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Polar Bear Research in Russia in 2023-2025

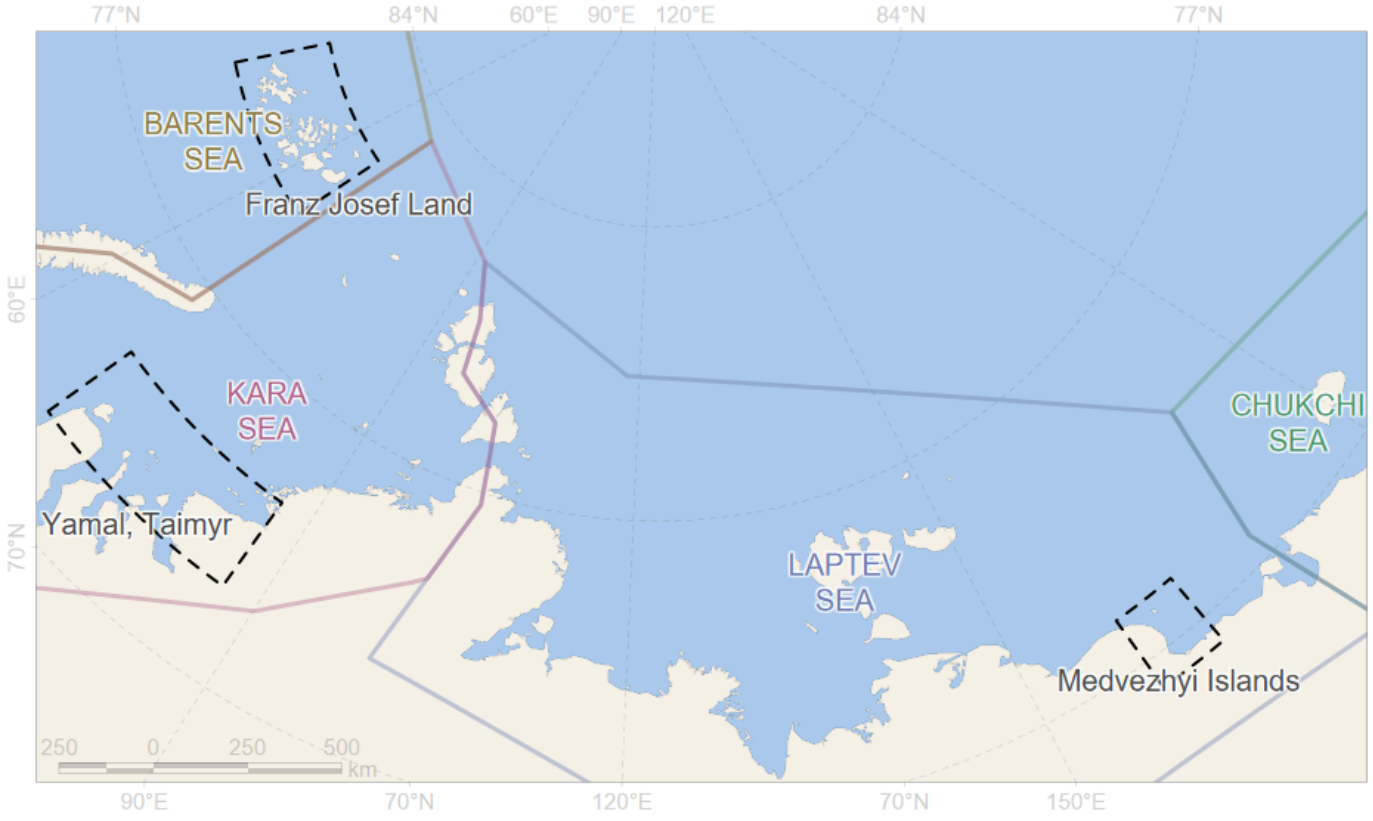
conducted by the Severtsov Institute of Ecology and Evolution of the Russian Academy of Sciences

Polar Bear Range States Meeting of the Parties

December 2-5, 2025

Updated: 2025-11-14 20:04

Program of polar bear study in the Russian Arctic



The Institute of Ecology and Evolution of the Russian Academy of Sciences (IEE RAS) continues polar bear research in the Russian Arctic, which began in 2010 under the Program of the Russian Academy of Sciences. Research is being conducted in accordance with the Strategy for the Conservation of Polar Bears in the Russian Federation for the period until 2030.

In 2023-2025, monitoring of polar bears was carried out on the Franz Josef Land archipelago, the islands in the Kara Sea near the Yamal and Taimyr Peninsulas, as well as in the East Siberian Sea on the Medvezhyi Islands (*Bear Islands*) archipelago.

The main contribution was on research and monitoring of the Kara Sea polar bear subpopulation

Main methods of polar bears research

- Study of abundance and distribution of polar bears
  - Field survey and observations
  - Aerial and ship survey and observations
- Satellite telemetry for evaluating the polar bear movement, behaviour and resource use
- Health assessment of polar bears and study of the influence of natural and anthropogenic factors on the animal health
  - Dangerous diseases (serological study)
  - Hematological study
  - Toxicological study
- Polar bear population structure studies by molecular genetic methods

Field work results in 2023-2025

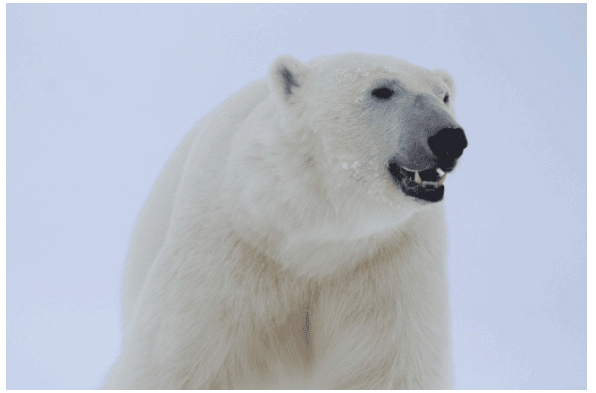
11 expeditions to the Barents, Kara and East Siberian Seas were carried out in spring and summer-autumn seasons;

