



Scientific expedition

«Research of unique forests of southern taiga, Visimsky Nature Reserve» May 15-30, 2019

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Relevance of research

The current state of forest cover, which is responsible for maintaining the ecosystem functions of the Earth's biota, is raises serious concerns.

In this regard, a comprehensive assessment of forests is necessary on complementary data, including the composition and structure of forest cover in the pre-anthropogenic period (the end of the Pleistocene - the beginning of the Holocene) and its significant changes in the Holocene. In addition, the study of the history of various methods of nature management will reveal the role of natural and anthropogenic factors in the formation of modern forests. Creating paleoreconstructions of living cover in reserves and other protected areas based on a comprehensive analysis of the composition, structure, productivity, chemical composition of species and their complexes will determine the presence of degradation and / or demutation processes in them.

The purpose of the expedition and research plan

The purpose is to assess the current state of the living cover of taiga forests of the Visimsky Nature Reserve.

Plan:

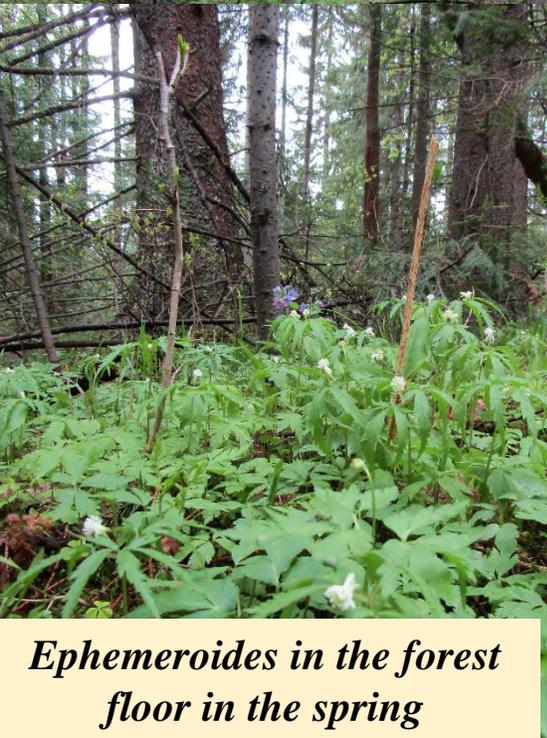
1. to choose two permanent test areas in the boreal forest without the participation of nemoral tree species (test area 1) and in the boreal-nemoral forest with the participation of nemoral tree species and ephemeroïdes (test area 2).
2. perform forest taxation and geobotanical descriptions
3. to determine the ontogenetic composition of tree populations
4. to take samples of plants
5. take soil samples to explore soil macrofauna.



