

Arctic Research Station, Labytnangi, Russia

Alexander Volkovitskiy

## The 2016 anthrax at Yamal

Morning Mix

# Anthrax sickens 13 in western Siberia, and a thawed-out reindeer corpse may be to blame



Reindeer in the Russian peninsula of Yamal. (Shantanu Tanna)

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### Russia anthrax outbreak affects dozens in north Siberia

2 August 2016

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Anthrax bacteria under a microscope - livestock are most at risk while grazing

Ninety people are undergoing hospital checks in remote northern Russia because of an anthrax outbreak that killed a boy on Monday.

Eight people are confirmed as infected with anthrax, a rare but deadly bacterial disease. It is believed to have spread from reindeer.

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The air pollution is in the "hazardous" category and has been described as the worst so far this year.

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#### Features



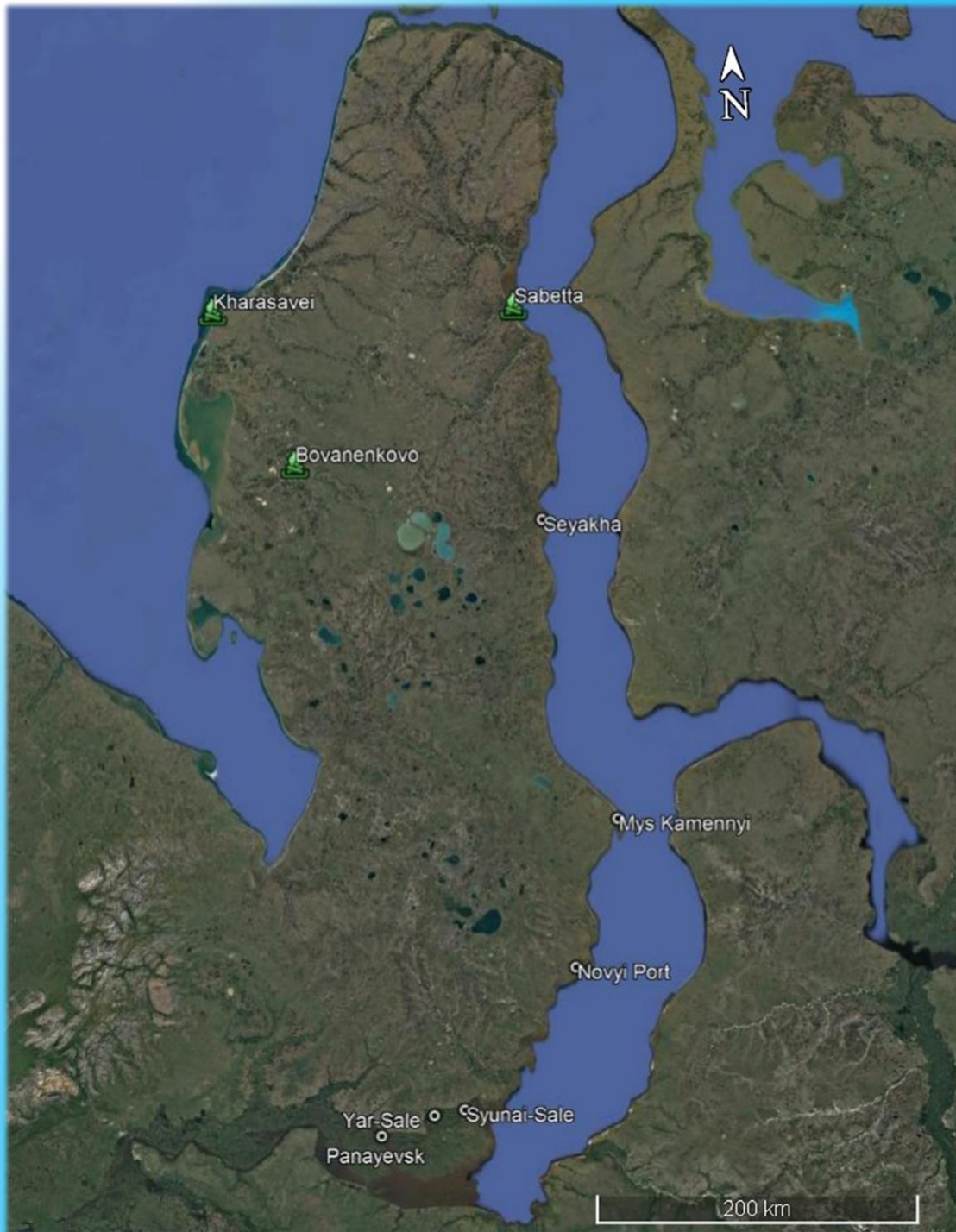
The Russian vegans cooking up a revolution



