



# PERMAFROST RESPONSE ON THE CLIMATE CHANGES IN THE NORTHERN YAKUTIA: MODERN STATE AND POSSIBLE HAZARDS.

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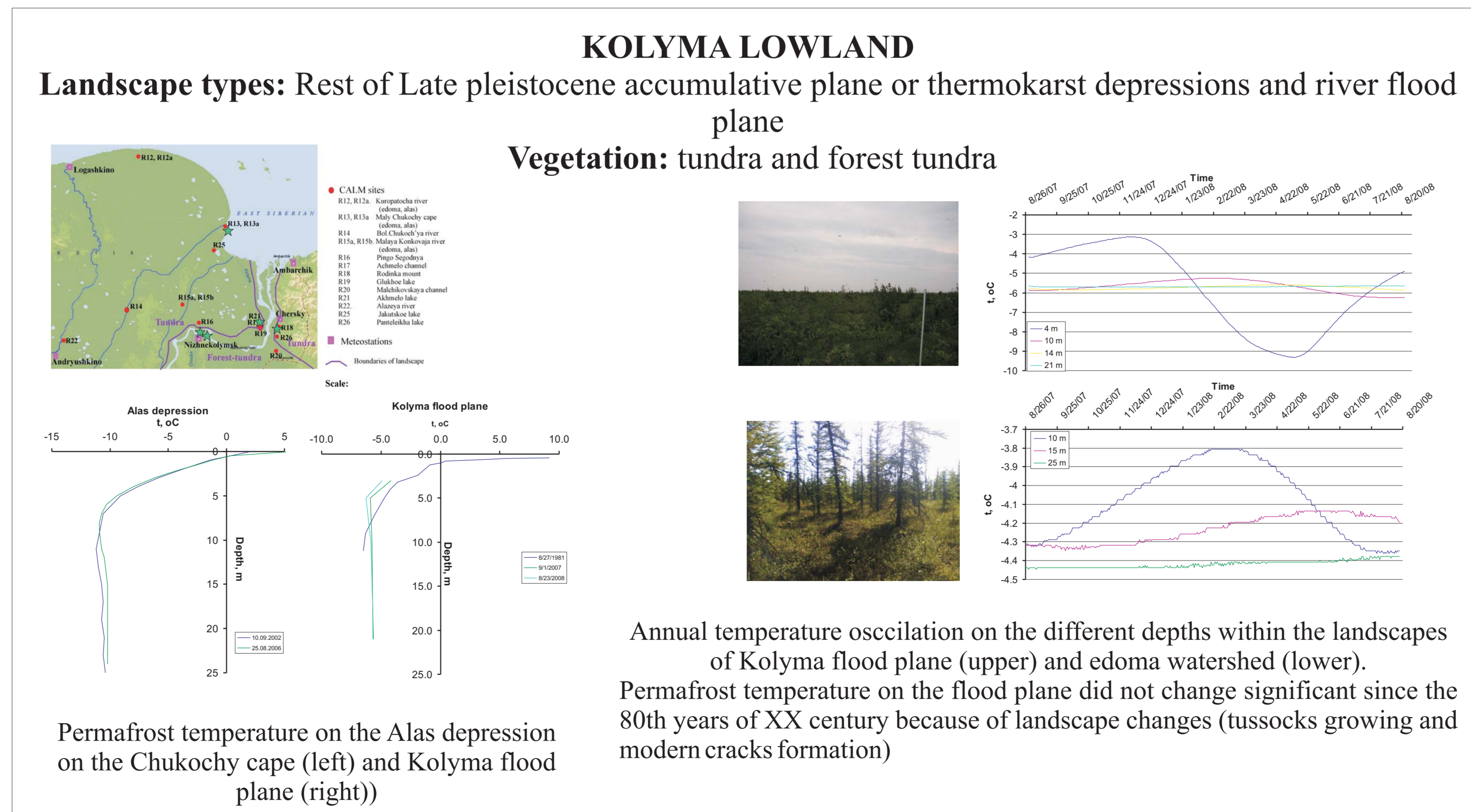