Fir-spruce with linden forest boreal-nemoral, *test area 1*



Forest area with a predominance of linden



Ephemeroidea in the forest floor in the spring



Earthworms are active in dead wood, mosses and plant litter

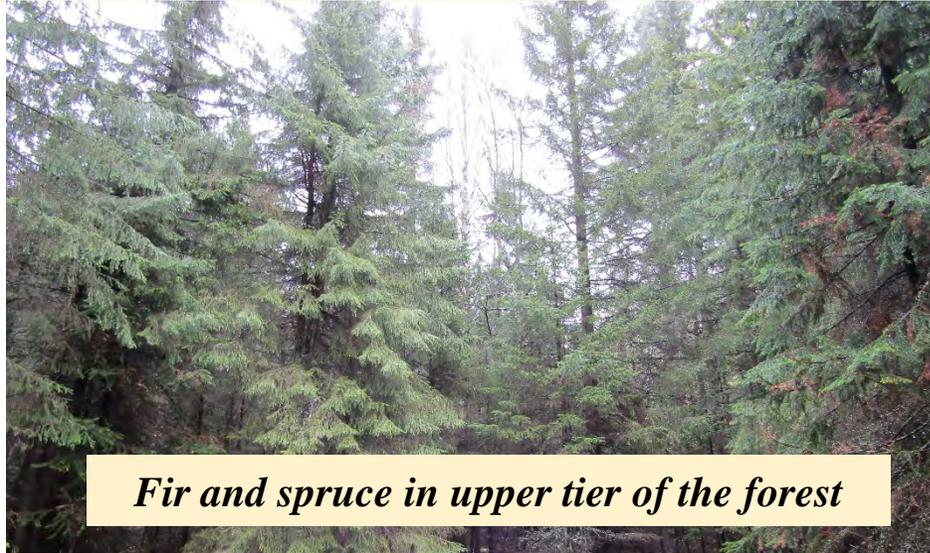


Soil type – brown forest soil with a well pronounced humus horizon



Coals in the litter and upper soil horizons

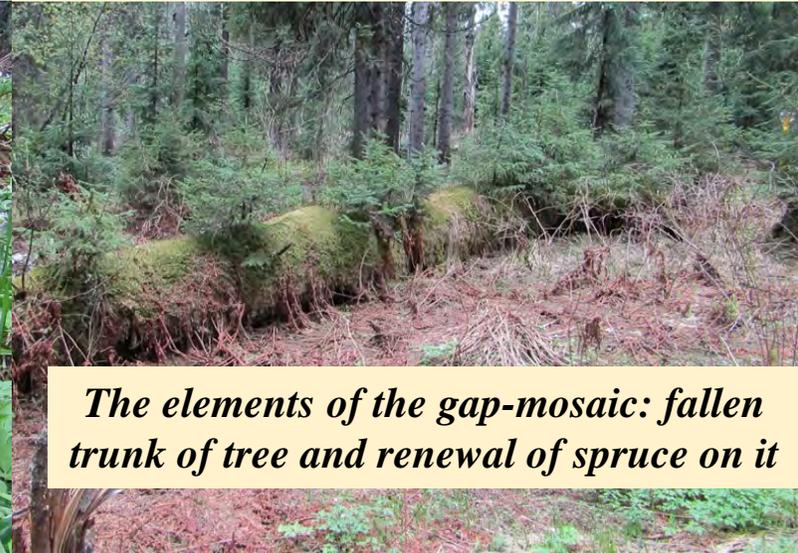
Fir-spruce forest tall-grass-fern, test area 2



Fir and spruce in upper tier of the forest



Ephemeroïdes in the forest floor in the spring



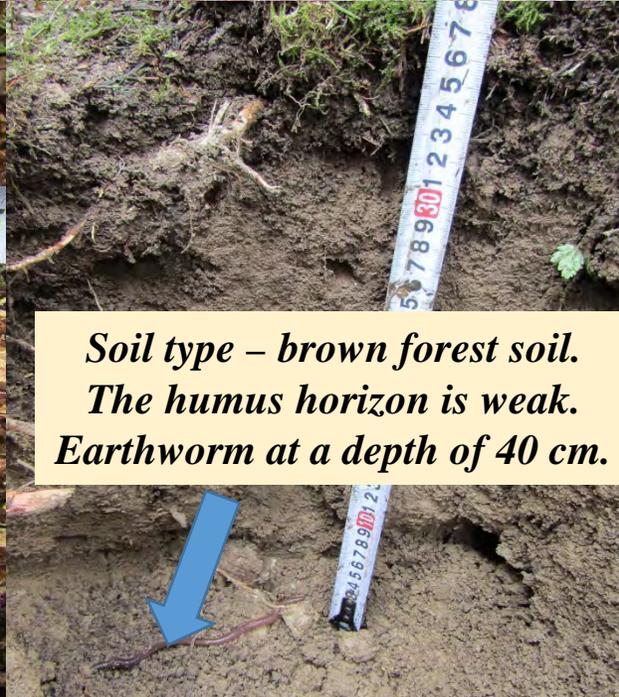
The elements of the gap-mosaic: fallen trunk of tree and renewal of spruce on it



Viola selkirkii on a fallen trunk of a fir



The earthworm in dead wood of the fir of the second stage decomposition



Soil type – brown forest soil. The humus horizon is weak. Earthworm at a depth of 40 cm.