338 polar bears were recorded during observations;

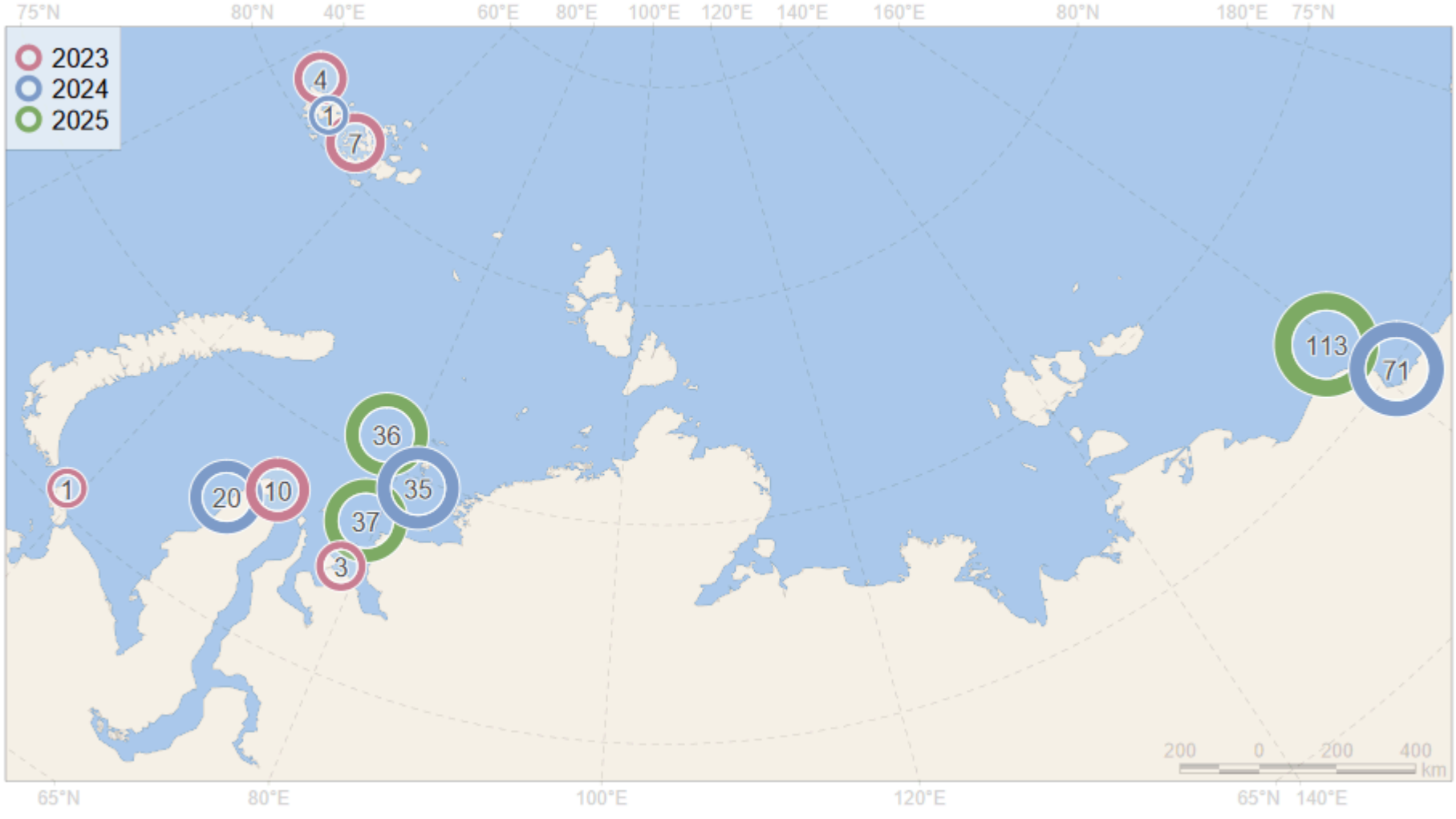
34 polar bears were captured during this period;

13 females and **6** males were tagged with satellite transmitters;

102 biological samples were taken from immobilized individuals (blood, hair, excrement);