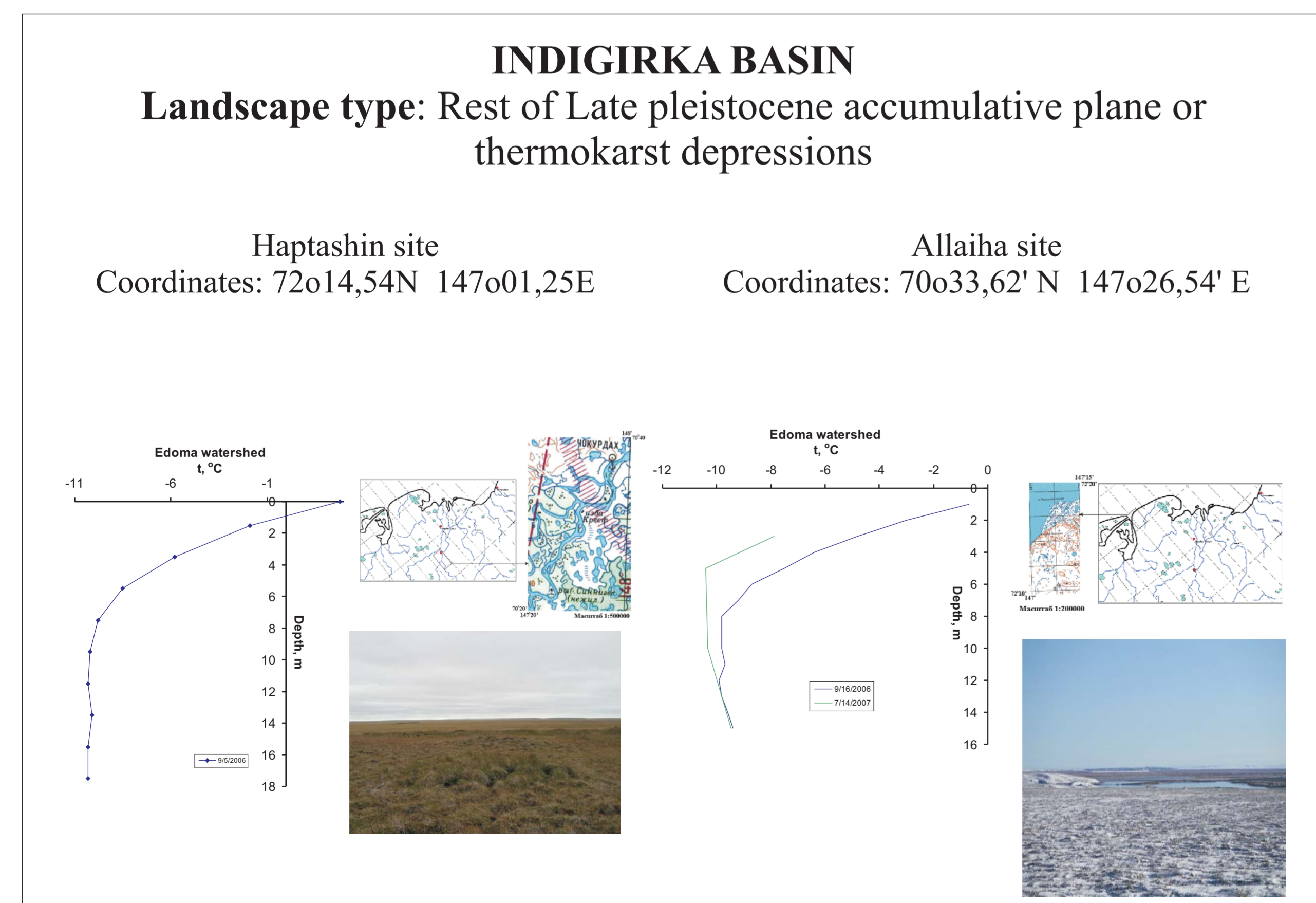
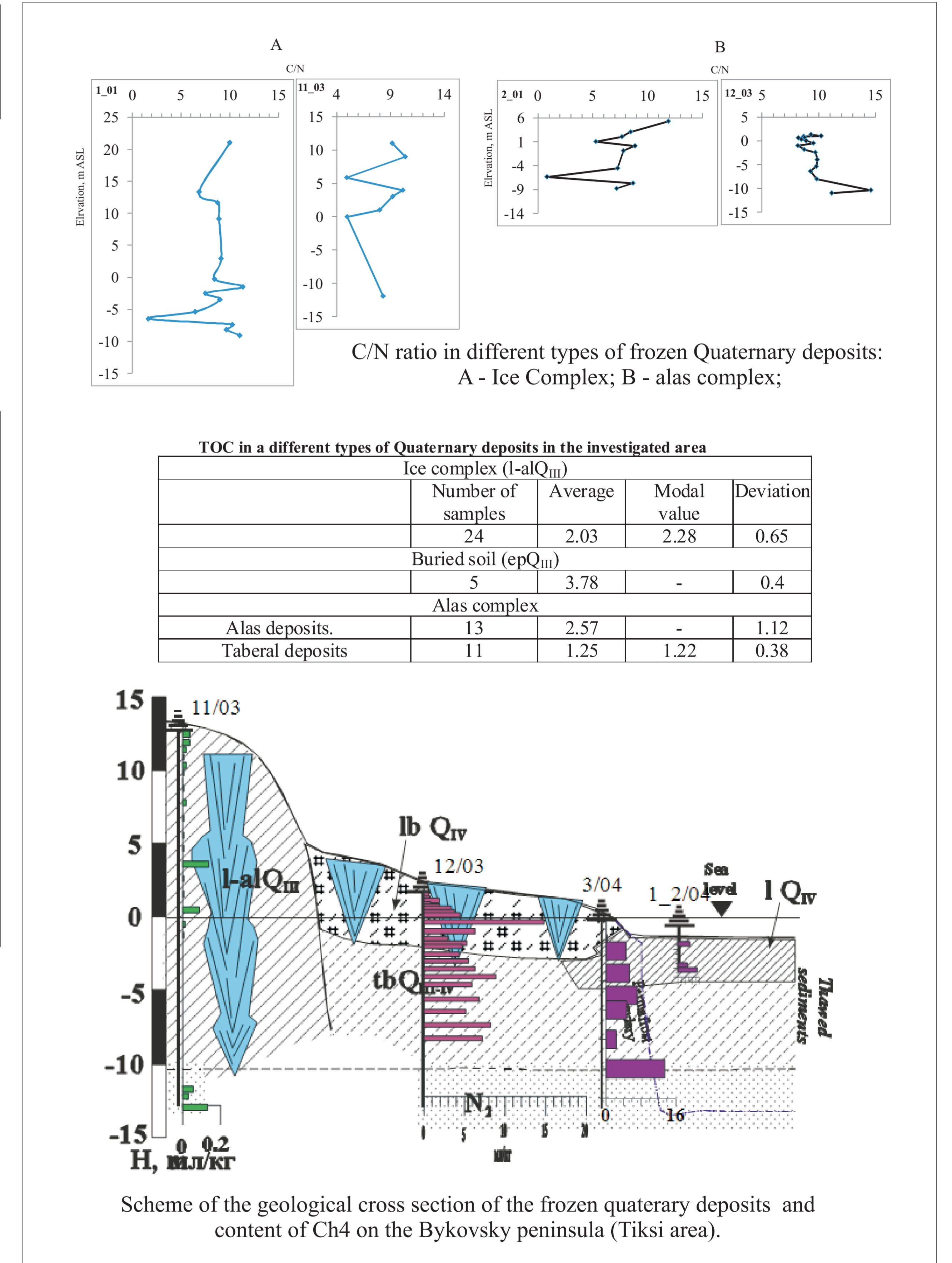
