

Permafrost observations at the circumpolar scale

Oleg Anisimov, State Hydrological Institute, Russia

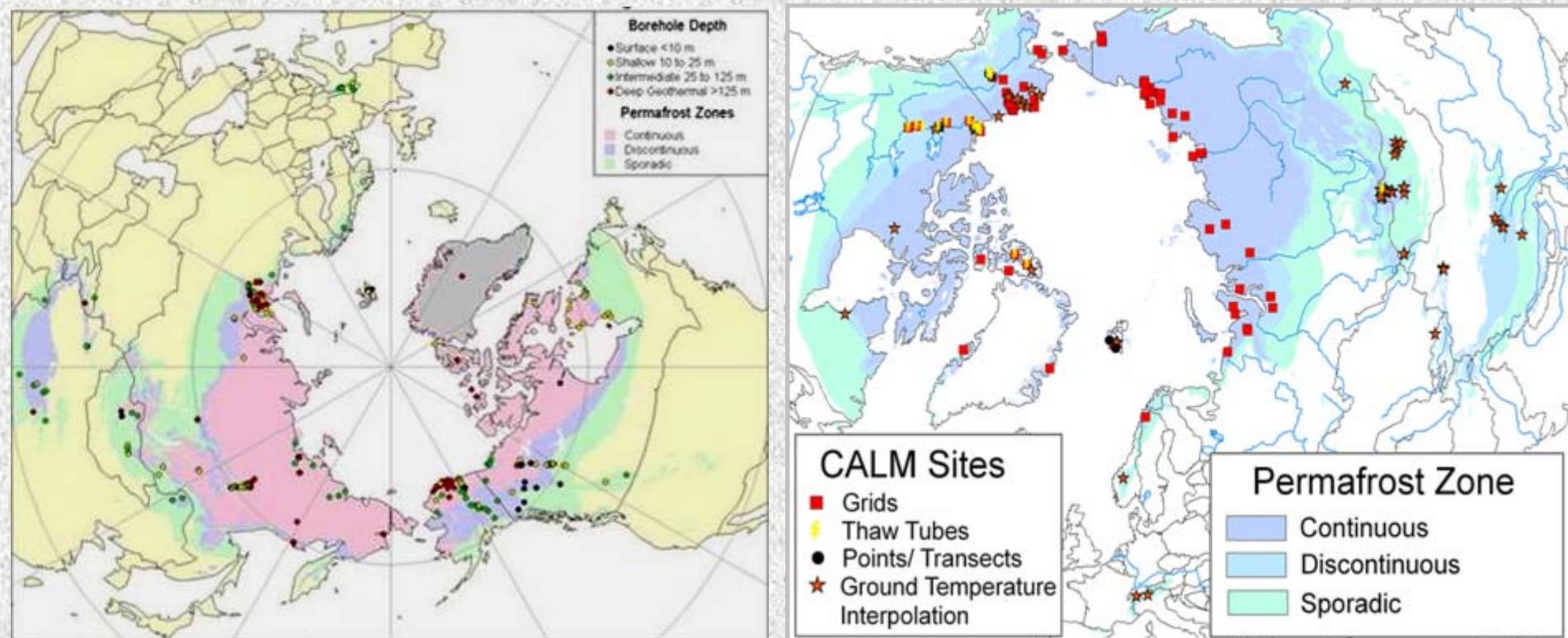
