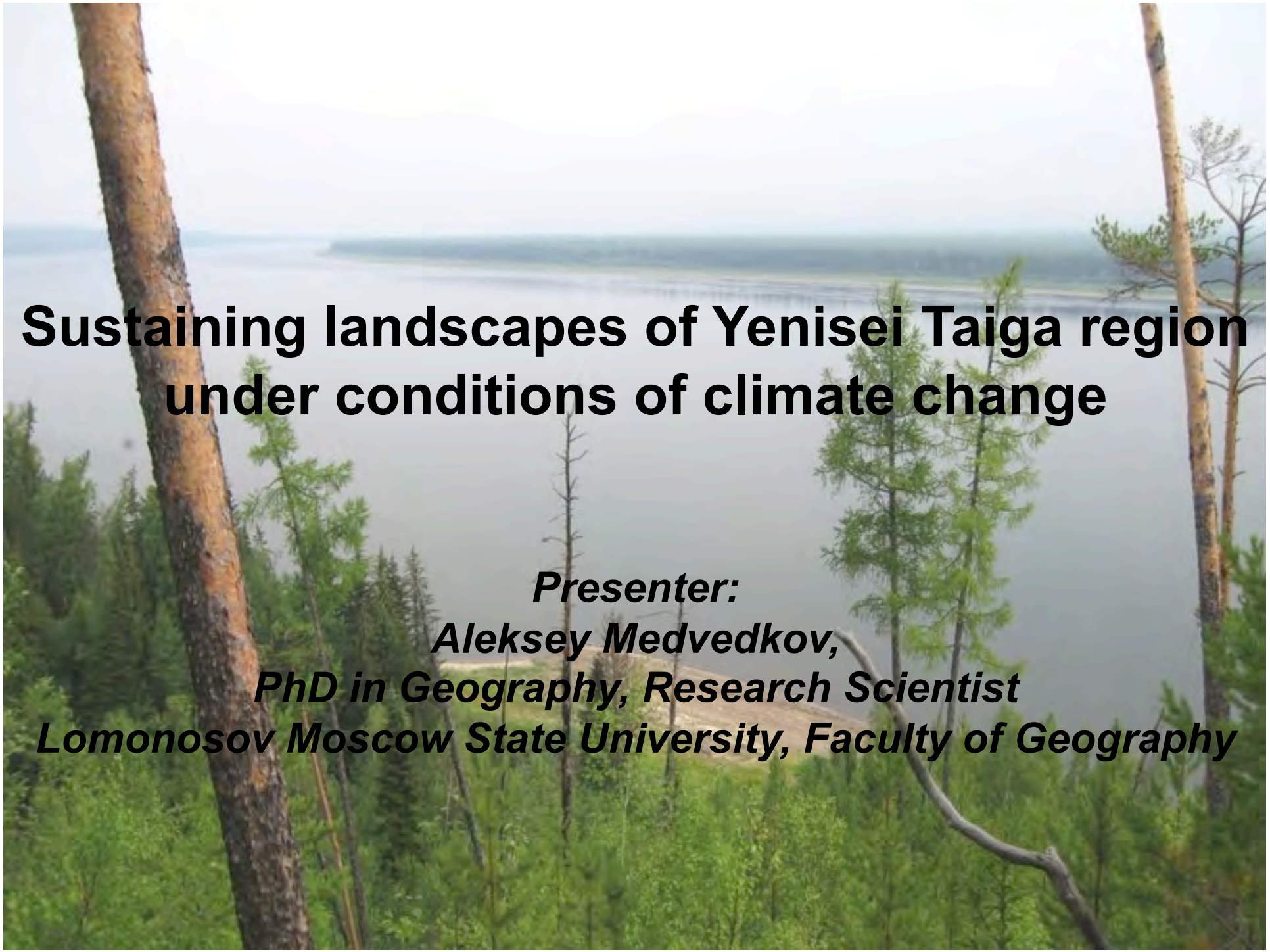

Sustaining landscapes of Yenisei Taiga region under