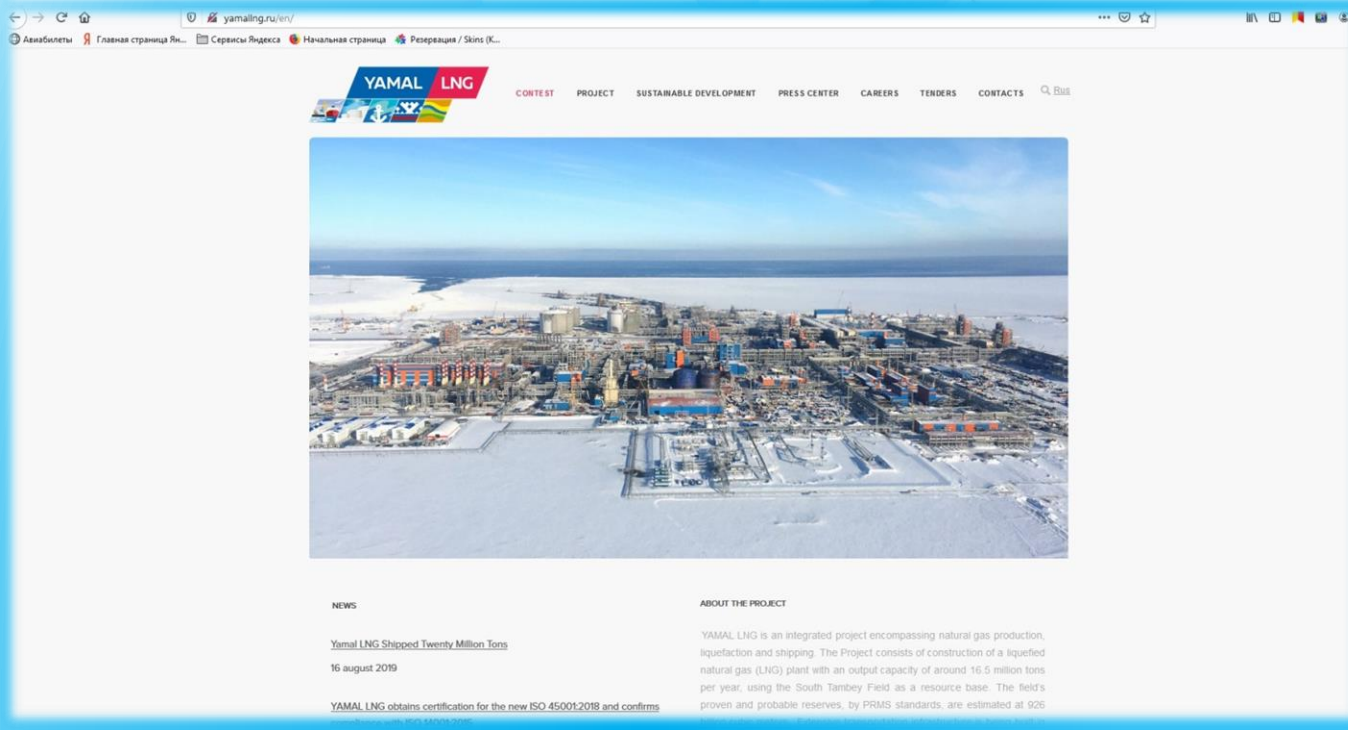
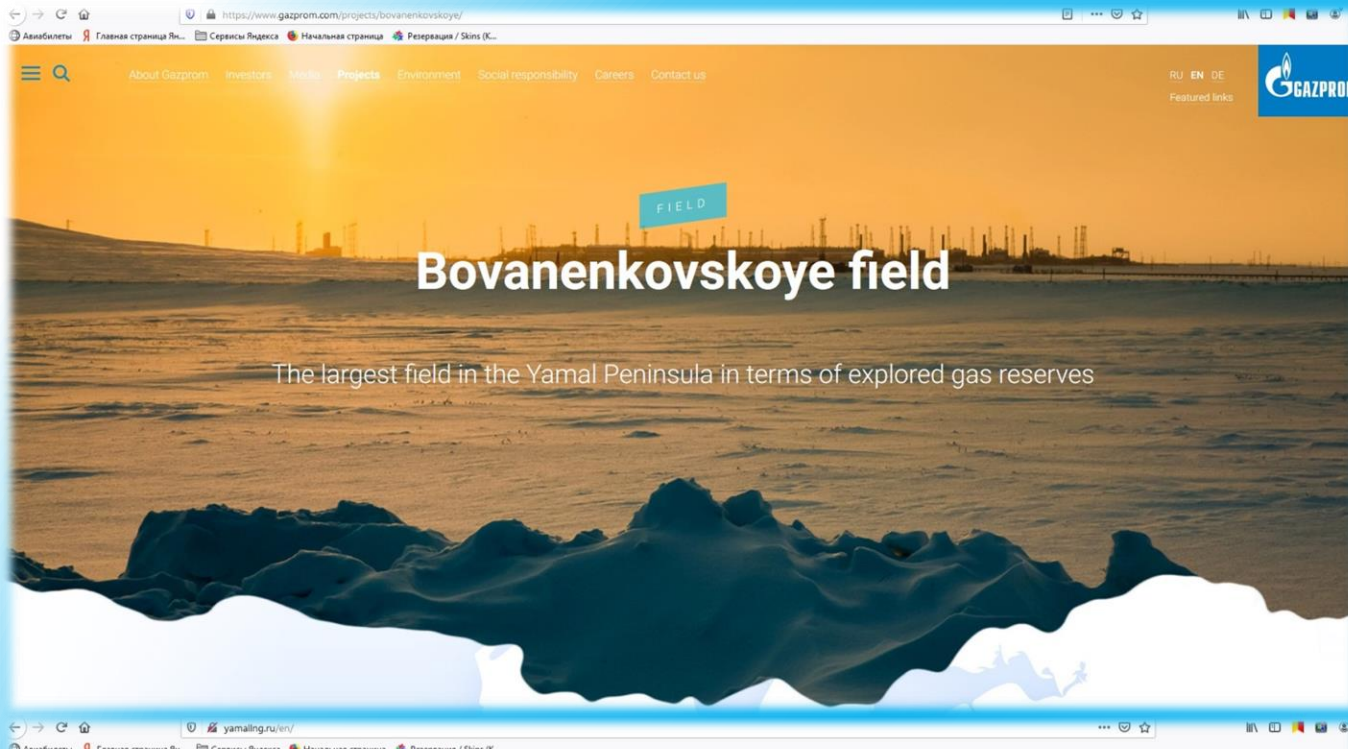
1. Yamal
2. Anthrax
3. Problem of permafrost thawing



Yamalo-Nenets Autonomous Okrug



Yamalskiy *raion* (district)



