INFLUENCE OF THE LANDSCAPE CONDITION ON THE THERMAL STATE OF PERMAFROST ON THE INTERIOR ALASKA AND KOLYMA LOWLAND.

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ABSTRACT

Permafrost exerts a significant influence on northern socioeconomic and biological systems, and the thermal state of permafrost is exquisitely sensitive to climate and other environmental changes. Permafrost temperature is an integrated parameter and depends not only on the air temperature, but also on the heat transfer conditions at the ground surface. Landscape conditions is one of the most important factors that influence permafrost temperature through the snow cover redistribution and vegetation. Since 2005b the global network of bores for permafrost temperature observation was established under umbrella of International Permafrost Association (IPY project Thermal state of Permafrost). Global trend to the permafrost temperature increasing was noticed as a result of this monitoring. However, the above-mentioned trend operates at different scales in different sites.

Currently, research was aimed on the influence of landscape condition (modern state and its natural dynamic) on the thermal state of permafrost.

LOCATION OF INVESTIGATION SITES

RESULTS AND DISCUSSION

Fig. 6. Mean annual temperature versus depth at the Chersky area: Chersky (Prokosevskoye polje) site, Onion river mouth and Ambolika (investigated site)

Although air temperature has positive trend over the last 30 years in Chersky area (fig. 3b) thermal state of permafrost was stable here until the end of 1990s. Only during the last decade increasing of the mean annual ground temperature was recorded at all observation sites on the Kolyma lowland except Ambolika site (see fig. 9). Comparison of modern observations and data of measurements had been done at 1981 does not show any significant changes of the mean annual ground temperature (fig 10). And active layer thickness decreased twice (from 1.2 to 0.6 m). It might be explained by the landscape changes take place at this spot. Growing of tussocks leads to the above mentioned peculiarities of snow cover influence on the thermal regime. Additionally, spreading of willow shrubs prevent radiation heating of the surface during the summer period.

CONCLUSIONS

The following conclusions can be done:

1) Specific types of landscape, characterized b the tussocky micro relief and shrub type of vegetation cause decreasing of mean annual ground temperature.

2) Landscape changes, possible induced by the climate changes, can compensate air temperature increasing and keep thermal state of permafrost stable.

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