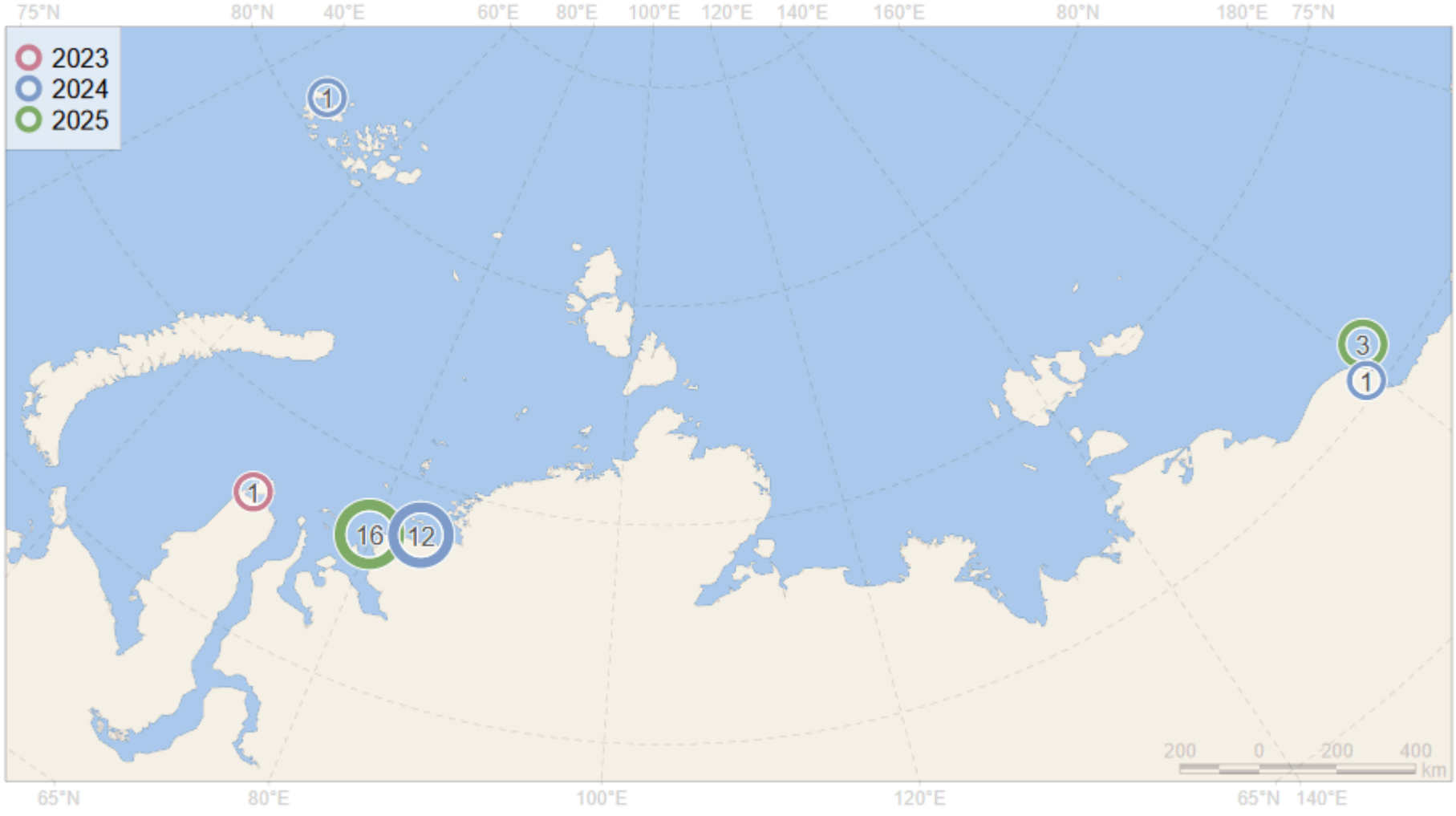


Number of polar bears observed, 2023-2025



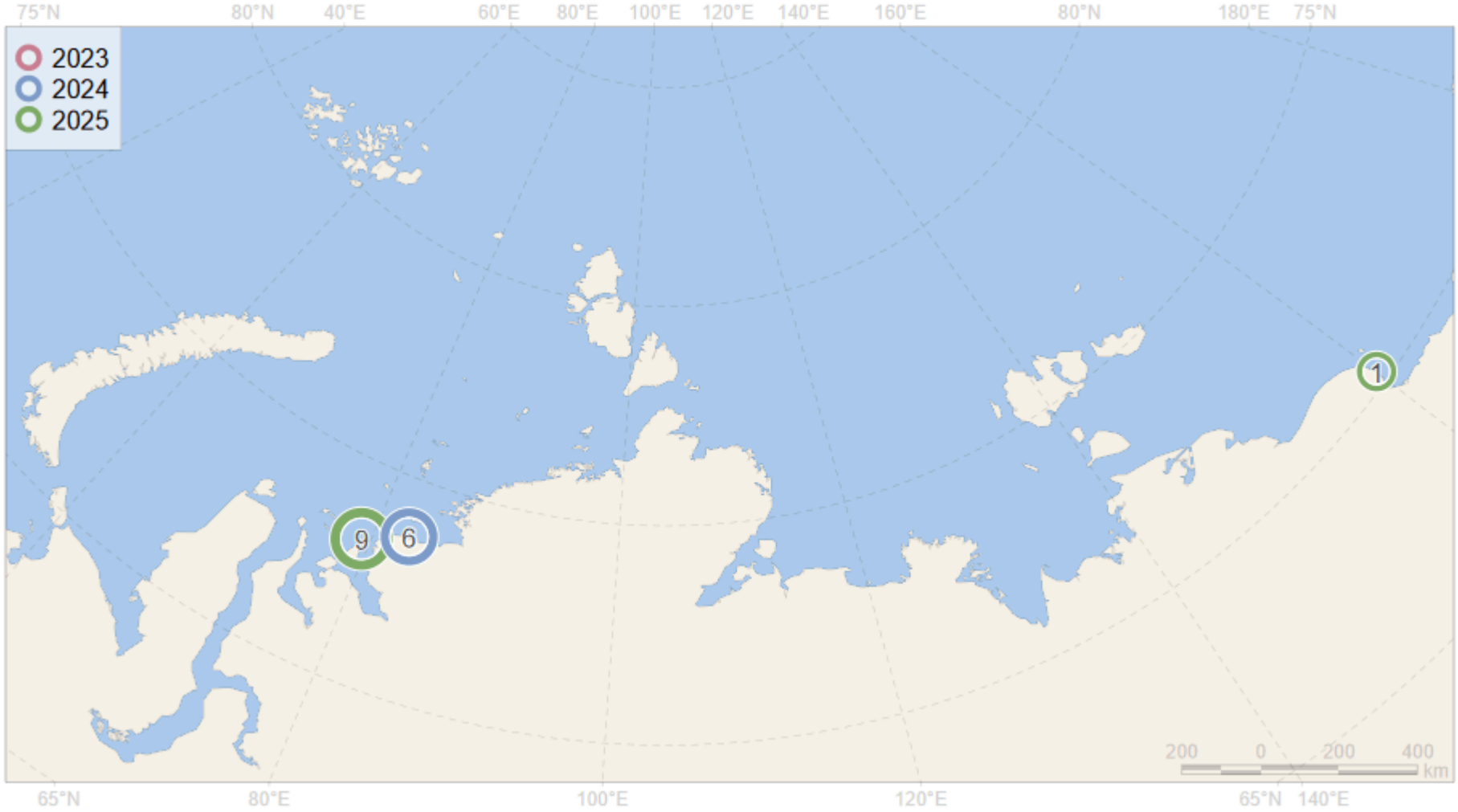
Results for 2023 include observations from ship during a cruise in the Barents and Kara Seas in July.