Bovanenkovo and Sabetta – the largest facilities of gas production in Yamal



The world's largest center of reindeer pastoralism



Anthropologists at Yamal



Nenets tundra nomads preserving their traditional life-style



Nenets perform the model of family migrating



A synthesis of traditions and modern innovations



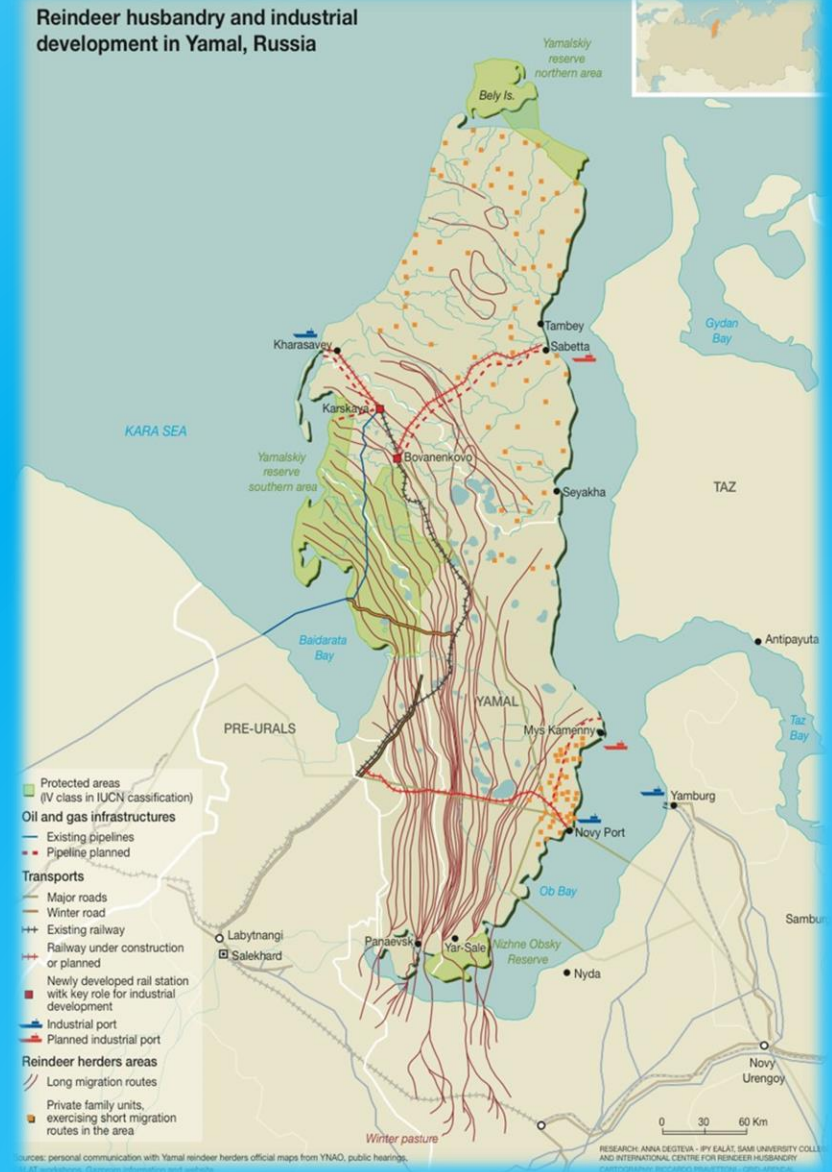
- At least 1000 families (almost 6000 people) live in tundra, depending on reindeer herding and fishing
- They graze about 250.000 reindeer
- Ca. 90% of reindeer are privately owned, only 10% – the state (municipal property)



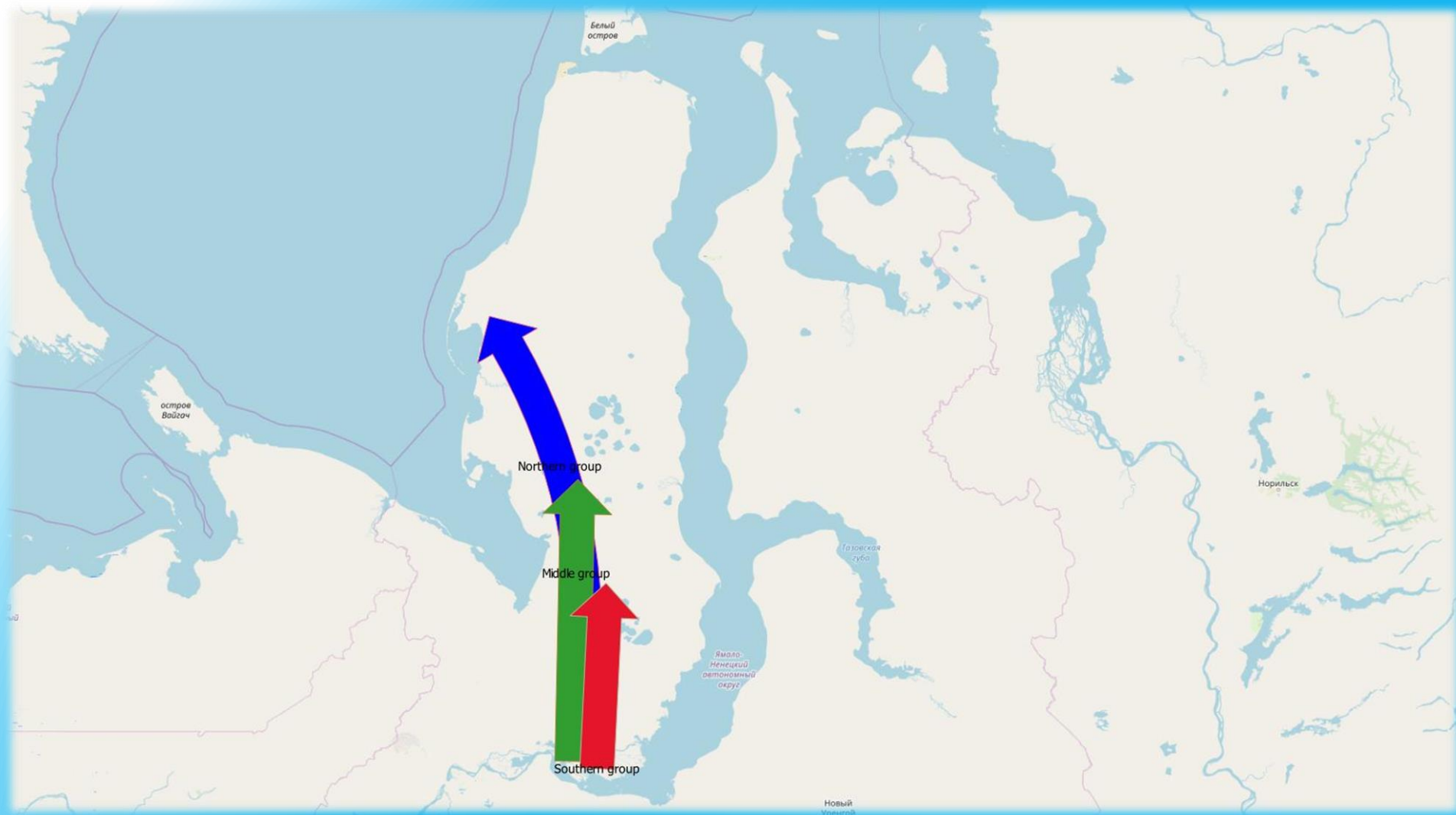
Reindeer herding against the background of intensive industrial development