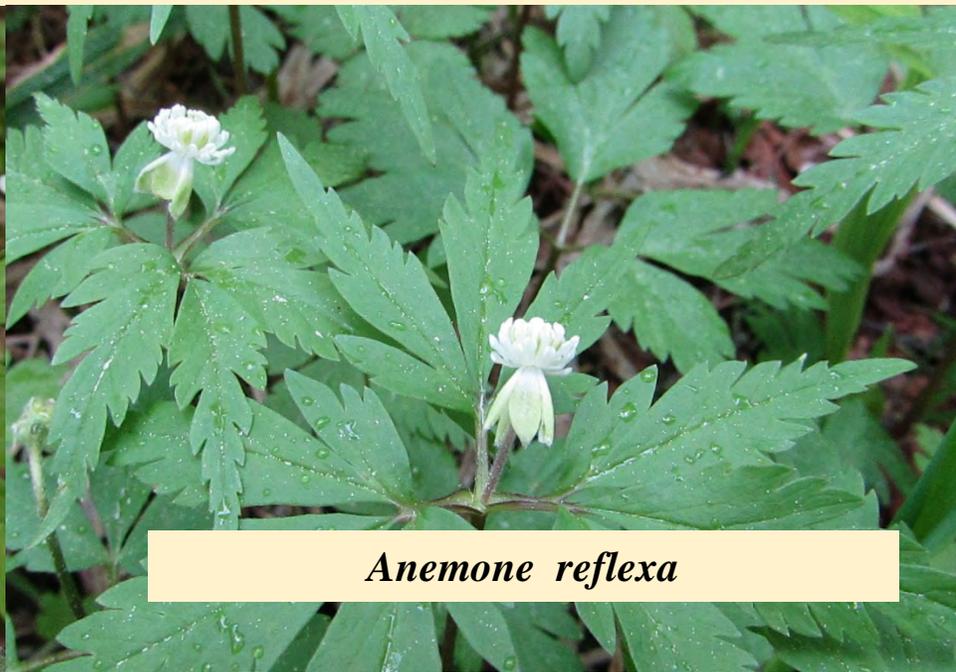
Spring ephemeroides of the forests of the Visimsky Nature Reserve



Anemone uralensis



Anemone altaica



Anemone reflexa



Corydalis solida



Allium victorialis



Gagea lutea

The unique plot of a multi-dominant forest of different ages in the protected area of the Visimsky Nature Reserve

During the expedition was discovered a plot of multi-dominant coniferous-deciduous forests with a predominance of small-leaved linden, elm and with the participation of Siberian spruce, Siberian fir and Siberian pine. This plot is location outside the reserve. The height of coniferous species of trees (fir, spruce and Siberian pine) reaches 27-30 m, and the diameters of the trunks at a height of 1.3 m - 70-80 cm. In addition, we were noted unique specimens of linden, with a height of 25-27 m, a trunk diameter of 60-70 cm, as well as a elm with a height of 15-18 m and a trunk diameter of 40-50 cm.