conditions of climate change

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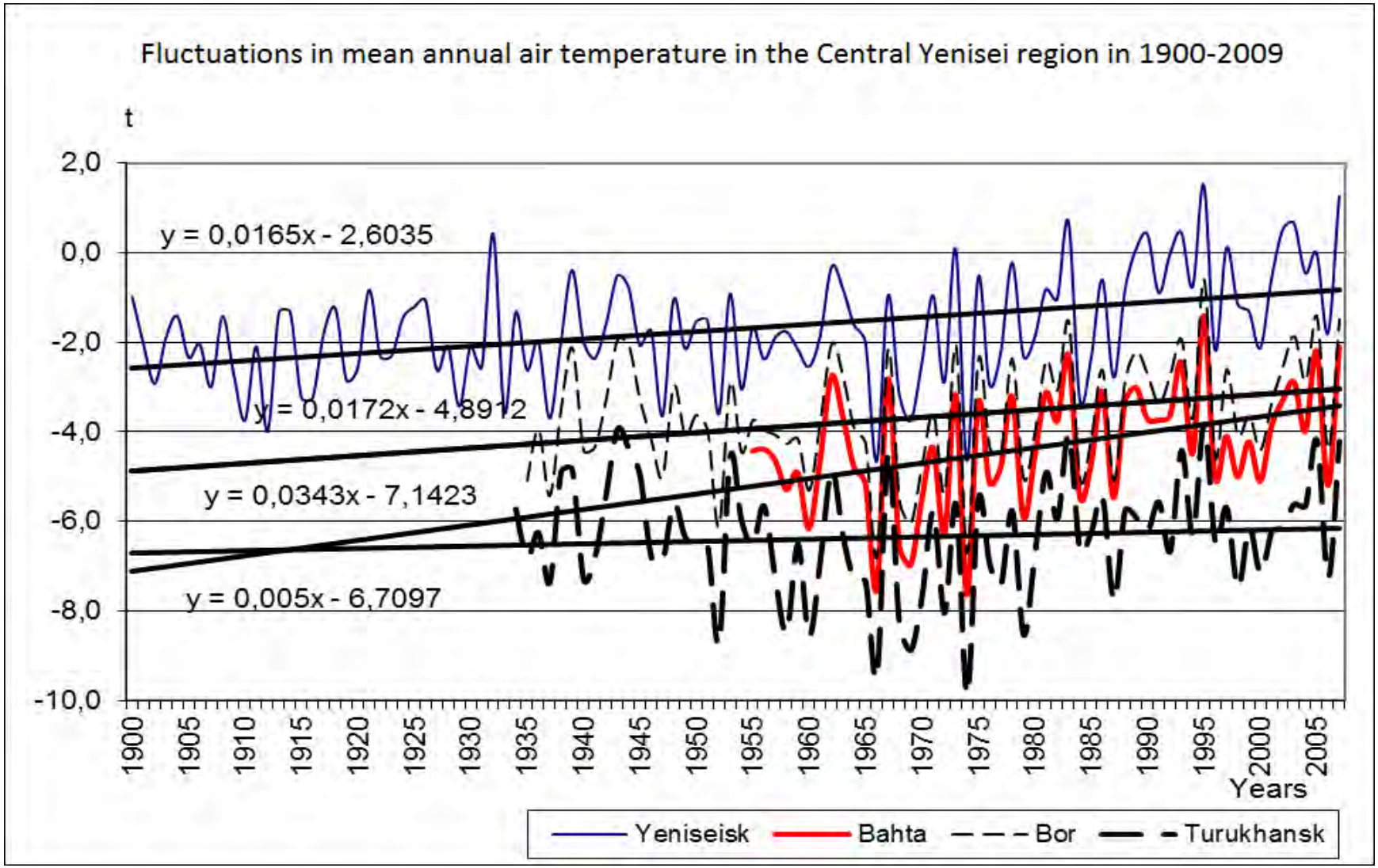
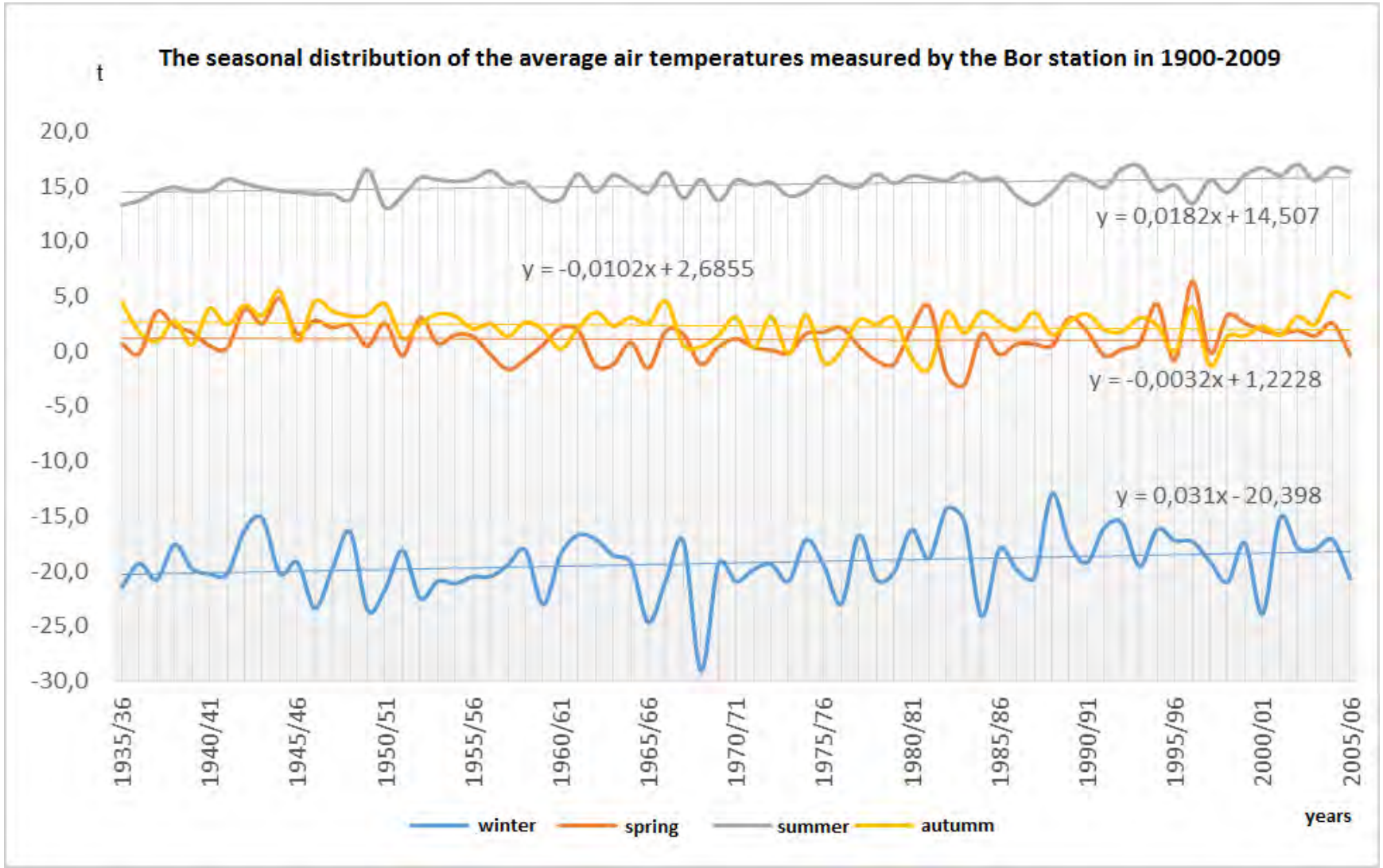
Climate changes



