OVERVIEW OF YAMAL PENINSULA
with focus on Laborovaya and Vaskiny Dachi: Climate, zonation, physiography, geology, permafrost

Marina Leibman, Galina Malkova (Earth Cryosphere Institute SB RAS, Moscow)
Artem Khomutov (Earth Cryosphere Institute SB RAS, Tyumen)
Anatoli Gubarkov (Tyumen State Oil and Gas University, Tyumen)
Freeze index zonation is not latitudinal but rather longitudinal with eastern coast much warmer than western due to effect of Gulf Stream.

Thaw index is less affected by warmth advection from the west and eastern coast is only slightly warmer.

Processed were 3-year records at Tyurin-To permafrost station. You can see that coastal freeze and thaw indexes are cooler and warmer inland, respectively, which is in compliance with higher continentality of inland Yamal.
CLIMATE OF YAMAL PENINSULA

Precipitation

- Average precipitation sum reduces northward from 433 to 258 mm
- Summer precipitation reduces northward from 300 to 170 mm

(Generalized by S.M. Fotiev, 1999)
PERMAFROST OF YAMAL PENINSULA

Ground temperature

Main watershed of Yamal (inland compared to coastal) is much colder as follows from analyses of air temperature distribution

After D.S. Drozdov and G.V. Malkova, 2002

Interface between areas with continuous and discontinuous permafrost
THICKNESS AND DISTRIBUTION OF PERMAFROST
(FUNDAMENTALS OF GEOCRYOLOGY, 1998)

1 $>100\ m$;
2 $>300\ m$;
3 $>500\ m$;
4 $>500\ m$. 
Evolution of permafrost

Relation between perennially frozen epigenetic, syngenetic, and cryotic deposits, and thawed deposits along the Yamal transect from Kharasavey southward (after G.I. Dubikov, 2002): 1, syngenetic frozen; 2, epigenetic frozen; 3, epigenetic cryotic; 4, non-frozen.
Zoning of the North of West Siberia (after Dubikov, 2002)

Distribution of saline deposits from the ground surface: Northern geocryological zone
Salinity (upper pane) and Clorine (lower pane) distribution in the North of West Siberia (after Dubikov, 2002)

1, modern laida;
2, I-III marine terraces;
3, IV (Kazan) marine terrace;
4, V (Salekhard) marine terrace;
5, Paleogene deposits at all geomorphic units.
Tabular ground ice and cryopegs

Geological profile at Bovanenkovo gas field
(after I.D. Streletskaia, 2003)
Low-center polygons
Kurum formation: frost-heaving up stones out of matrix
Stones heaved up in a vertical position
Hill top away from hard-rock exposures
Vaskiny Dachi Research Location:
Ravines inheriting polygonal pattern, and thermokarst depression
Polygonal pattern at the drained lake (khashyrei) slope
LANDSLIDE ACTIVATION IN CENTRAL YAMAL PENINSULA NEAR VASKINY DACHI RESEARCH LOCATION IN 1989
Aerial photo of 1990, oblique photo of 2005
Share surface of a 1989 landslide in 2005
Thermocirque with exposure of tabular ground ice
Landslide (retrogressive thaw slump) body
Tabular ground ice: landslide share surface
Widespread willow shrubs
WHY VEGETATION BENEFITS FROM LANDSLIDE

1.5 m high willow shrubs at the ancient shear surface of a landslide

After N.G. Ukraintseva
Thank you for your attention