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ABSTRACT BOOK

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Reconstruction of the Late Pleistocene soil-vegetation cover of the Yana-Indigirka Lowland mammoth fauna

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The studied region is situated in the north of the Republic of Sakha (Yakutia), representing tundra-bog landscapes of the Yana-Indigirka Lowland (N=70°43', E=135°24'). According to the permafrost landscape map of Yakutia (Fedorov et al., 1989), the region belongs to the Lower Yana lake thermokarst province.

There are numerous finds of the mammoth fauna remains in the territory of the Yana-Indigirka Lowland. Recently, an early man-site has been discovered there (Basilyan et al., 2011) dated to the Late Pleistocene. A study of buried soils is performed in order to refine the evolution of the soil-vegetation cover of that time. The studied buried ancient soils represent the frozen loess-like sandy loams alternating with organogenic horizons of various origin (humus, black mold, peat).

The paper describes the results of the study of similar strata in the "Mus-Khaya" locality (Fig. 1). The studied pedocomplexes are as follows:

- Sartan "peat-gley" pedocomplex (PR-3 T);
- Kargin (№1) "sod-gley" pedocomplex (PR-6 A);
- Kargin (№2) "sod (forest)" pedocomplex (PR-7 A);
- Kargin (№3) "peat-gley" pedocomplex (PR-7 T);
- Kargin (№4) "sod (forest)" pedocomplex (PR-11 A).

The Sartan pedocomplex (PR-3 T) is as deep as ~215(217)-275 cm from the modern surface. Morphologically, it

represents a profile of "peat-gley" soils. The organogenic horizon of this pedocomplex lacks palinological material, up to 100 grains in 4 samples. The pollen of tree-shrub plants makes up 46.0%, herbs and dwarf shrubs – 50.0%, and spores – 4.0%. Spore-pollen spectrum shows intrinsic changes of vegetation during the formation period of this pedocomplex. Abrupt climate cooling resulted in reducing tree-shrub vegetation and developing grass-forb associations with minor participation of larch and shrubs. The basic trend of soil formation at that time was rather peat formation.

The other four revealed pedocomplexes are situated in the Kargin stratum. At its basement the cultural layer is confined, studied by a number of specialists (Basilyan et al., 2011).

The first discerned (top down the soil profile) Kargin pedocomplex (PR-6 A) is situated as deep as ~ 436(453)-484(514) cm. According to morphological parameters, it is represented by a profile of "sod-gley" soils.

At a depth of ~ 484(514) cm, it is followed by the second Kargin pedocomplex (PR-7 A ~484(514)-514(554)). Morphologically, it represents a profile of "forest" soils, though with more developed organogenic horizon (~20 cm). This horizon is enriched with plant root remains representing a slightly decomposed humus soil layer. The spore-pollen spectrum of this horizon shows high pollen productivity, the pollen content reaching up to 904 in one sample. Generally, the spectrum shows increased content