Oleg@oa7661.spb.edu

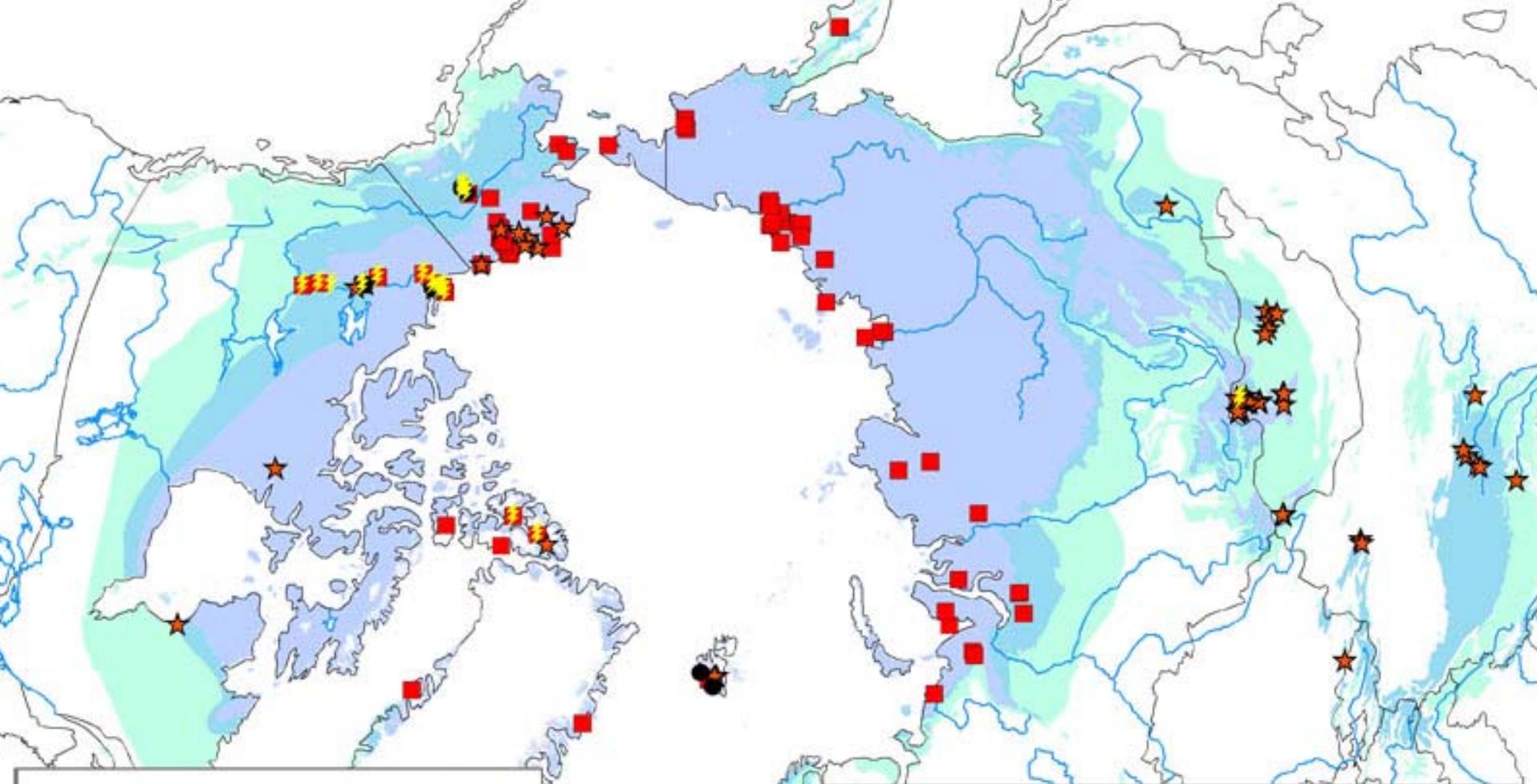


Modern permafrost observations



<http://nsidc.org/fgdc>





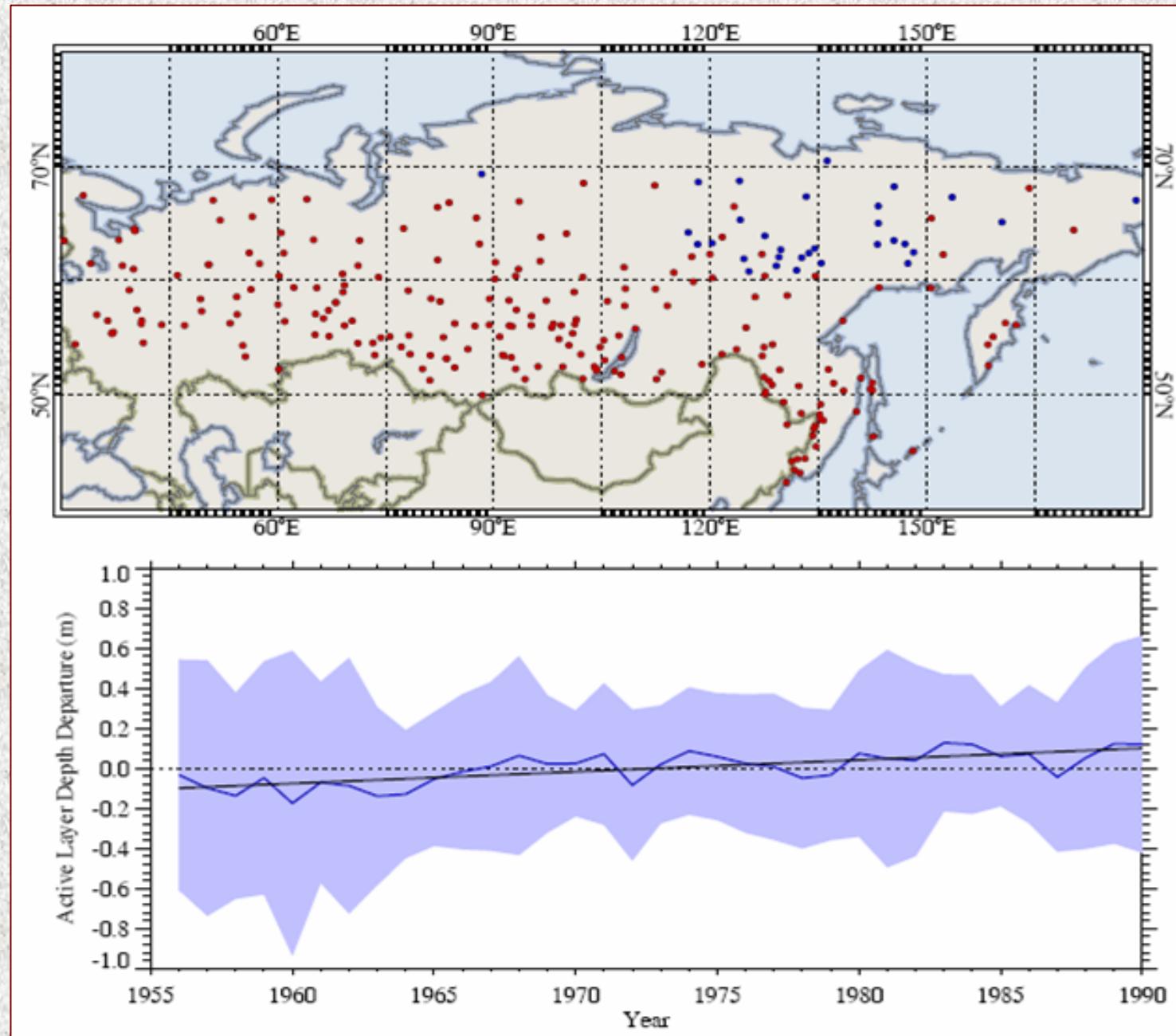