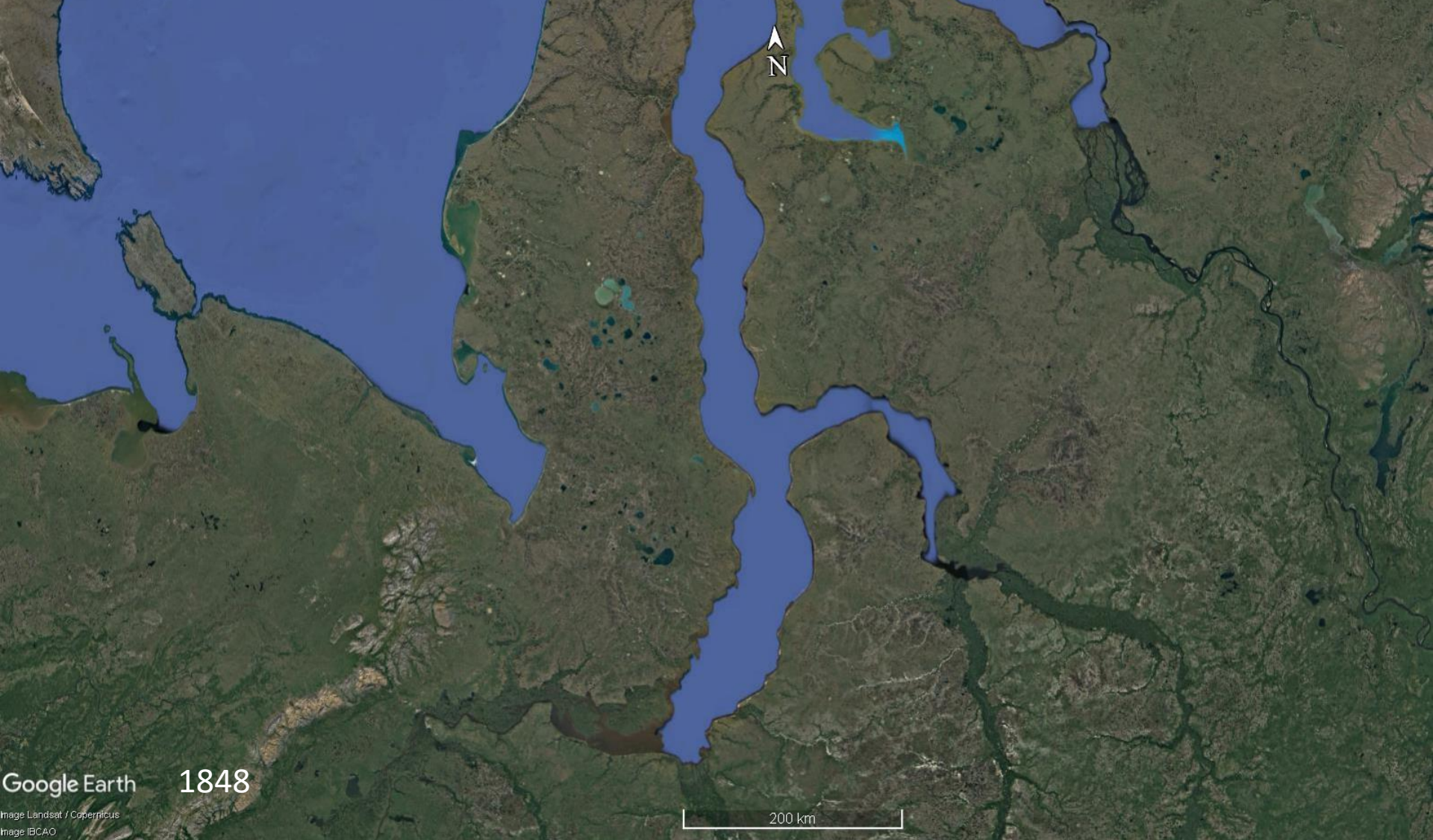
# Reindeer husbandry and industrial development in Yamal, Russia



Reindeer herding infrastructure of Yamal. Left: Golovněv A. V., Kukanov D. A., Perevalova E. V. (2018) *Arktika: atlas kochevykh tekhnologii* [The Arctic: Atlas of the Nomadic Technologies]. – P. 159, Fig. 34; right: Degteva A., Nellemann Ch. Nenets migration in the landscape: impacts of industrial development in Yamal peninsula, Russia. In: *Pastoralism: Research, Policy and Practice*. Volume 3, Article number: 15 (2013). P. 4, fig. 2.