Number of polar bears captured, 2023-2025



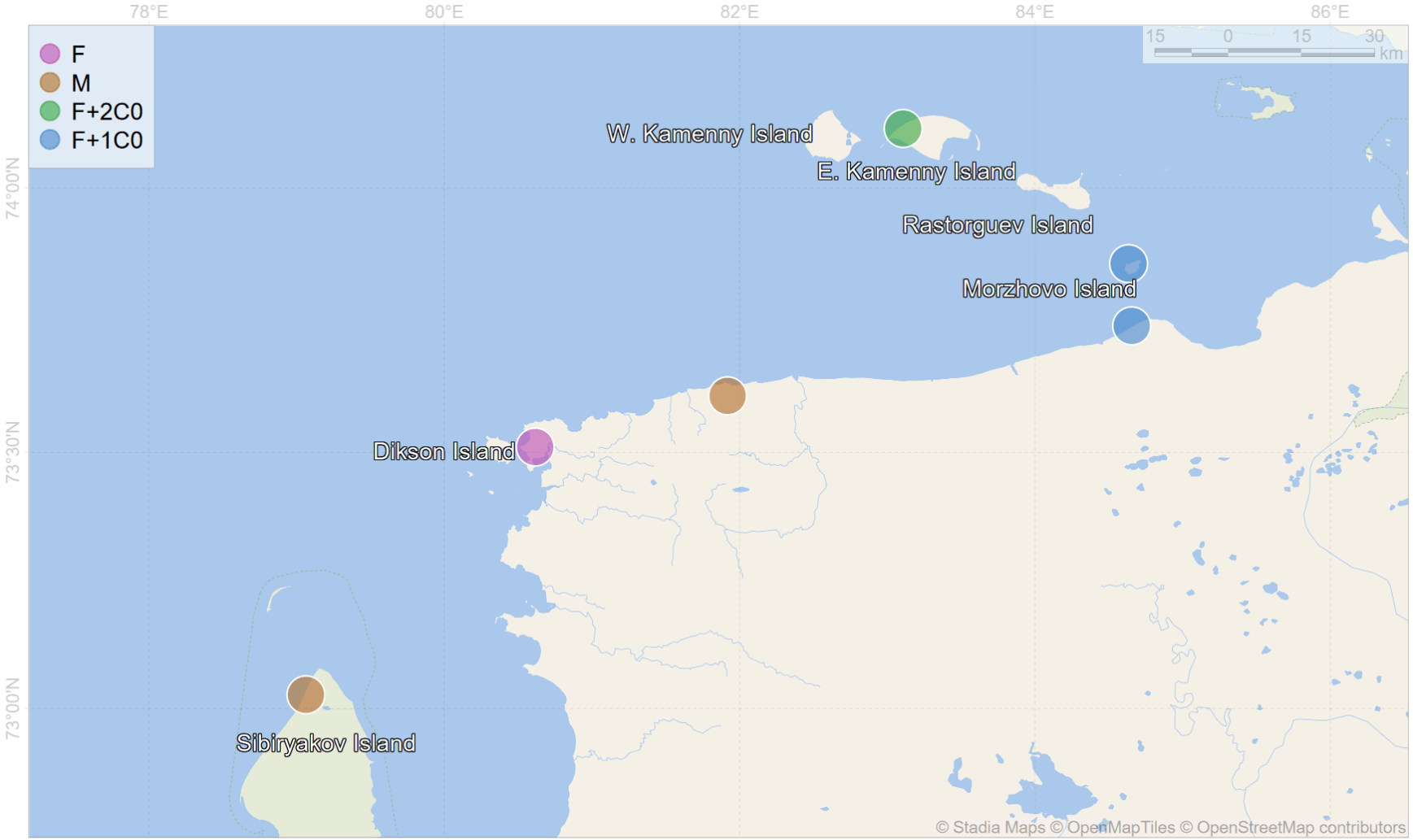
Immobilization was carried out mainly from a helicopter and, in some cases, from the ground using vehicles.

