



Russian Academy of Sciences  
Institute of Forest Science



## MIRE ECOSYSTEMS OF NORTHEAST EUROPE INTERNATIONAL FIELD SYMPOSIUM

# EXCURSION TO THE SUBPOLAR URAL

22-27 July, 2017



## DRAFT PROGRAMME OF THE EXCURSION

**July 22:** Meeting the participants at the Inta Railway Station, city tour, car trip to the Yugyd-va National park to Zhelannoye Tourist Facility, visit to monitoring plot on a palsa mire in Inta Administrative District, dinner at tourist facility at the Kozhym River;

**July 23:** Zhelannoye Tourist Facility, introductory excursion to a slope mire near Yerkusey Mountain (before lunch), visit to canyon at the foot of Barkova Mountain or Lake Bolshoye Balbanty (after lunch);

**July 24:** Zhelannoye Tourist Facility, excursion to montanepalsa mires, visit to canyon;

**July 25:** Zhelannoye Tourist Facility, visit to quartz mine gallery, ascend to Barkova Mountain, visit to high-montane mires and introduction to alpine flora (or visit to Grubependity cirque lake);

**July 26:** departure from Zhelannoye Tourist Facility, visit to Sanavozh Tourist Facility, arrival in Inta, departure of the participants to Syktyvkar (by train to Mikun Station and by bus from Mikun Station to Syktyvkar);

**July 27:** Arrival in Syktyvkar.

*The field programme may be changed depending on weather conditions.*

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## THE TOWN OF INTA

Inta is a town in the northeast of Komi Republic, Russian Federation. It is situated in forested tundra at foothills of the Ural Mountains, 50 km south from the Arctic Circle, at the left bank of the Bolshaya Inta River (Pechora Basin), 12 km from a railway station, 665 km northeast from Syktyvkar, 1654 km from Moscow. Principal occupation is coal mining. As of January 1, 2016, population of the town was about 27 000 people.

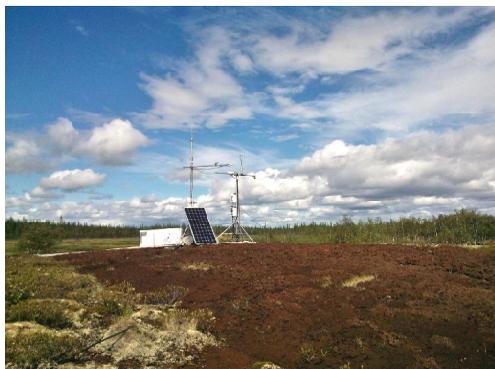
Inta was founded in 1932 at a large thermal coal deposit (part of the Pechora coal basin) that was discovered early in the 20<sup>th</sup> century by Ivan Sorvachev under support from Piotr Mataftin, active member of the Russian Geographic Society. The Inta coal deposit was actively exploited since 1940. Back then, the settlement of Inta was founded as a base of mine design expeditions. It became an industrial township in 1944 and a town in 1954.



## LARGE-MOUND PALSA MIRE.MONITORING PLOT

The mire is located in the Kulitsanyur site (65°54'10" N, 60°26'40" E) at foothills of the Ural Mountains, at the watershed of the rivers Chernaya and BolshayaInta. Vegetation of the mire has a complex character. Mounds are 1 to 3 meters high, with permafrost depth of 0.5 to 0.7 meters. Mound tops are occupied by dwarf shrub and lichen communities, with bare peat patches covering 20% of the area. Slopes of the mounds are dominated by communities with *Betula nana*, *Rubus chamaemorus*, sphagna and green mosses. The peat layer consists of dwarf shrubs and moss remains of variable decomposition degree. Cottongrass-sphagnum and sedge-sphagnum communities predominate in hollows. The peat layer is built of raised-bog sphagnum peat (0.5 m deep), while underlying layers are sedge-cottongrass peat.

Thanks to its position at the southern border of the cryolithic zone, the Kulitsanyur large-mound palsa mire complex plays a special part in studies of carbon-bearing greenhouse gas fluxes.



Methane and carbon dioxide flow rates at the mire have been monitored since 2014. To do so, permanent plots and wooden boardwalks were established there. Main monitoring methods are the chamber method and eddy covariance method. The plots are equipped with automatic meteorological stations to measure permafrost temperature. Thermal gages were installed in wells at various depth (max 10 m). Comprehensive studies enable researchers to assess ecosystem CO<sub>2</sub> and CH<sub>4</sub> balance, temperature regimes of peat soils in palsa mires and their contribution to carbon sequestration in permafrost ecosystems.

## SETTLEMENT OF MINE WORKERS AND ZHELANNOYE DEPOSIT

The Zhelannoye Tourist Facility is managed by the Kozhym Exploration and Mining Enterprise that quarries quartz and rock crystal. The facility is located in the very heart of the Subpolar Ural – 130 km from Inta, on Lake B. Balbanty (650 m a.s.l.), at the foothills of Barkova Mountain, between the Travyanisty and Kamenisty mountain streams. The Zhelannoye quartz deposit is included with the Subpolar Uralian Crystal-bearing Quartz Vein Province and has Russia's greatest resources of transparent gangue quartz and mountain crystal qualified for quartz glass melting, single crystal synthesis, and silicon production. Findings of some phosphate minerals are known there as well. The deposit is located in permafrost zone, which means temperature in quartz mining galleries varies only slightly, between +3 and -10 degrees.