3 groups of reindeer herders of Yar-Sale and Panaevsk:  
“southern”, “middle” and “northern”



Anthrax on the territory of YNAO (historical perspective):

1848 – 1<sup>st</sup> case of anthrax on Urals described by D.  $\widehat{\text{U}}$ Ur'ev



1876 – epizooty of anthrax, observed by O. Finsch



Google Earth

Image Landsat / Copernicus  
Image IBCAO

200 km

1911 – anthrax reached Yamal, first attempts to identify the disease, organized by regional officials.

Timeline of greatest epizooties of reindeer in Tobolskaya *guberniya* (county) of Russian Empire:

1847-1852, 1856, 1863, 1872, 1876, 1889, 1896, 1898, 1903, 1911, 1912, 1915...

1924 – The Institute for veterinary and bacteriology organized in Obdorsk.

1930 – first anti-anthrax vaccination campaigns in Yamal.

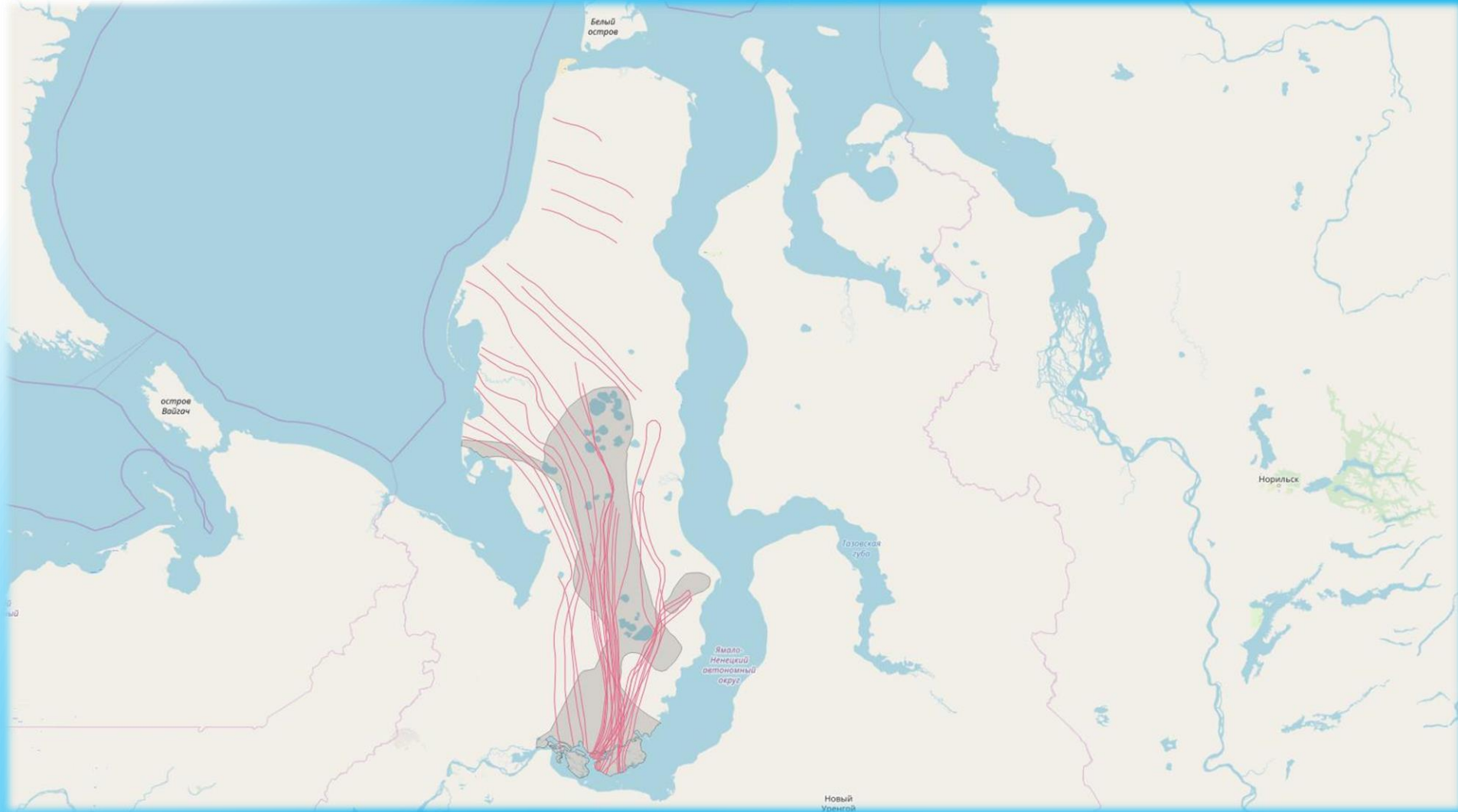
1941 – the last officially recorded case of anthrax near Novy Port. The total losses of the Yamal reindeer caused by anthrax in 1898–1931 – at least 1 million heads in 68 epizooties.

59 pestilence fields were taken into account in YNAO, 10 in the Yamalskiy raion.