CALM Sites

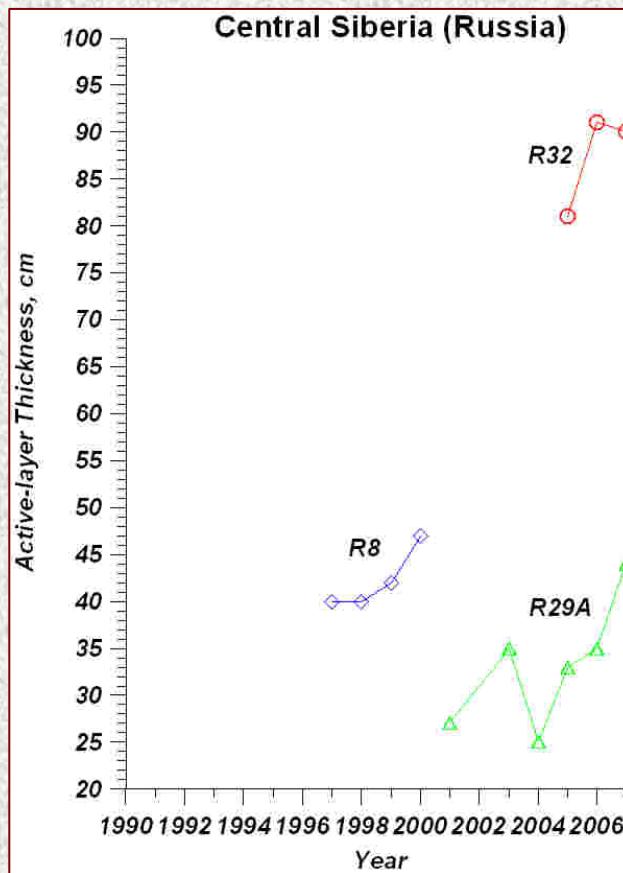
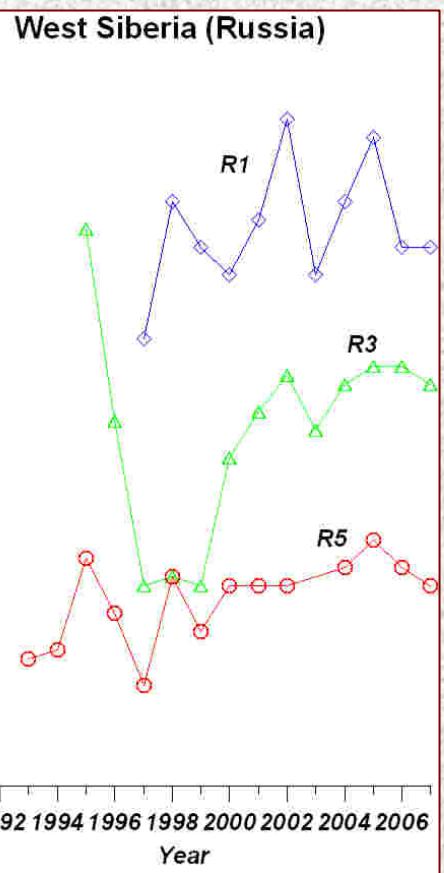
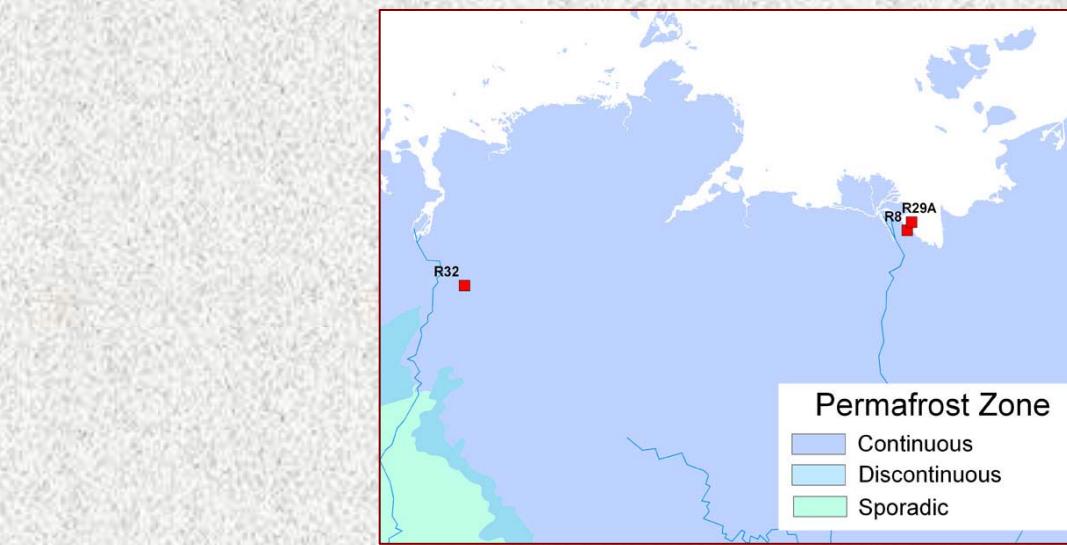
