14 %) varieties. Primary sulfide copper-lead-zinc ores prevail. The main primary ore minerals are sphalerite, pyrite, galena, chalcopyrite. The main minerals in oxidized ores are azurite, malachite, and cerussite; minor minerals are chalcocite, plumbojarosite, covellite, cuprite, and anglesite.

Stop 5. Granite pegmatites of the Savvushinskoe field, Ortitovaya vein, the north coast of Kolyvanskoe Lake.

Granite pegmatites of the Savvushinskoe field are represented by a series of sublatitudinal small veins occurring in the vicinity of Kolyvanskoe Lake . Among them the largest and the most interesting is the Ortitovaya vein. The vein is exposed in a small open pit at the northern shore of the lake and represents a sub-lateral tabular body having about 5 m thick in a bulge. The pegmatite is largely composed of coarse- to giant-grained quartz-plagioclase-K-feldspar pegmatite with a block structure. In the east wall of the pit the large crystals of orthite and titanite are clearly seen.

Large crystal of orthite surrounded by titanite crystals in granite pegmatite, Ortitovaya vein

Malachite pseudomorphs after azurite, Stepnoye deposit

PRELIMINARY PROGRAM

4st day (Tuesday 21 June):

Stop 6. Kolyvan Stone-Carving Factory and The Museum of History of Stone-Carving Skill of Altai.

The traditions of stone-carving skill in the Altai can be traced to the late 18th-early 19th centuries. Most part of the articles of the Kolyvan grinding works are kept in the depositories of the Hermitage and in other Russion museums. The largest vase, known as "Queen of Vases" and made of jasper is now displayed in the Hermitage. The museum in the Altai was founded in 1989 and has interesting collections of semi precious stones found in the vicinity, wonderful articles made by the masters of the 19th century, items which reflect the history and development of the stone-carving works. There is a possibility to buy stony souvenirs.

Stop 7. Kolyvan deposit (W-Cu-Bi). Neighborhood of deserted Kolyvanstroi village.

The deposit known as a copper deposit since 1721-1723, was mined in 1936-1960 as tungsten with copper and bismuth deposit. This deposit refers to pneumatolytic-hydrothermal-plutonogenic type of the quartz-vein formation. It occurs in a thick (150-300 m) submeridional vertically dipping dyke-like body of aplite-like granites intruding granodiorites of the Ust'-Belovo complex and cutting-off in its southern part by the porphyric granites of the Sinyushinsky complex. The main ore mineral is wolframite; gangue quartz also contains arsenopyrite, pyrite, scheelite, chalcopyrite, bismuthite, molybdenite, and Bi sulphosalts. Oxidation zone, descending up to 25-30 m in depth, contains tungstite, hematite, limonite, covellite, chalcocite, cuprite, malachite, and azurite.

Stop 8. MokhovoeLake.

An amazingly beautiful lake in a pine forest on the Mountain Sinyukha NW hillside.

5st day (Wednesday 22 June):

Stop 9. Murzinskoe deposit (Au).

The deposits is located at the contact of small stock-like granodiorite body of the Ust'-Belaya gabbrodiorite complex and the calcareous sandstone of the Murzinka Formation. Gold mineralization at the deposits was early ascribed to gold-skarn type. But recent data have shown that only a minor part of the deposit ore – scarce postskarn sulfide mineralization (chalcopyrite, pyrite, bornite, and sphalerite) spatially associated with a skarn-magnetite bodies – can be referred to this type. Most of commercial ores occur in mineralized crushing zones. They form gold-sulfide mineralization in quartz and quartz-carbonate veins and near veins metasomatites in a 300-400 m thick and 3 km long zone. The crust of weathering is widespread and contains hypergen copper minerals (malachite, chrysocolla, azurite, chalcocite, and coveline).

6st day (Thursday 23 June):

Departure from Zmeinogorsk (~ 8 00 a.m.), arrival to Novosibirsk (~ 18 00 a.m.).

****The final program may be changed depending on weather conditions. Photos provided by Sergey Smirnov.***

Kolyvan W-Cu-Bi deposit

Open pit at Murzinskoe gold deposit