Number of polar bears tagged, 2023-2025



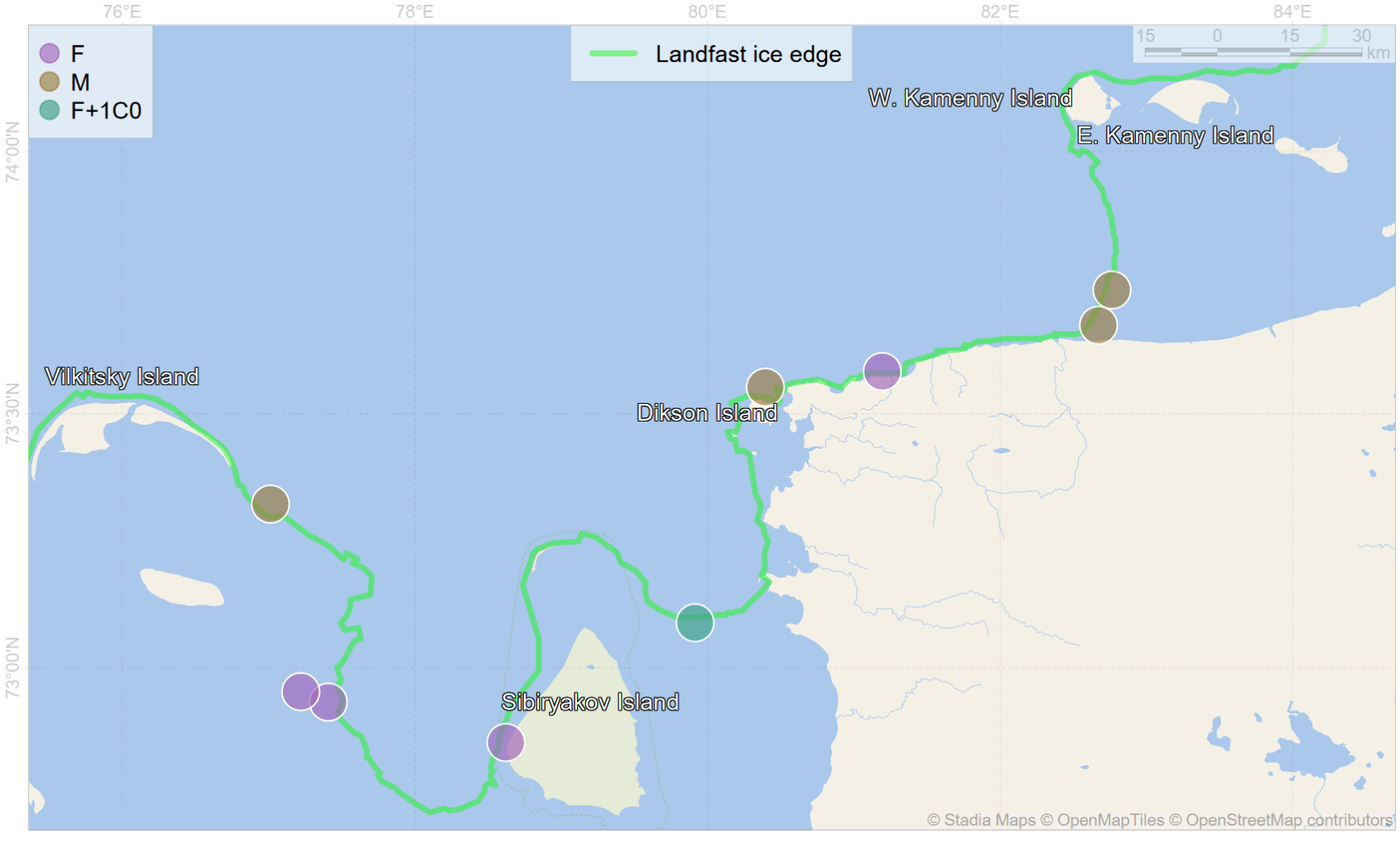
Satellite-linked radio and GPS collars for females and ear-mounted satellite tags for males produced by the Russian company "Es Pas" are used.

Satellite tagging of polar bears in the Kara Sea, 2024-2025



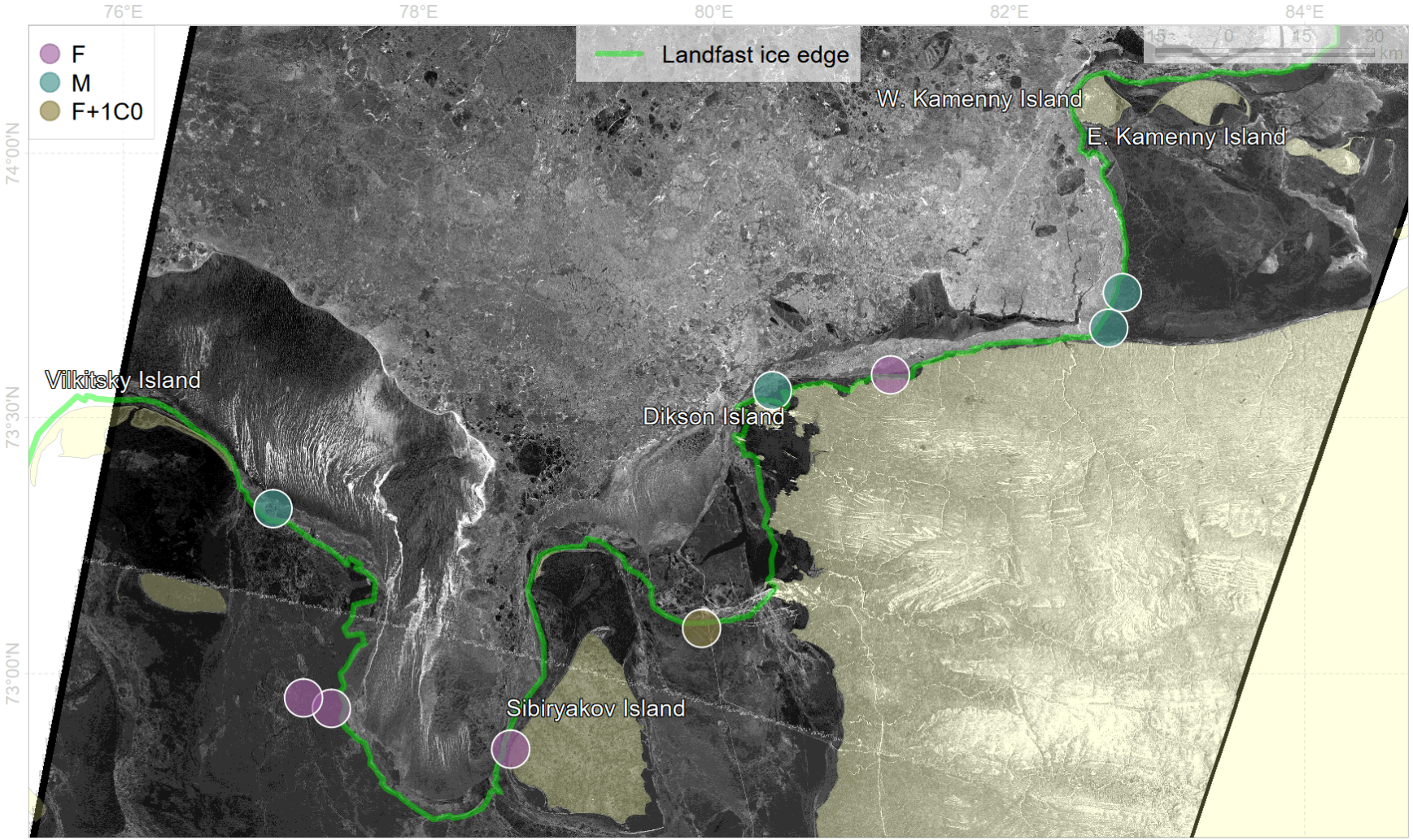
August-September, 2024. 6 polar bears (4 females and 2 males) were tagged on land during the ice-free period