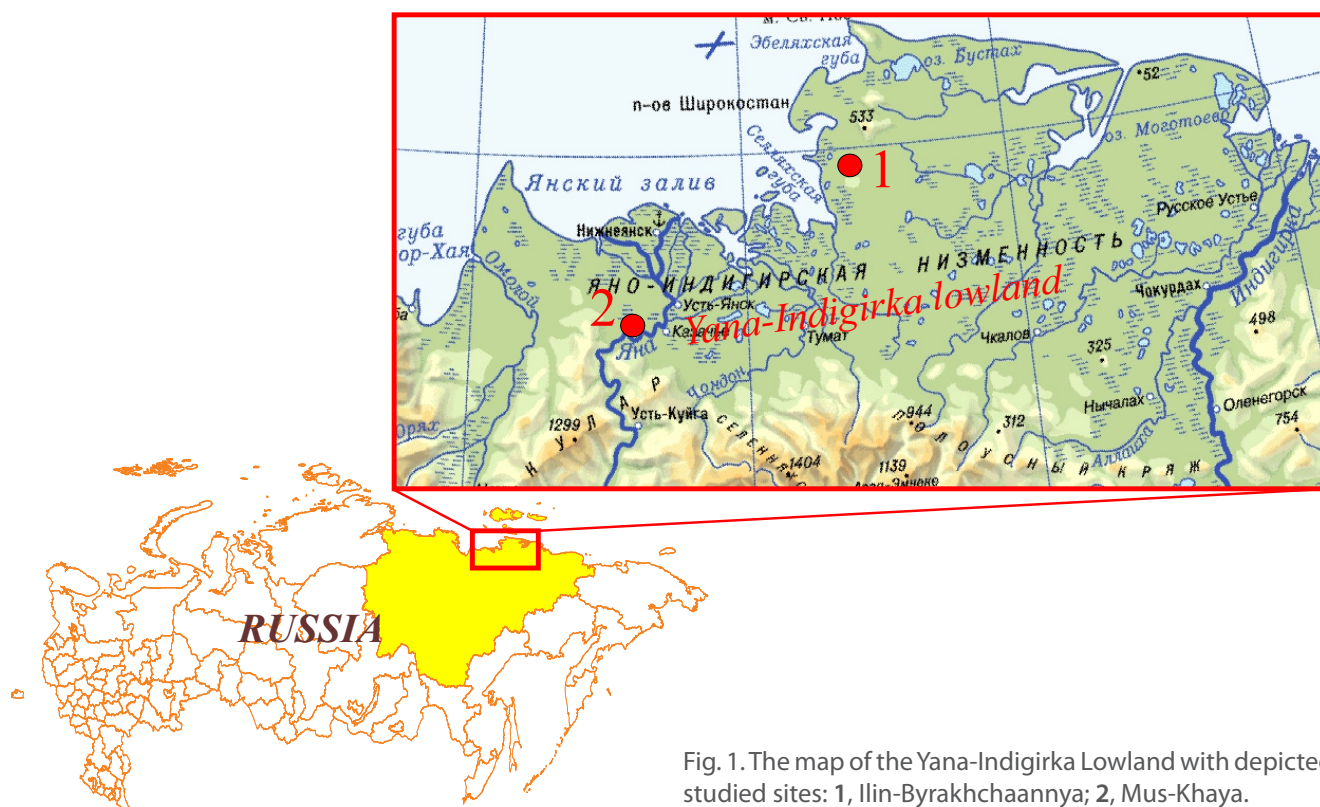


Fig. 1. The map of the Yana-Indigirka Lowland with depicted studied sites: 1, Ilin-Byrakhchaannya; 2, Mus-Khaya.

of tree-shrub plant pollen (74.6%) and dependency of herb-dwarf shrub (23.8%) and spore (1.6%) plants. The spectrum composition apparently indicates that during the period of sedimentation, larch thin forests occurred with participation of tree-like birches, and properly developed shrub and herb layers. The main trend of soil formation was humus formation.

The third pedocomplex (PR-7 T) was discerned at a depth of ~514(534)-570 representing the profile of "peat-gley" soils. As compared to the horizon PR-7 A, the content of micro-grains here is somewhat decreased (211 in two samples). The spectrum contains almost equal portions of tree-shrub (48.3%) and herb-dwarf shrub (49.2%) plants. The spores make up 2.5%. The spore-pollen composition of two horizons indicates predominance of poorly forested landscapes during that period of sedimentation.

Beneath the abovementioned cyclites (pedocomplex alternation), a well preserved pedocomplex (PR-11 A) was discerned at a depth of ~ 864(872)-950cm. It represents a profile of "forest" soils. The spore-pollen spectrum of the organic horizon of this pedocomplex is characterized by a very low content of spores and pollen (164 grains in three samples). Despite the small amount of pollen grains the spectrum is prevailed by the pollen of tree-shrub species (50.7%). The pollen of herbs and dwarf shrubs makes up 43.1% of the association, whereas the spores represents only 7.2 %.

Thus, in the studied profile 1 Sartan and 4 Kargin pedocomplexes have been discerned reflecting the soil-vegetation cover succession. The gained results allow to state that the Kargin pedocomplex consists of three warm

and one cold stages, their signs being clearly traced in the studied pedocomplexes. According to the published data, those changes in coastal lowlands are related to the drastic change in geochemical landscapes (Tomirdiaro, 1980) expressed by gleization of subhorizons and other soil properties (Zykina et al., 2010).

As a whole, the results of the soil evolution study testify five drastic changes in habitats of the Late Pleistocene mammoth fauna in the Yana-Indigirka Lowland due to climate fluctuations.

References

- Basilyan A.E., Anisimov M.A., Nikolskiy P.A., Pitulko V.V., 2011. Woolly mammoth mass accumulation next to the Paleolithic Yana RHS site, Arctic Siberia: its geology, age, and relation to past human activity. *Journal of Archaeological Science* 38(9), 2461-2474.
- Fedorov A.N., Botulu T.A., Varlamov S.P., Vasilyev I.S., Gribanova S.P., Dorofeyev I.V., Klimovsky I.V., Samsonova V.V., Solovyev P.A. 1989. Permafrost landscapes of Yakutia (Explanatory Notes to the "Permafrost landscape map of Yakutian ASSR" of scale 1 : 2 500 000) (in Russian). Novosibirsk.
- Tomirdiaro S.V., 1980. Loess-ice formation of Eastern Siberia in the Late Pleistocene and Holocene (in Russian). Nauka, Moscow.
- Zykina V.S., Savvinov G.N., Danilov P.P., 2010. The buried soils of the North-Anui low-mountain soil province of Yakutia (the lower reaches of the Kolyma River). *Quaternaire, supplement 3*, 117-118.

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