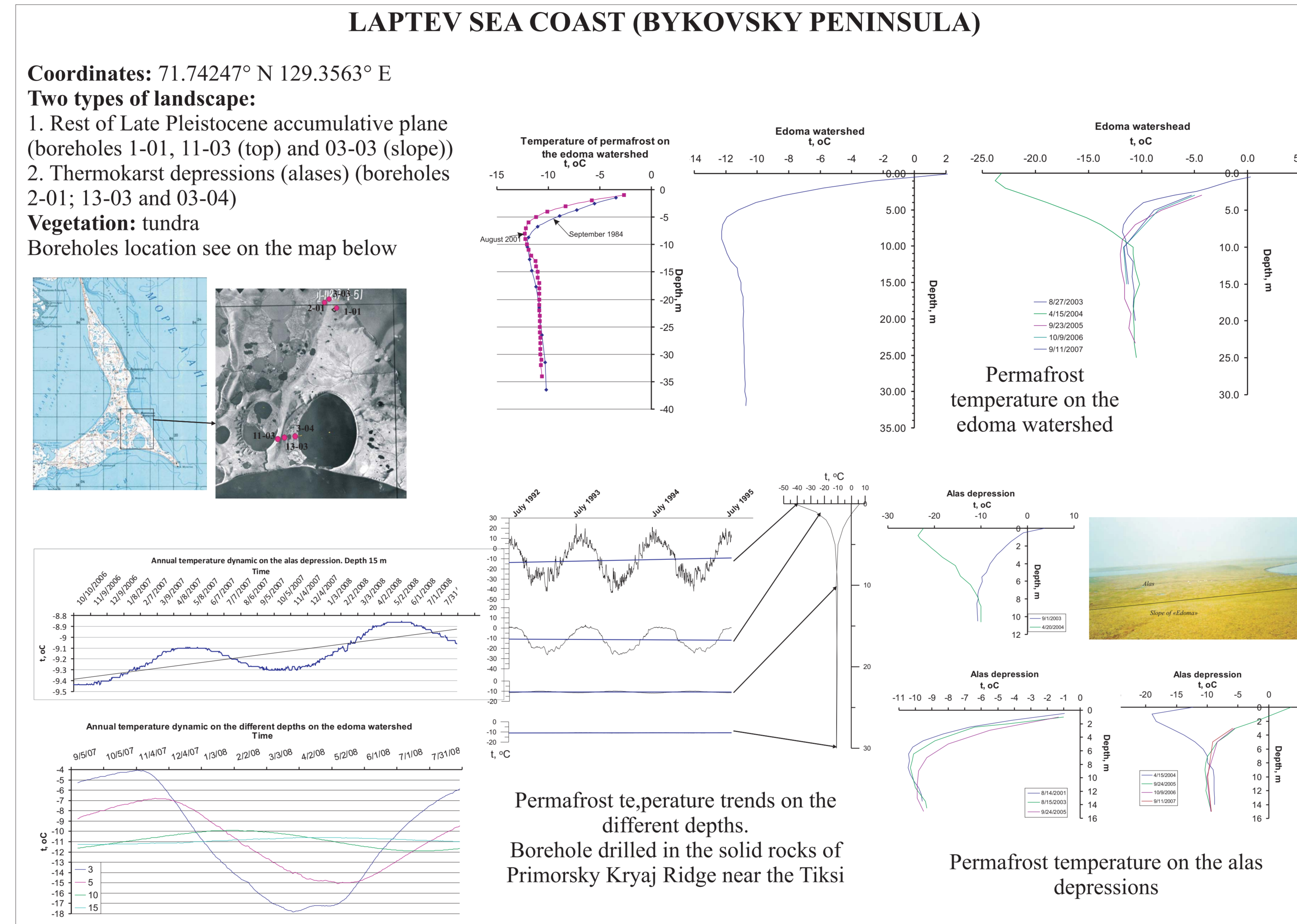
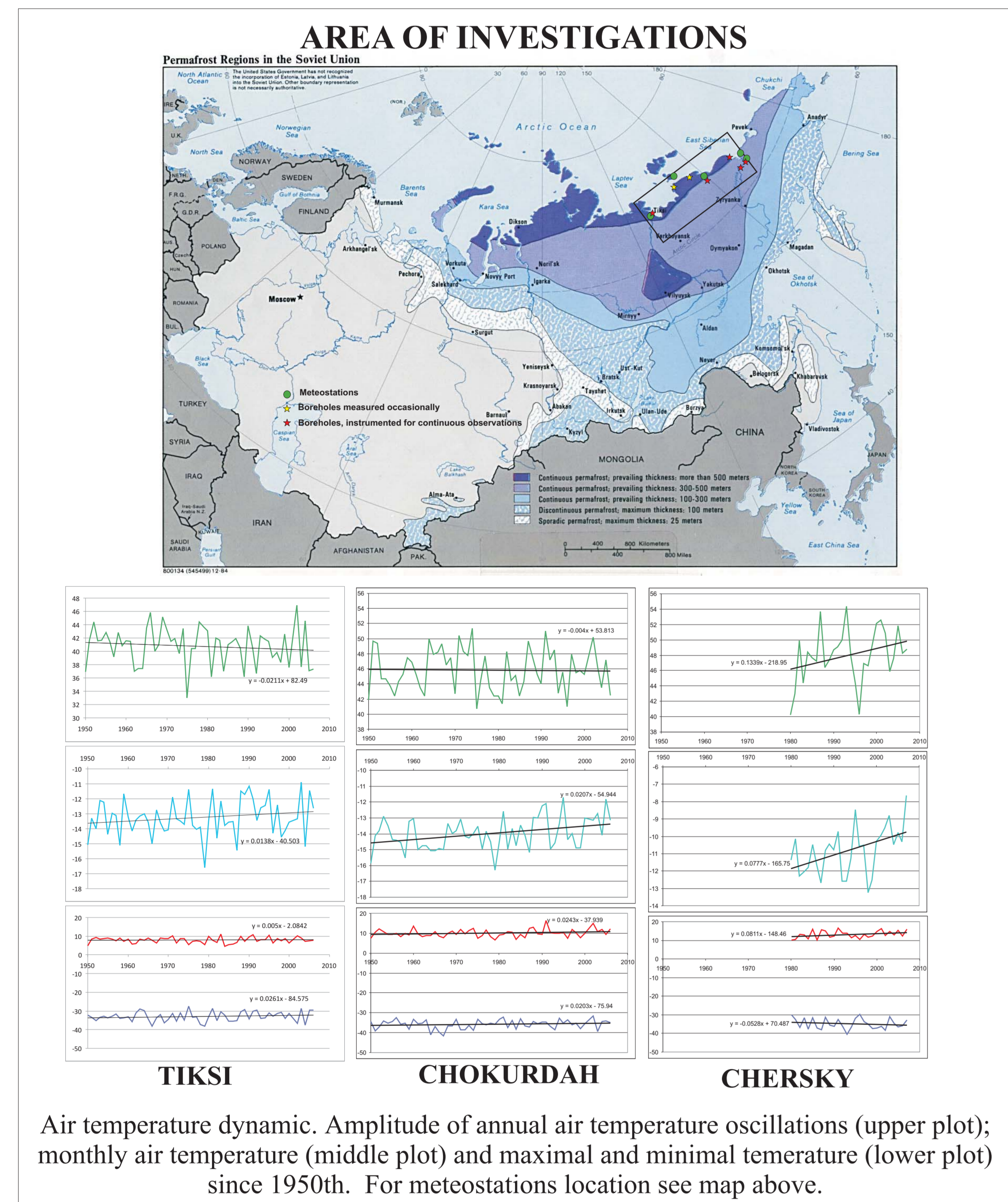