Climate changes



Response of permafrost landscapes

- Solifluction is a very important attribute of whole system of cryogenic exodynamic processes that worked in unstable conditions during interglacial Pleistocene period.

- At present the main response to the climatic warming is an intensification of solifluction as a result of noticeable increase of the active layer thickness.

Response of permafrost landscapes

- Reduced water content of permafrost landscapes increases their fire risk;
- In taiga zone the pine forests are the most vulnerable to fires

Response of permafrost landscapes

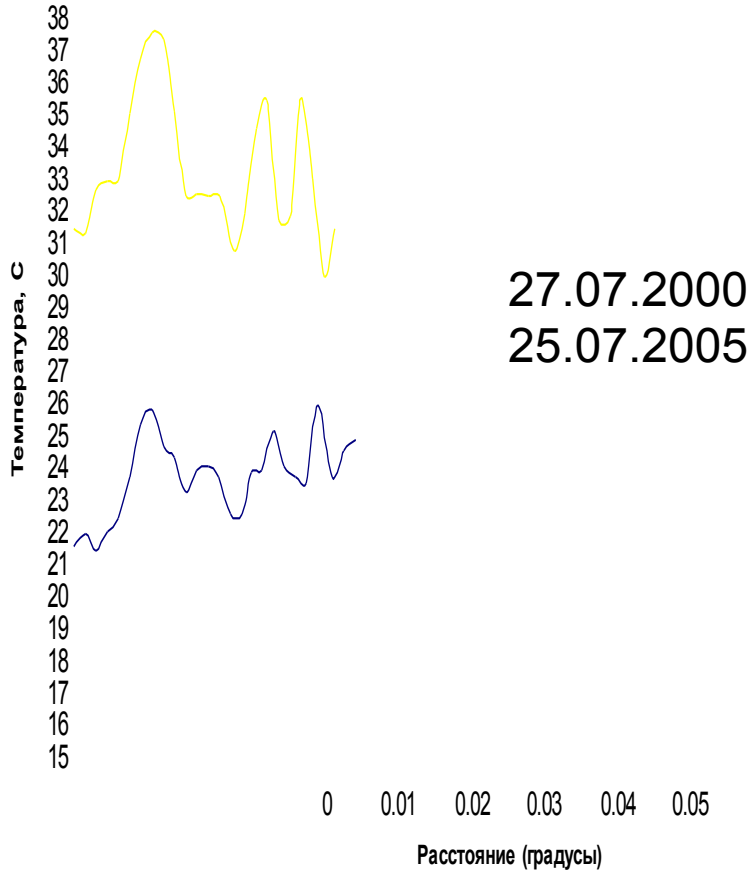
Not everywhere the permafrost and permafrost landscapes are so sensitive to observed climatic changes. The permafrost stows of glacis-floodplain and floodplain situated in large river valleys are the most stable. The stability of the stows of cold steep slopes covered by the frozen peat is a little bit less.

Windows-ruptures, filled with water in summer, indicate the presence of frozen aquiclude and its stability.

Response of permafrost landscapes

Within the corroms, even on badly heated slopes, goletz ice has thawed through, with formation of small depressions and disappearance of cold streamlets. They are overgrowing with lichens, low shrubs and individual trees. Piping hare, which plays an important role in sable diet, is leaving the corroms. This is facilitated by late spring frosts and the loss of underground water resources in base of the corroms.