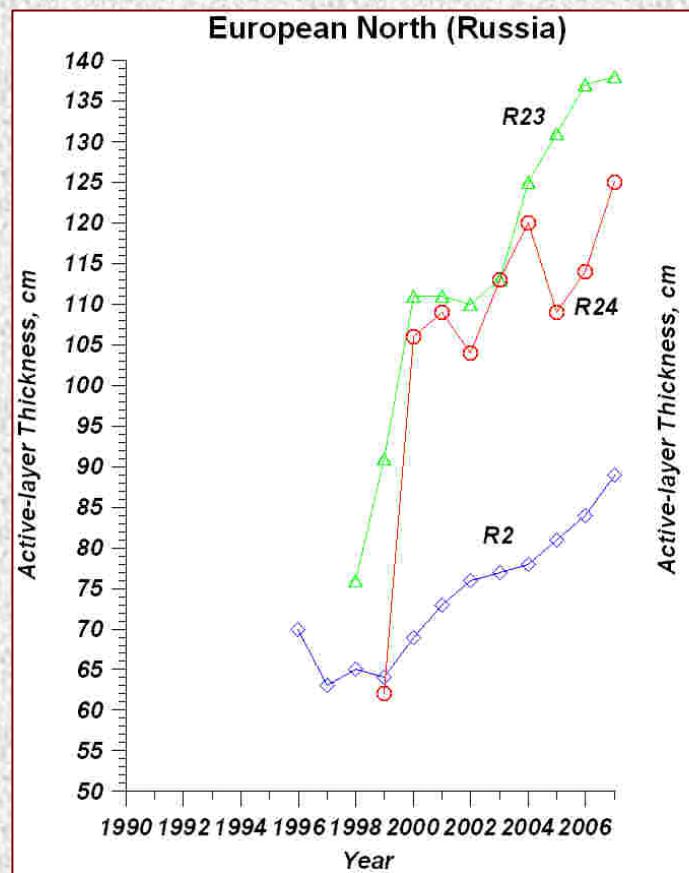
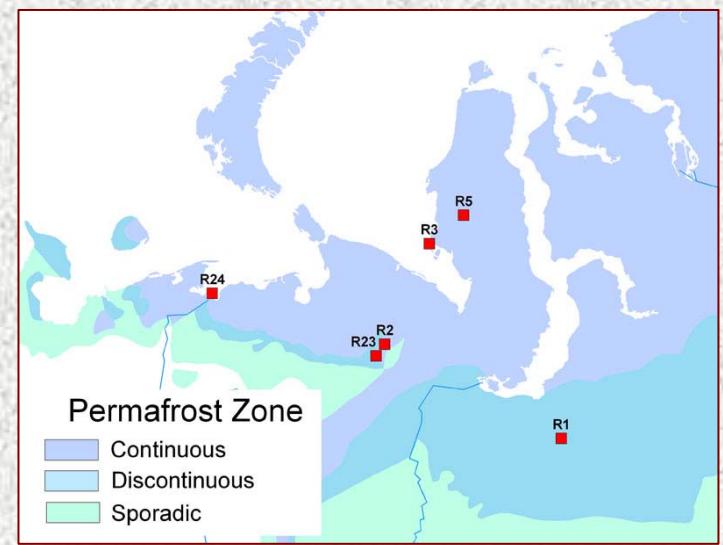
- Grids
- Thaw Tubes
- Points/ Transects
- ★ Ground Temperature Interpolation
- Interpolation