Permafrost is a one of most important component of natural environment in the Northern Hemisphere. It is very sensitive to the any natural changes, especially climatic. Permafrost warming and possible consequent thawing can leads to several hazardous processes both local, like constructions damages, local flooding etc, and global (changes in the global carbon and water cycles).

Investigated region covers the area from the Lena delta to Kolyma and characterized by cold continental climate (mean annual air temperature -13.5 to -14°C) and continuous permafrost distribution up to 700-800 m thick. Active layer thickness is 0.3-0.6 m in some spots up to 1 m. Current investigations aimed on the permafrost thermal state and its biogeochemical parameters are doing here since 90<sup>th</sup> years of XX centuries by the scientists from Institute of Physical-Chemical and Biological Problems of Soil Science RAS in collaboration with GI UAF. The main method of research was scientific drilling of shallow (up to 25 meters) boreholes with core description, sampling and logging.

Recently, the network for continuous geothermal observation was established. It includes 10 boreholes located on the different latitudes, natural zones and landscapes. These boreholes allow us to estimate both spatial and temporal changes of the geothermal field from the one side and content of organic carbon and green house gases from another.

Permafrost temperature in this region did not changed significantly since the 60th years of XX century. Only in the western part of region changes are noticed. Permafrost here is getting warmer on the 1 - 2°C. But during the last few years trend to permafrost warming in the whole region is noticed. Upper horizons of permafrost in this region composed by fine-grained sediments, characterized by the high content of organic carbon (up to 5-6%) and greenhouse gases (methane concentration up to 40 mg per kg of soil). In case of permafrost thawing due to current climatic changes it can be involved into the modern biogeochemical cycle.



### CONCLUSIONS:

Permafrost temperature in this region did not changed significantly since the 60th years of XX century. Only in the western part of region changes are noticed. Permafrost here is getting warmer on the 1 - 2°C. But during the last few years trend to permafrost warming in the whole region is noticed.

Upper horizons of the permafrost in the region is significant reservoir of the greenhouse gases and organic matter. If modern trend on the permafrost warming will continues it can lead to the start of permafrost degradation and relies of methane and carbon into the modern biogeochemical cycle.

### ACKNOWLEDGEMENTS

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