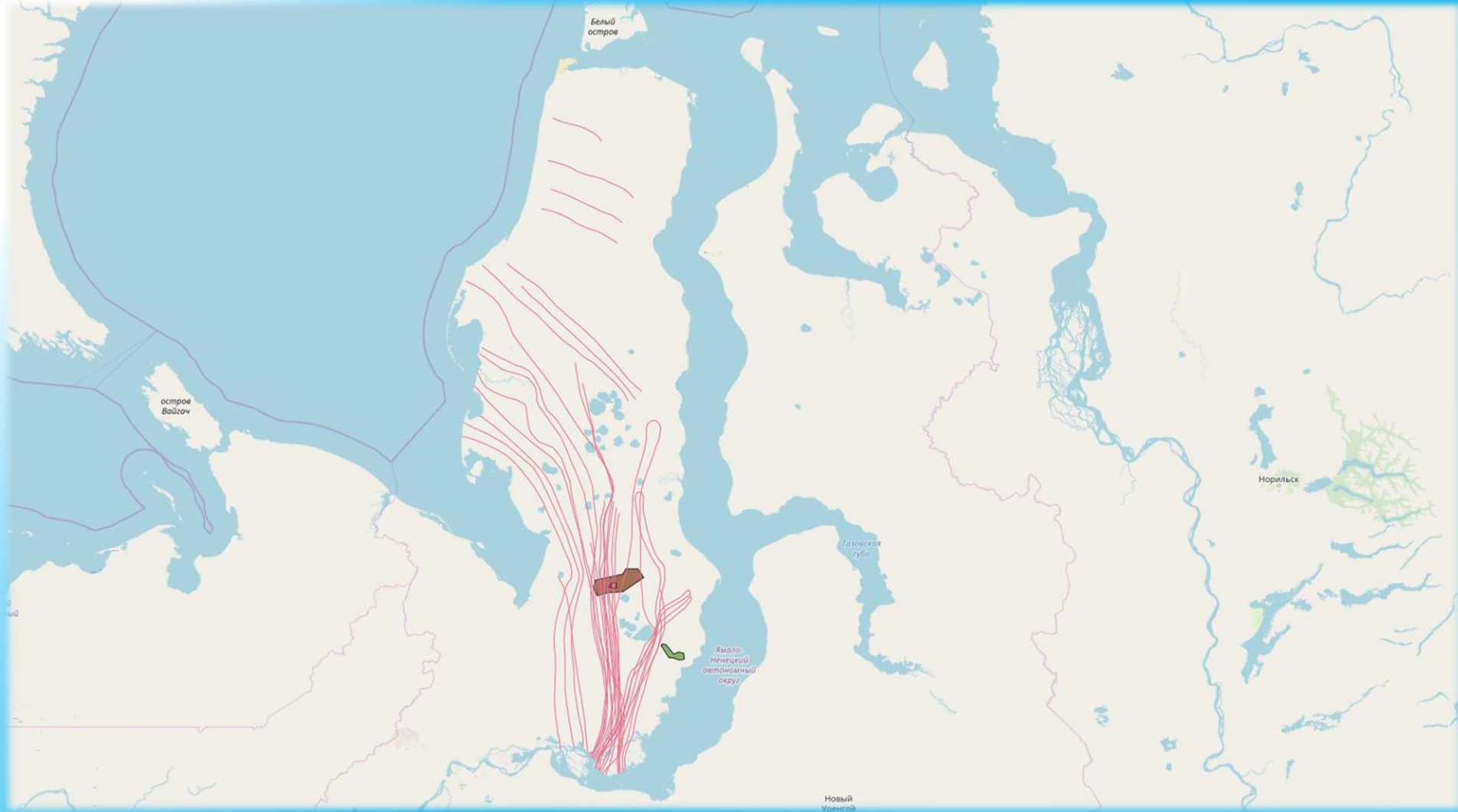
1960s – 82,5% of potentially receptive reindeer were vaccinated.

1968 – Yamal is claimed to be “clean” of anthrax.

2007 – mass vaccination was halted.



Modern reindeer herders' routes and old anthrax pestilence fields – the huge part of Yamal reindeer are migrating over the old “fields of dead”



Migration routes and the 2019 anthrax areas

2016 anthrax. Some outcomes:

2649 reindeer perished

2572 carcasses terminated

36 cases of anthrax among people

21 – cutaneous form

11 – oropharyngeal form

1 – gastrointestinal form (fatal)

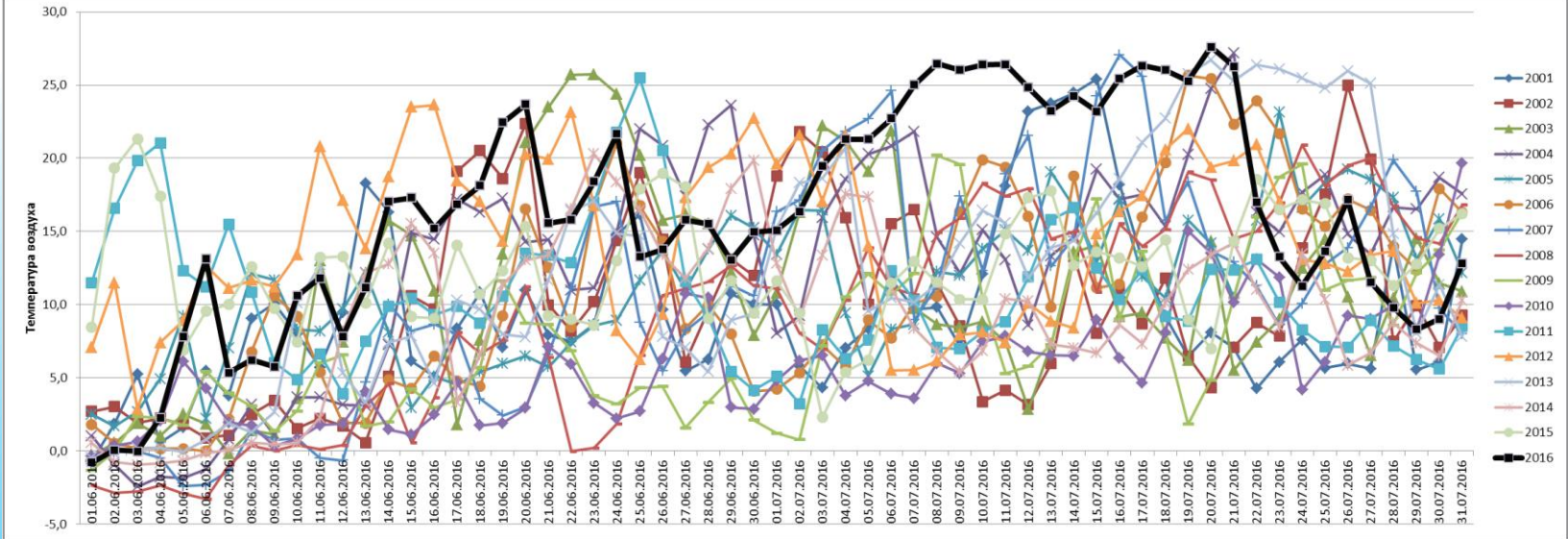
Since 2016 the mass vaccination was resumed in YNAO