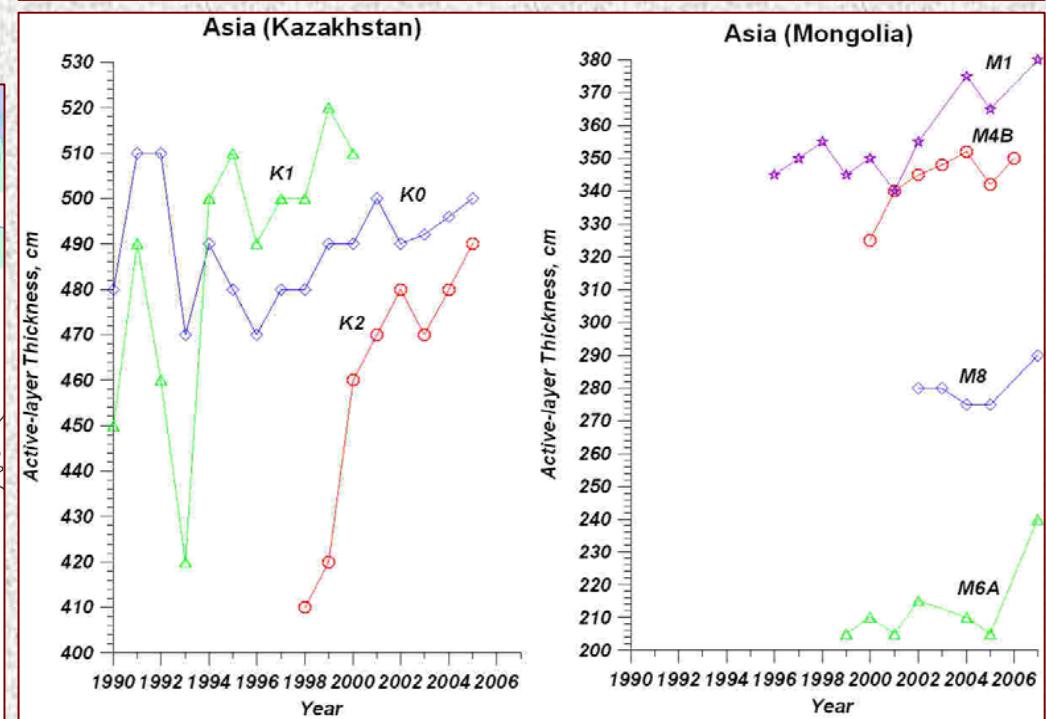
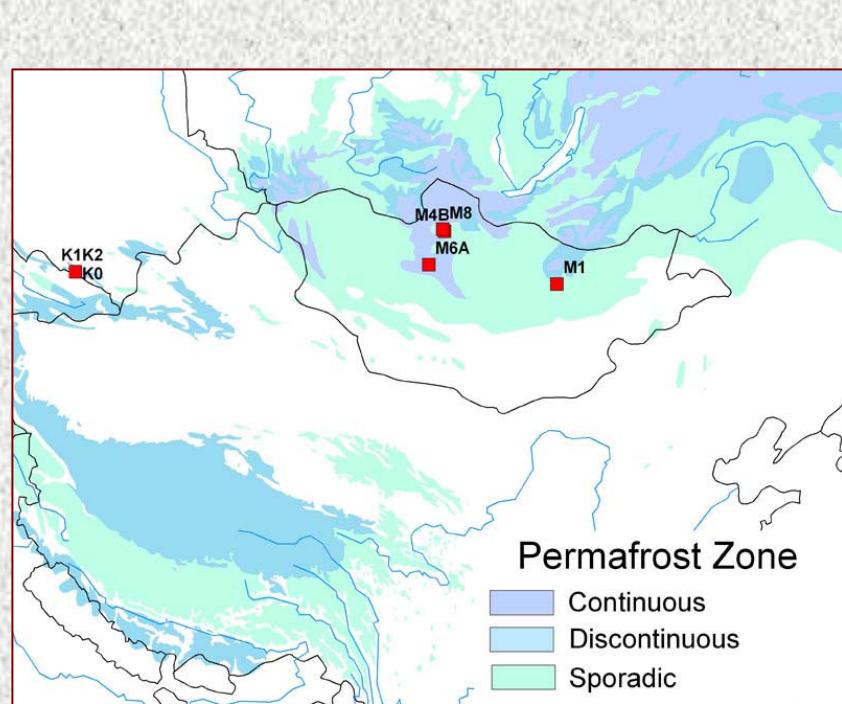