Forest plots with gap mosaic



Picea obovata

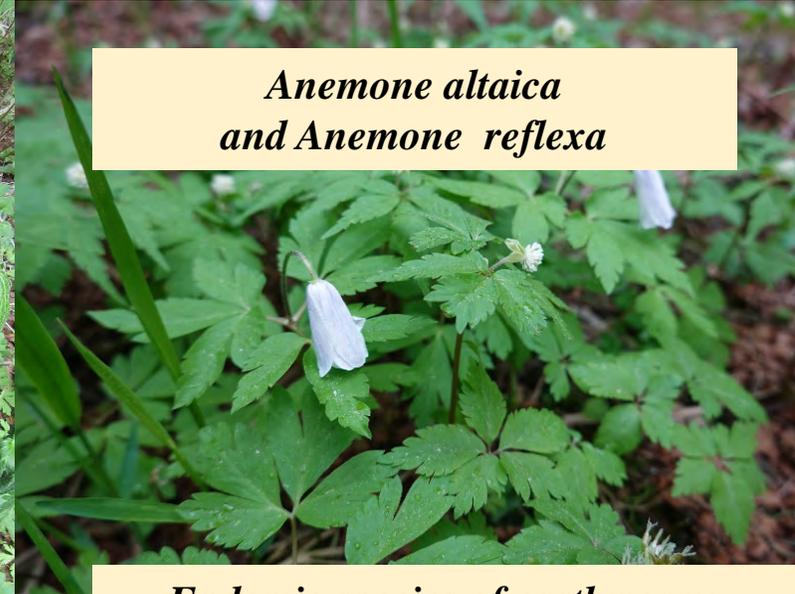
Tilia cordata

The unique plot of a multi-dominant forest of different ages in the protected area of the Visimsky Nature Reserve

Over a limited area we have been identified more than 100 species of vascular plants, including protected species included in the Red Book of the Sverdlovsk Region (*Anemone reflexa*, *Knautia tatarica*, *Lilium martagon*, *Allium victorialis*, *Paeonia anomala*, *Cicerbita uralensis*). We are revealed exceptional wealth and high density of soil invertebrates. **Such fragments of coniferous-deciduous forests are unique to the Middle Urals and are not found on the territory of the Visimsky Nature Reserve.**



Delphinium elatum



Anemone altaica
and Anemone reflexa



Cacalia hastata

Endemic species of earthworms in the Urals



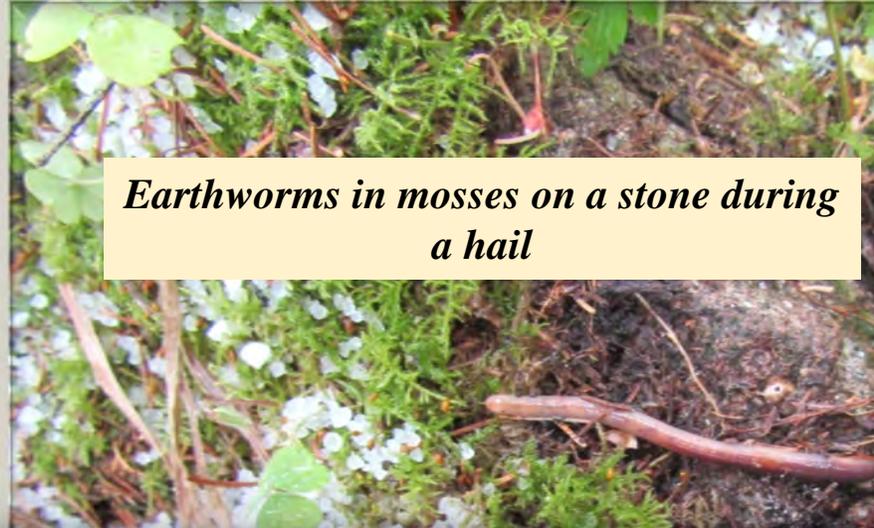
Perelia tuberosa

P. diplotetrachea

Atypical weather conditions: snow and hail in the southern taiga in the end of May



Coniferous forest under the snow



Earthworms in mosses on a stone during a hail



Snow-covered rocks



Anemone altaica under the snow



Soil excavations under hail



Peony under the snow

Life marks of elks in the forests of the Visimsky Reserve



Elm bark damage



Elk excrements on soil and stone



Damage to fir bark

Results of field research

During the expedition, in two types of forest (fir-spruce with linden forest boreal-nemoral and fir-spruce forest tall-grass-fern) were made:

1. geobotanical descriptions by the method of Brown-Blanca in 10-fold repetition on sites of 100 m²;
2. standard soil cuts with sampling of soil from different horizons;
3. demographic studies of population tree species in both sample plots;
4. collection biomass of indicator species of vascular plants on sites of 1 m²;
5. collection of data on soil biota in different types of forest using standard soil-zoological methods.

In addition, we identified a unique area of a multi-dominant forest in the protected area of Visimsky Nature Reserve.

Based on the data obtained, it was recommended to this unique forest area will be attached to territory Visimsky Nature Reserve or to be created a protected area of regional value.

Acknowledgments

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"Model reconstruction of the pre-anthropogenic living cover of the Northern and Middle Urals"