The 2016 anthrax has actualized the new wave of discussion concerning both – the conditions of pastures and the problem of overgrazing.

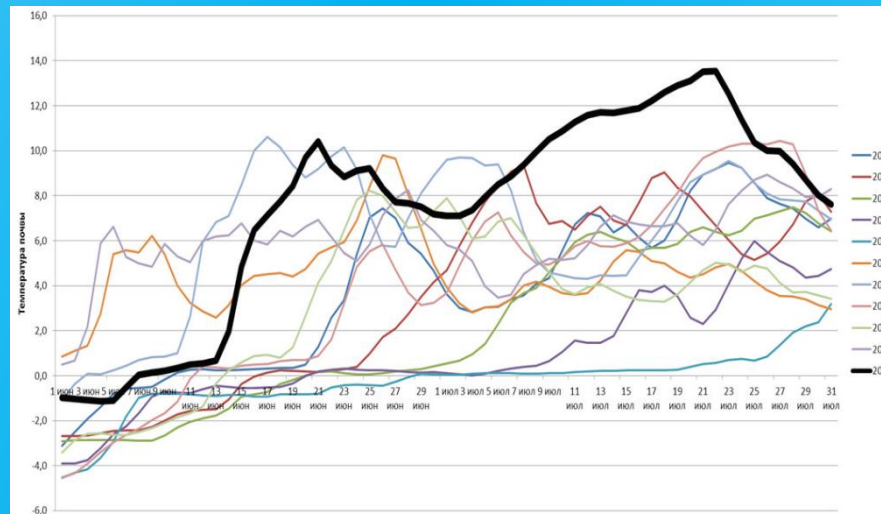
Reindeer herders and reindeer were claimed to be the only actors guilty in the conditions of extremely hot weather of the 2016 July.

No one in the Yamal reindeer herding community believes in anthrax, some of nomads reject to vaccinate themselves and reindeer.

The order of vaccination provoke the inequality in the reindeer herders' society.



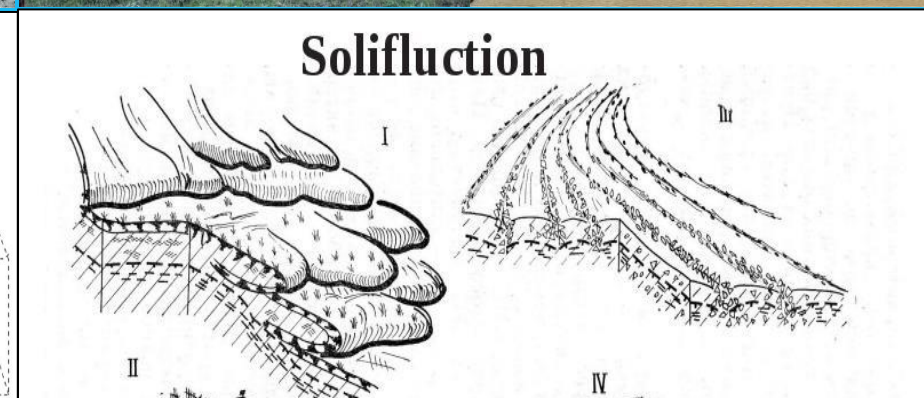
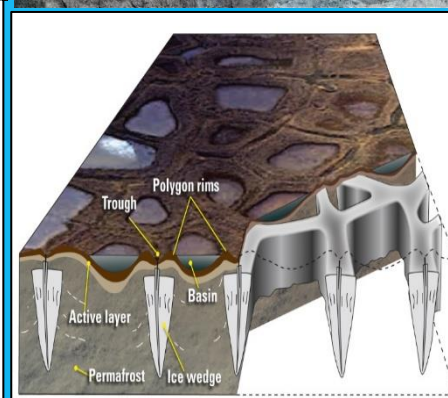
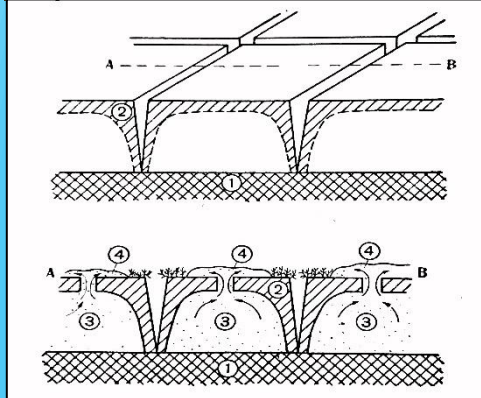
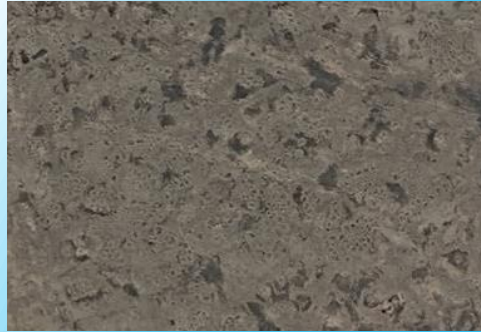
The dynamics of average air temperature on the territory of the anthrax zone in the Yamal peninsula, June-July, 2000–2016.