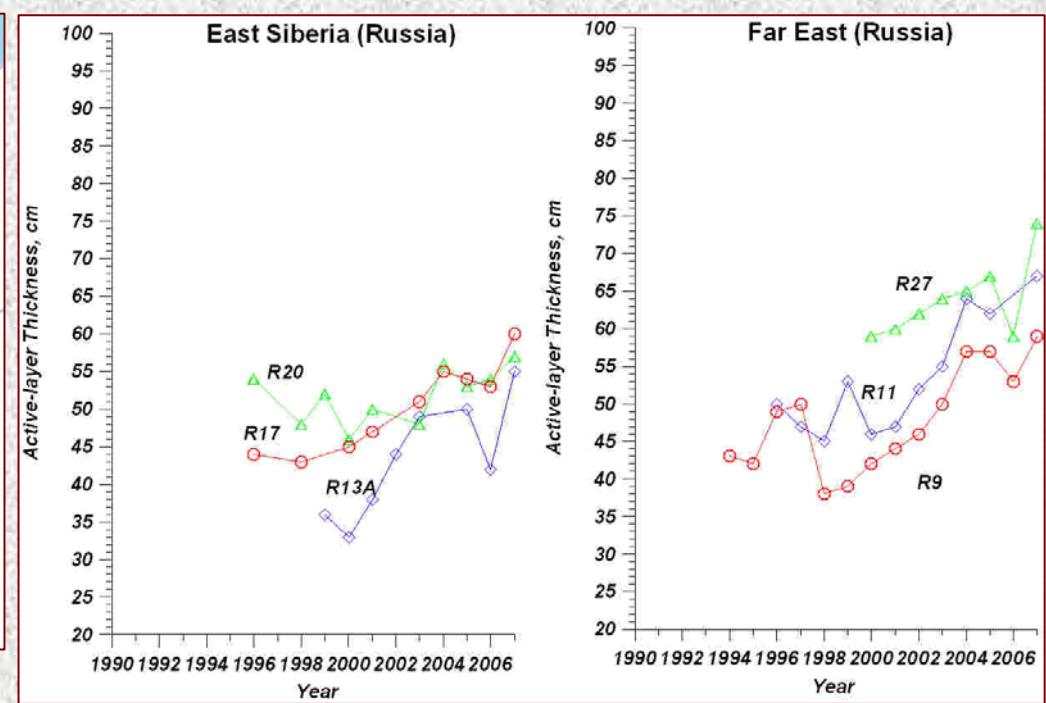
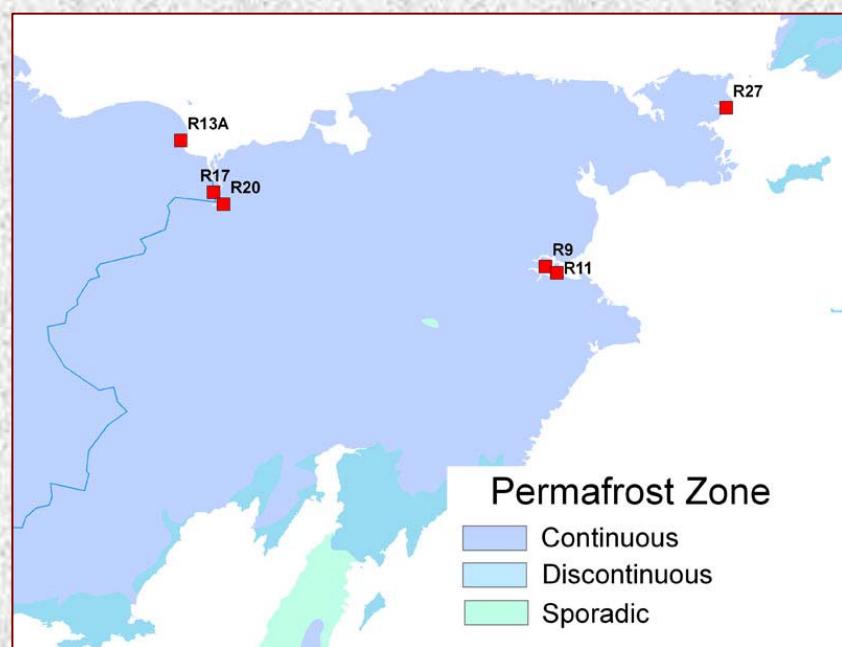
Permafrost Zone