## BARKOVA MOUNTAIN. INTRODUCTION TO HIGH MONTANE FLORA AND VEGETATION

Rising to 1321 m a.s.l., Barkova Mountain is located southeast from the Maldynyrd Ridge. Its name refers to Aleksander Barkov (1873-1953), a Soviet physico-geographer, active member of the RSFSR Academy of Pedagogical Sciences.

The plateau at Barkova Mountain commands spectacular views of the Maldynyrd and Sanaiz ridges, peaks Karpinskogo and Narodnaya (highest point of the Urals), the Balbanyu River valley, and lakes Maloye Balbanty and Bolshoye Balbanty.

Two vegetation belts can be observed on Barkova Mountain: alpine tundra and bald mountains. The alpine tundra belt rises up mountain slopes to altitudes of 800-1000 m a.s.l. Polygonal dwarf shrub tundra, moss-lichen tundra, and lichen tundra habitats have developed there in the least favorable ecological conditions – on the plateau and upland terraces. Raised topographic features on slopes are occupied by patchy dwarf shrub – moss tundra habitats that, affected by grazing pressure, have given way to tundra meadows.

The bald mountain belt is situated above 800-1000 m a.s.l. and has a patchy vegetation cover. Small-area montane tundra phytocenoses have developed there on upland plateaus. Sedge-moss fen tundra habitats with *Carex arctisibirica*, mosses of *Polytrichum* and *Sphagnum* genera, willow-moss communities, and nival meadows are common in waterlogged locations. Well-drained habitats are occupied by grass-lichen, dwarf-shrub – lichen, and lichen polygonal tundra. *Acomastylis glacialis*, which is a protected species in Komi Republic, has a considerable proportion in the grass-lichen tundra vegetation cover on Barkova Mountain top (the bald mountain belt); 15 other plant species listed in the Red Data Book of the Komi Republic are present there. Stone fields cover most part of the top level. The stones are covered with crustose mosses and lichens.



## MONTANE PALSIA MIRE

The mire is situated 6.5 km south from the Zhelannoye Tourist Facility, at the foothills of Starik-Iz Mountain (685 m a.s.l.). The mire complex consists of scattered, flat-top, one-meter high (or less) frost mounds covered with dwarf-shrub – cloudberry – lichen small-hummock communities surrounded by sedge-sphagnum and sedge-moss fens. Mounds are overgrown with typical mire plant species: *Andromeda polifolia*, *Betula nana*, *Empetrum hermaphroditum*, *Eriophorum vaginatum*, *Ledum palustre*, *Oxycoccus microcarpus*, *Rubus chamaemorus*, *Vaccinium uliginosum*. In addition to mosses (*Sphagnum fuscum*, *S. russowii*, *Polytrichum strictum*), the soil cover is dominated by lichens (*Cladonia arbuscula*, *C. rangiferina*, *C. gracilis*, *C. cuculata*, *Flavocetraria nivalis*, *F. cuculata*, *Peltigera scabrosa* and others). Fen phytocenoses are dominated by sedges (*Carexa aquatilis*, *C. rariflora*, *C. rotundata*) and sphagna mosses (*S. riparium* and *S. lindbergii*). *Salix lapponum*, *Eriophorum russeolum*, *Comarum palustre*, *Epilobium palustre*, *Carex cinerea*, *Calamagrostis lapponum*, *Paludella squarrosa* are typical in the hollows. The soil cover is represented by dry-peat permafrost soils in mounds and oligotrophic peat soils in hollows. The permafrost is found at the depths of 45-50 cm (mounds).



## LAKE GRUBEPENDITY

Lake Grubependity (Grube-Pendi-Ty or Grube-Pendity) is situated 2.5 km from the Zhelannoye Tourist Facility – on the Maldynyrd Ridge at the left bank of the Balbanyu River, at the height of 863.9 m). The lake is found in a deep cirque and has a glacial origin. It is fed with snowfield and snow waters. Despite its small area (300\*600 m), the lake is several tens of meters deep. Its water is very clear, with a low mineral content, and wonderfully blue. Grubependity is one of the most beautiful lakes in the Balbanyu River basin. Two gold fields are located in the vicinity of the lake: “Nesterovskoye”, which is a unique gold ore field in basalt strata of Paleozoic sedimentary cross section, and “Chudnoye”.



## VASCULAR FLORA IN THE VICINITIES OF ZHELANNOYE TOURIST FACILITY

Vascular flora of the Yugyd-va National Park comprises 668 plant species of 297 genera and 92 families. Vascular flora of the BalbanyuRiver basin with nearby ridges (Maldynyrd and Rosomacha) comprises about 400 plant species, of which 70 are included in the Red Data Book of the Russian Federation, Red Data Book of the Komi Republic, or need protection.



*Eritrichium villosum*



*Saxifraga cernua*



*Linum boreale*



*Rhodiola rosea*



*Rhodiola quadrifida*



*Anemonastrum biarmense*



*Woodsia glabella*



*Diapensia lapponica*



*Selene acaulis*



*Papaver lapponicum*



*Tephroseris atropurpurea*



*Loiseleuria procumbens*



*Acomastylis glacialis*  
(= *Novosieversia glacialis*)



*Pentaphylloides fruticosa*

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