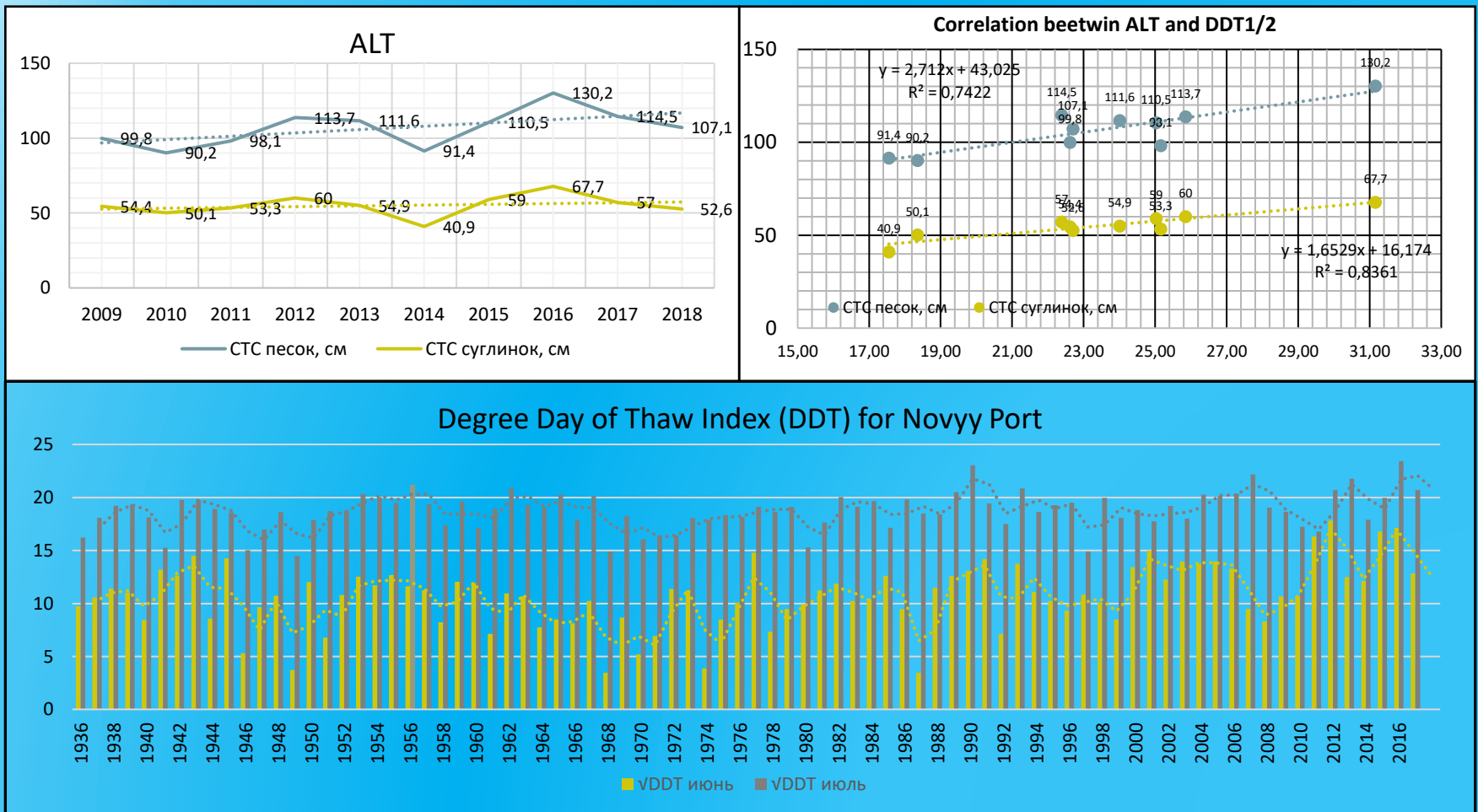
The dynamics of temperature of soil on the territory of the anthrax zone in the Yamal peninsula, June-July, 2000–2016.

Source: Simonova Ye. G. Conceptual approaches in the organization and supervision of anthrax in Russian Federation (*in Russian*). *Epidemiologiya i infeksionnyye bolezni. Aktualnye voprosy*. – 2016. – P. 4–8.

# Complex of cryogenic processes determining the «distortion» of a surface



We employed the standard CALM analytic procedures for establishing correlations between ALT with the quantity of heat delivered into the ground, primarily during the warm season. The degree days of thaw indexes (DDT) are computed for each site as the annual sum of day-averaged positive air temperatures. DDT provides an integrated measure of summer warmth. The quantity DDT1/2, used as an independent variable, is well known to produce straight-line relations with ALT.



- The survey of 20<sup>th</sup> c. temperatures combined with the DDT for the tundra with 2016 anthrax demonstrates that to the start of the 2016 anthrax (early July) there's no valid data of extreme heat in compare to the years of previous epizooties.
- The density of reindeer in 1910-1930 (years of anthrax) in the area was lower and this fact disavows the idea that the increasing of Yamal herds – the reason of the 2016 outbreak.
- Anthrax could have happen in any period after the vaccination cessation in 2007.



Thank you!  
Спасибо!  
Нарка вада!