- Continuous
- Discontinuous
- Sporadic

ALT inferred from ground temperature interpolation

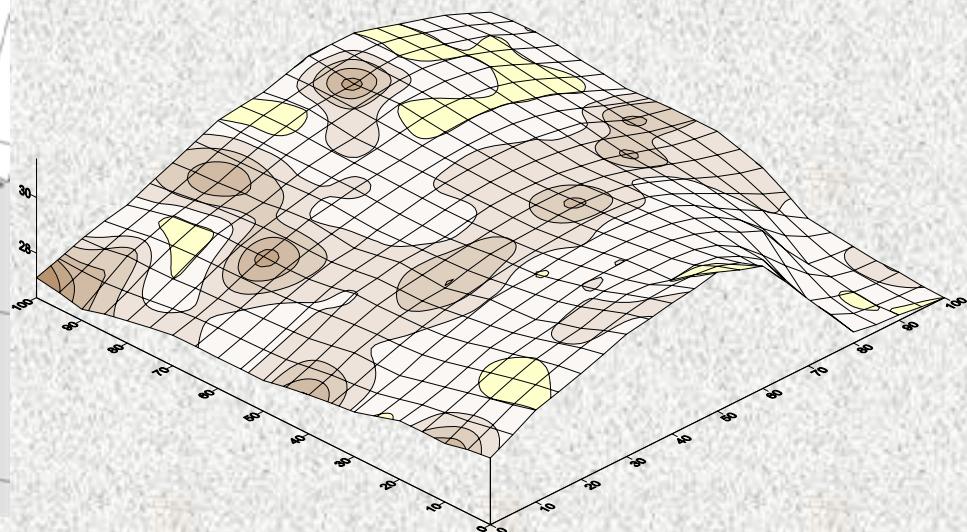




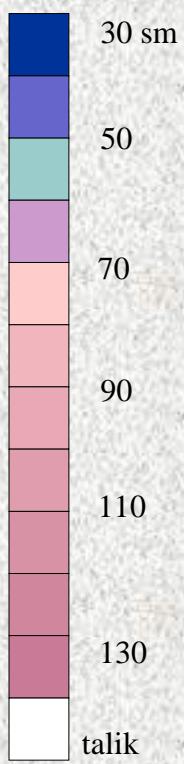
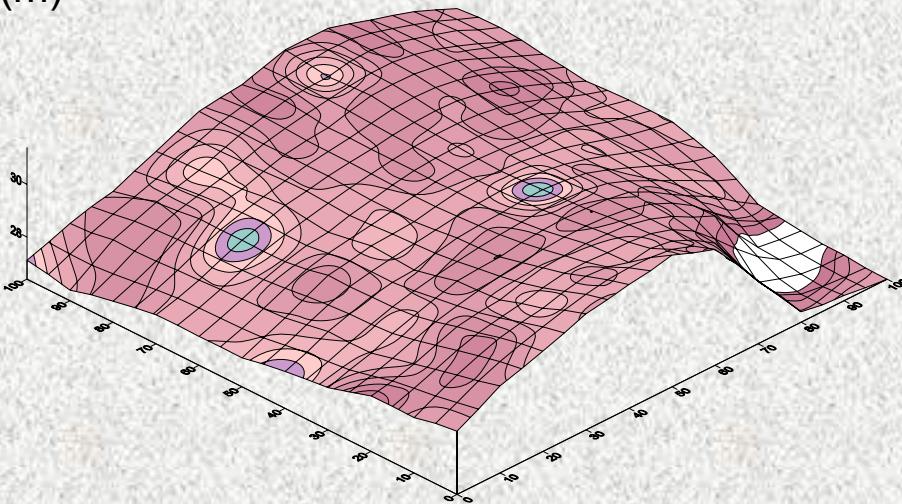




Bolvansky
Organic layer thickness and elevation (m)

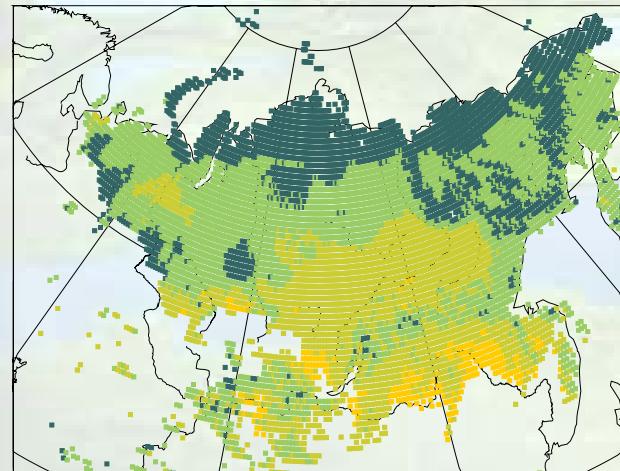


Thaw depth and elevation (m)