Satellite tagging of polar bears in the Kara Sea, 2024-2025



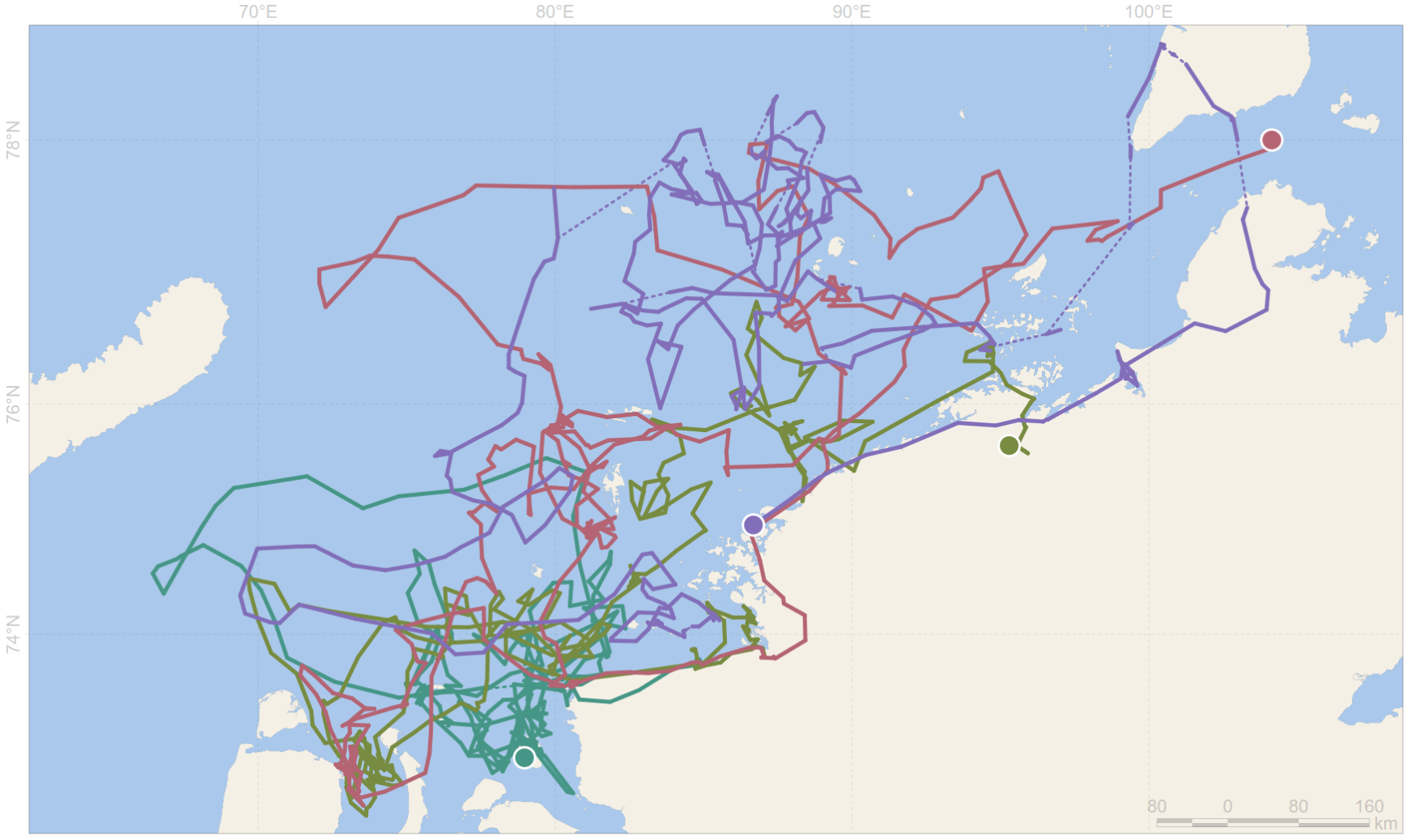
April-May, 2025. 9 polar bears (5 females and 4 males) were tagged on fast ice

Satellite tagging of polar bears in the Kara Sea, 2024-2025



During the spring melt season, pack ice was not reliable for immobilization and following ground manipulations with polar bears.