Response of permafrost landscapes



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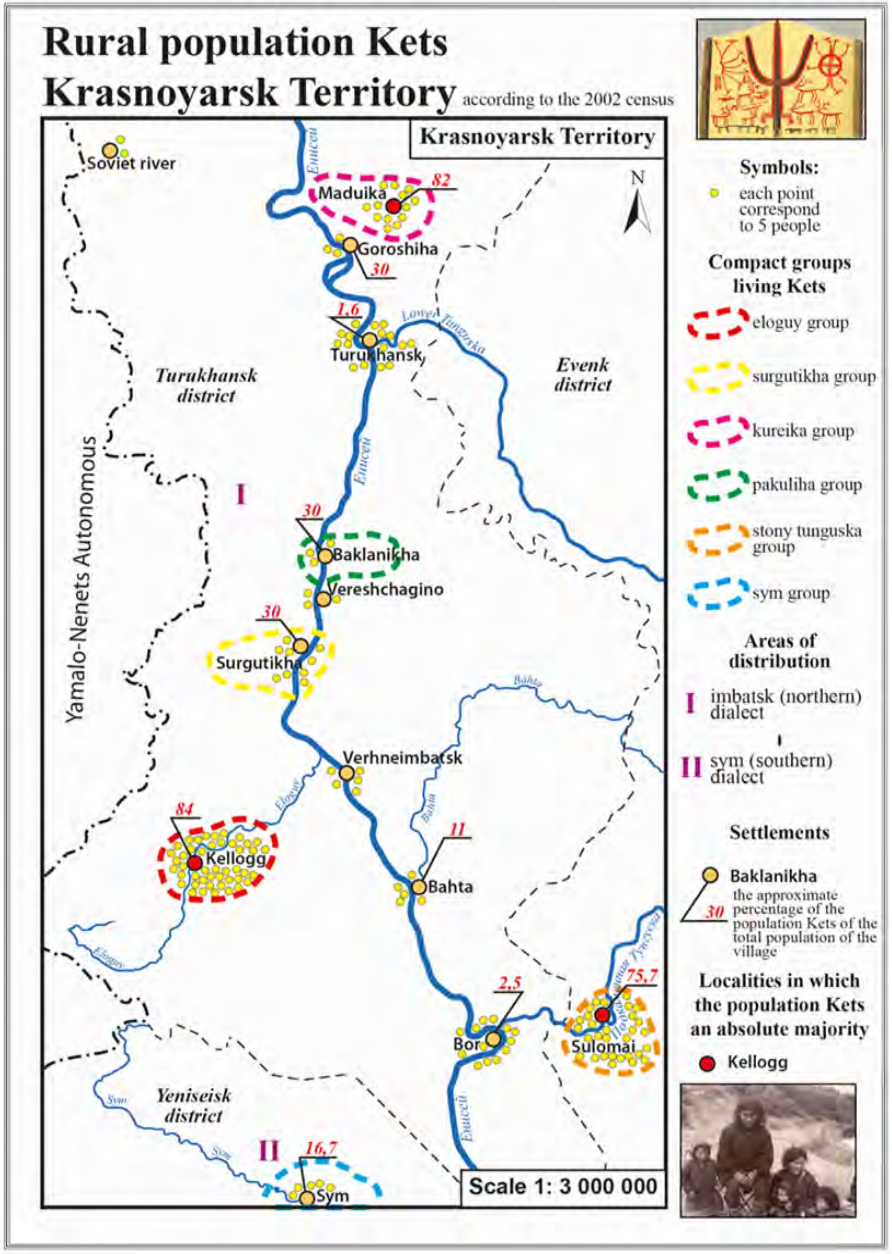
- Using data of thermal survey Terra Aster shows that substitution of permafrost landscapes in taiga zone with non-permafrost landscapes is accompanied with a decrease of surface temperatures during the vegetation season and the slight increase in the cold period, which leads to soft climate.

Life Support Systems in a Changing Climate

- Due to climatic changes, there is a reduction of productivity of natural systems: reduced yields of berries, pine nuts, and mushrooms (the impact of short strong frosts in the spring, during the flowering, and of dry heat), reduced number of sable and other game animals because of poor food supply;
- The years of low reproduction of game resources became the rule rather than the exception, especially in the areas east of the Yenisei.

Life Support Systems in a Changing Climate

- Kets pointed out that 20 to 25 years ago, cold weather lasted at least one month, and now, it is no more than 2 or 3 weeks. These observations of Kets are supported by the weather stations in the region, indicating more frequent thaws and warming in winter. As a result, the depth of the snow cover is lower, which impacts the productivity of berries. It is known that the reduction of snow cover increases the likelihood of freezing of billberry and blueberry. Many Kets note that a decrease in snow cover, makes it more difficult to hunt moose. The result of these processes is the phenomenon of "hungry taiga" inherent in the last two decades.



Changes in natural habitat:

over last 25 years the boundary of encephalitic tick areal has moved 250 kilometers to the north

Hydrological hazards:

over last 20 years the occurrence of low water has increased

Conclusions:

- It can be assumed that the trophic pyramid of the middle taiga is substantially impaired because of global warming and climate instability growth;
- The era of climate warming is characterized by increased natural hazards and increased frequency of hydrometeorological anomalies;
- The reduction of life-supporting function of "the feeding landscape" (in the terminology of L. N. Gumilev) requires a focus on integrated development of appropriative economy types and their diversification, processing of raw materials and products;
- It seems that in an era of climate warming and the growth of its instability, even more so is manifested a close dependence of the development appropriative economy of indigenous peoples upon the natural-resource and ecological-geographical factors of the environment.

Thank you for your attention!