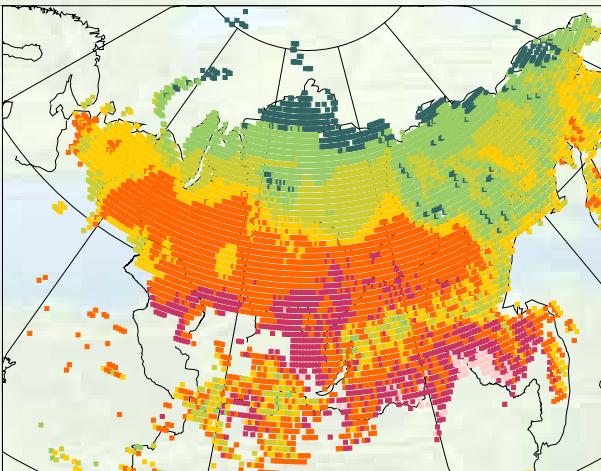


Seasonal thaw depth at decadal time scale

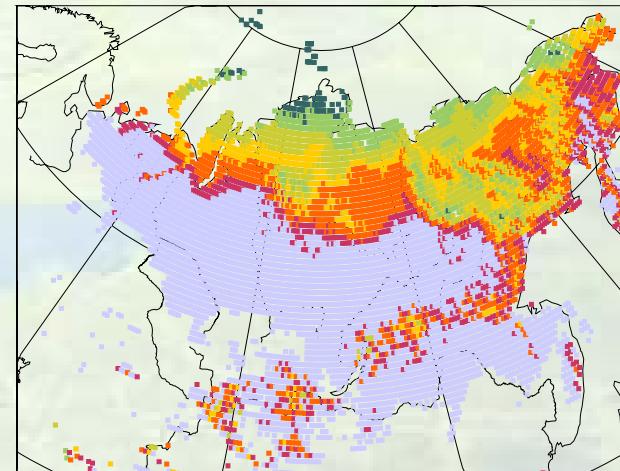
Modern climate (1991-2000 climatology)



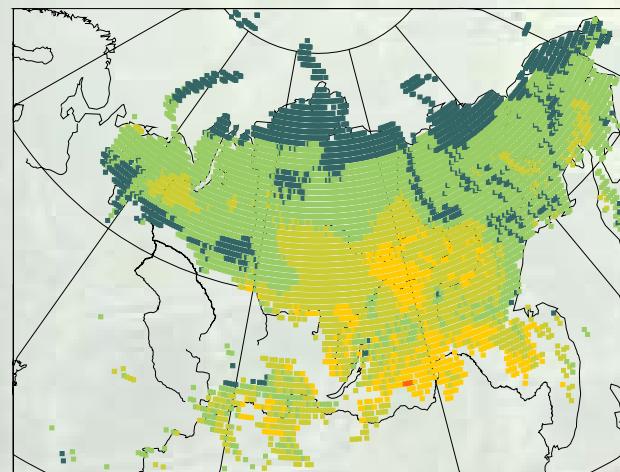
$$\text{Min} = (Z_m - 1.96 \square \sigma_z)$$



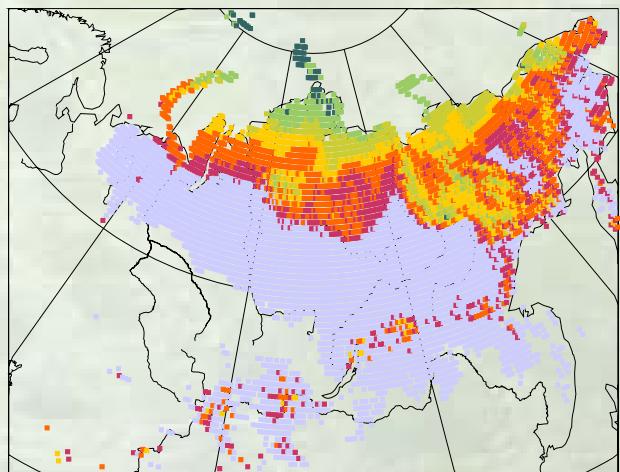
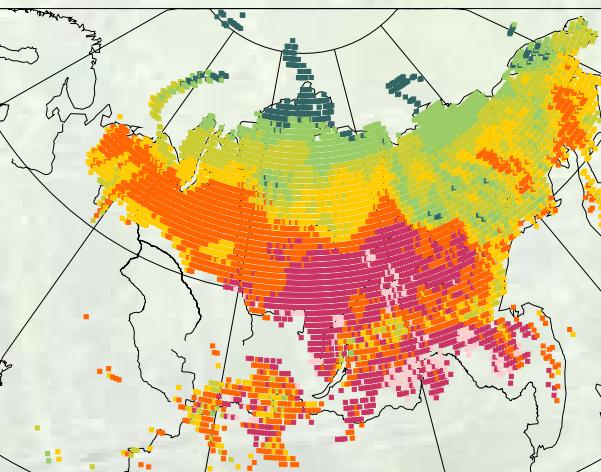
$$\text{Mean, } Z_m$$



$$\text{Max} = (Z_m + 1.96 \square \sigma_z)$$



Projection for 2050 (based on 5 GCMs)



Seasonal thaw depth, m

0 0.6 1.0 1.3 1.5 1.8 2.0 >2

Probabilistic permafrost mapping at decadal time scale

Modern climate

Ensemble projection for 2050

Seasonal thaw range

<0.8 m

0.8-1.5 m

1.5-1.8 m

>1.8 m

Probability scale



The background image shows an aerial view of a wetland landscape. The terrain is characterized by numerous small, scattered blue lakes or ponds, which are surrounded by dense green vegetation, likely grasses or low shrubs. The overall pattern is one of a patchwork of water and land.

Permafrost web sites

1. Survey of results from research projects and permafrost data bases <http://nsidc.org/fgdc>
2. CALM project and data www.udel.edu/Geography/calm
3. Sub-aquatic permafrost [www. awi-potsdam.de/acd/](http://www.awi-potsdam.de/acd/)