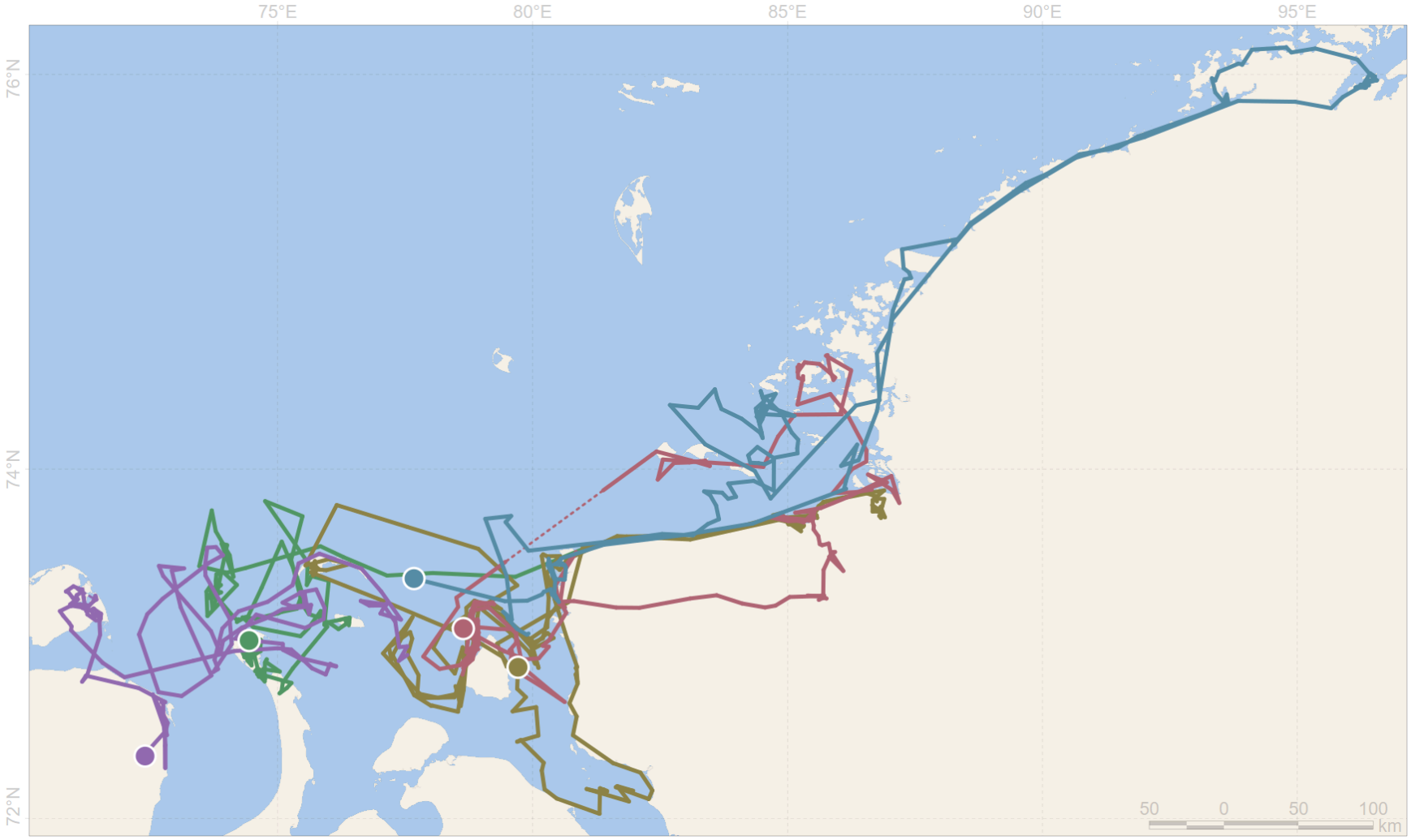
Evaluating of the polar bear movements by satellite telemetry



After sea ice advance, polar bear females used only the southern part of the Kara Sea.

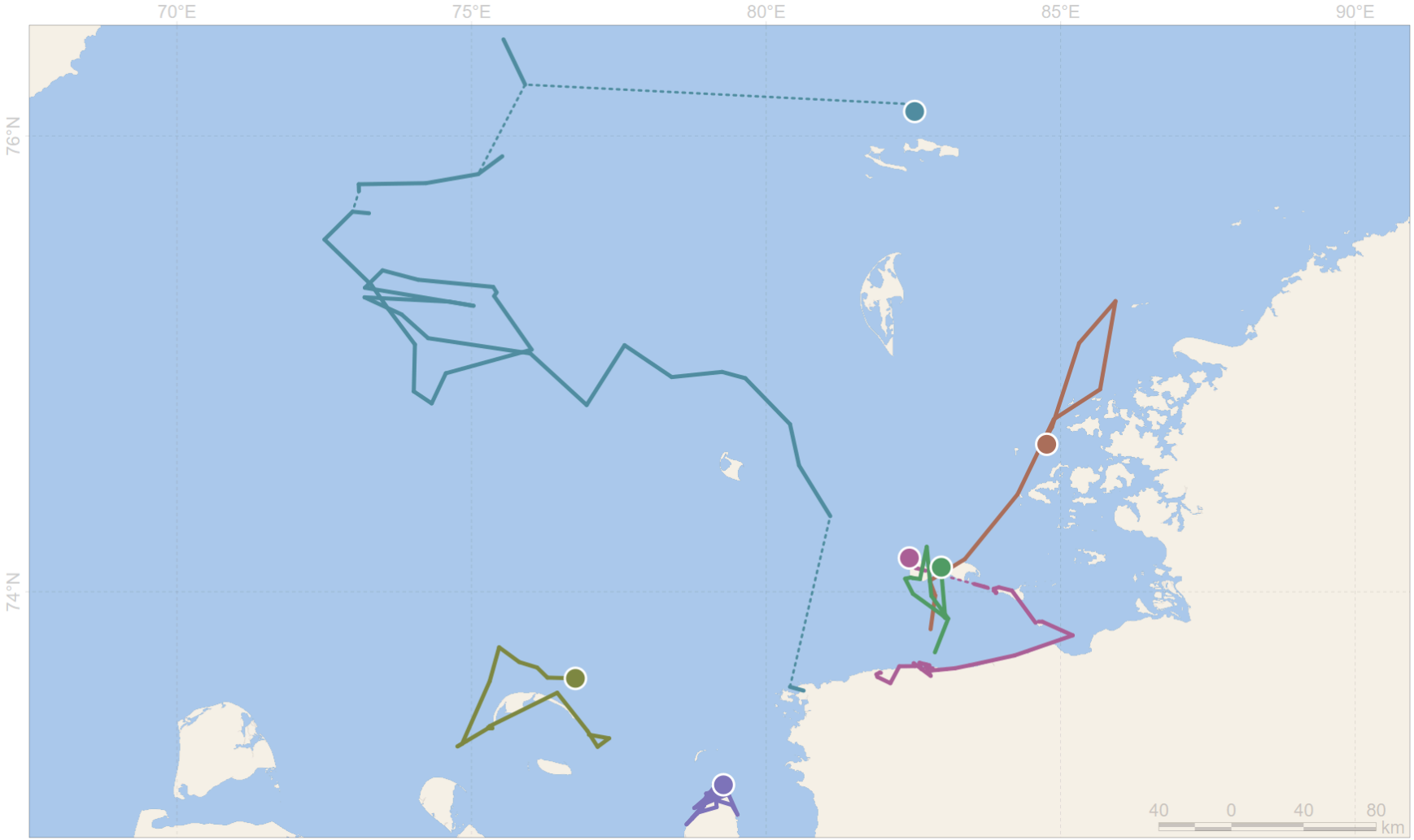
Movement trajectories of 4 polar bear females in the Kara Sea, captured in 2024 on the islands and coast of Taimyr.

Evaluating of the polar bear movements by satellite telemetry



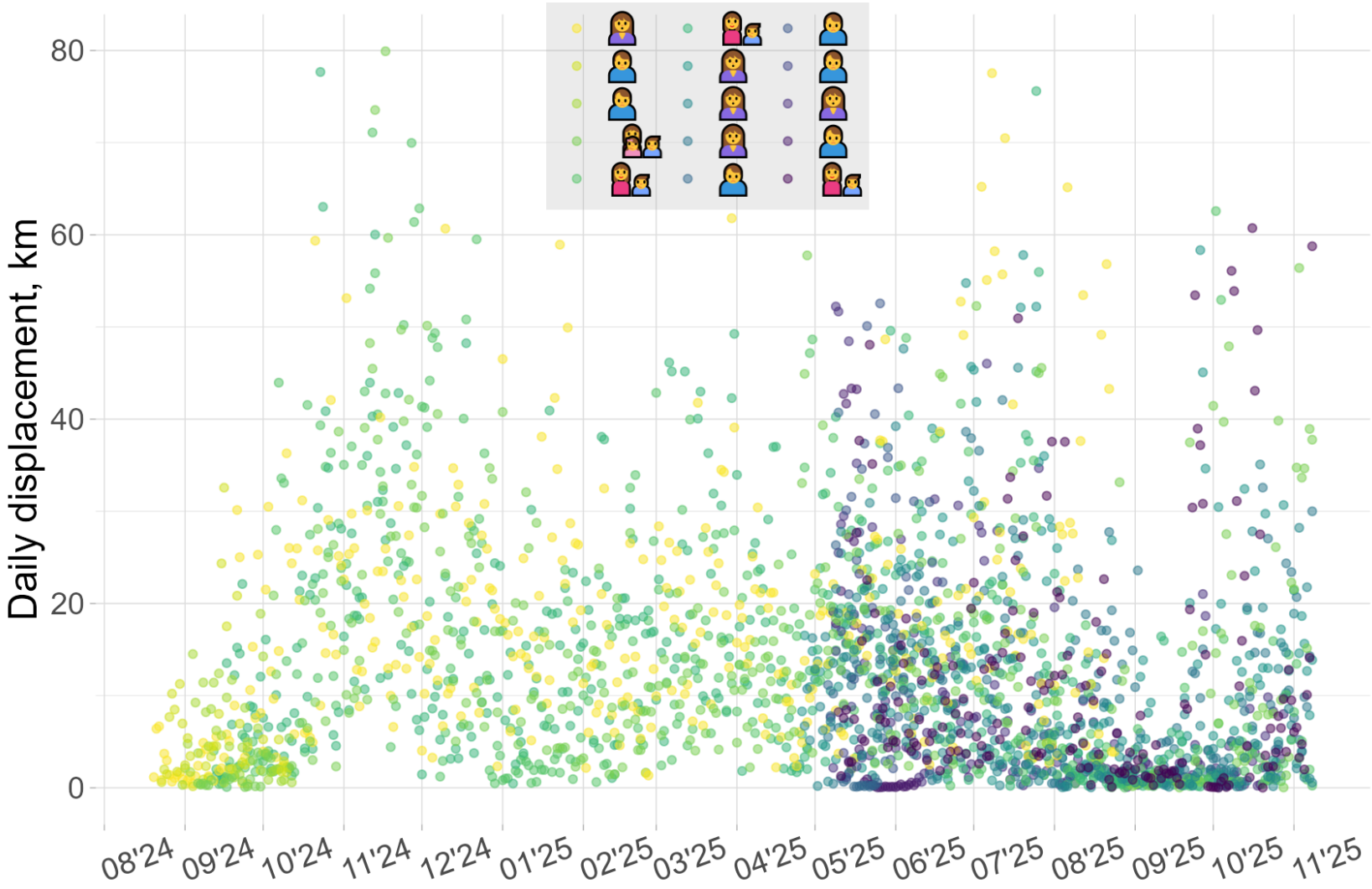
Movement trajectories of 5 polar bear females in the Kara Sea, captured in 2025 on fast ice

Evaluating of the polar bear movements by satellite telemetry



Movement trajectories of polar bear males in the Kara Sea, captured in 2024 on shoreline and in 2025 on fast ice.

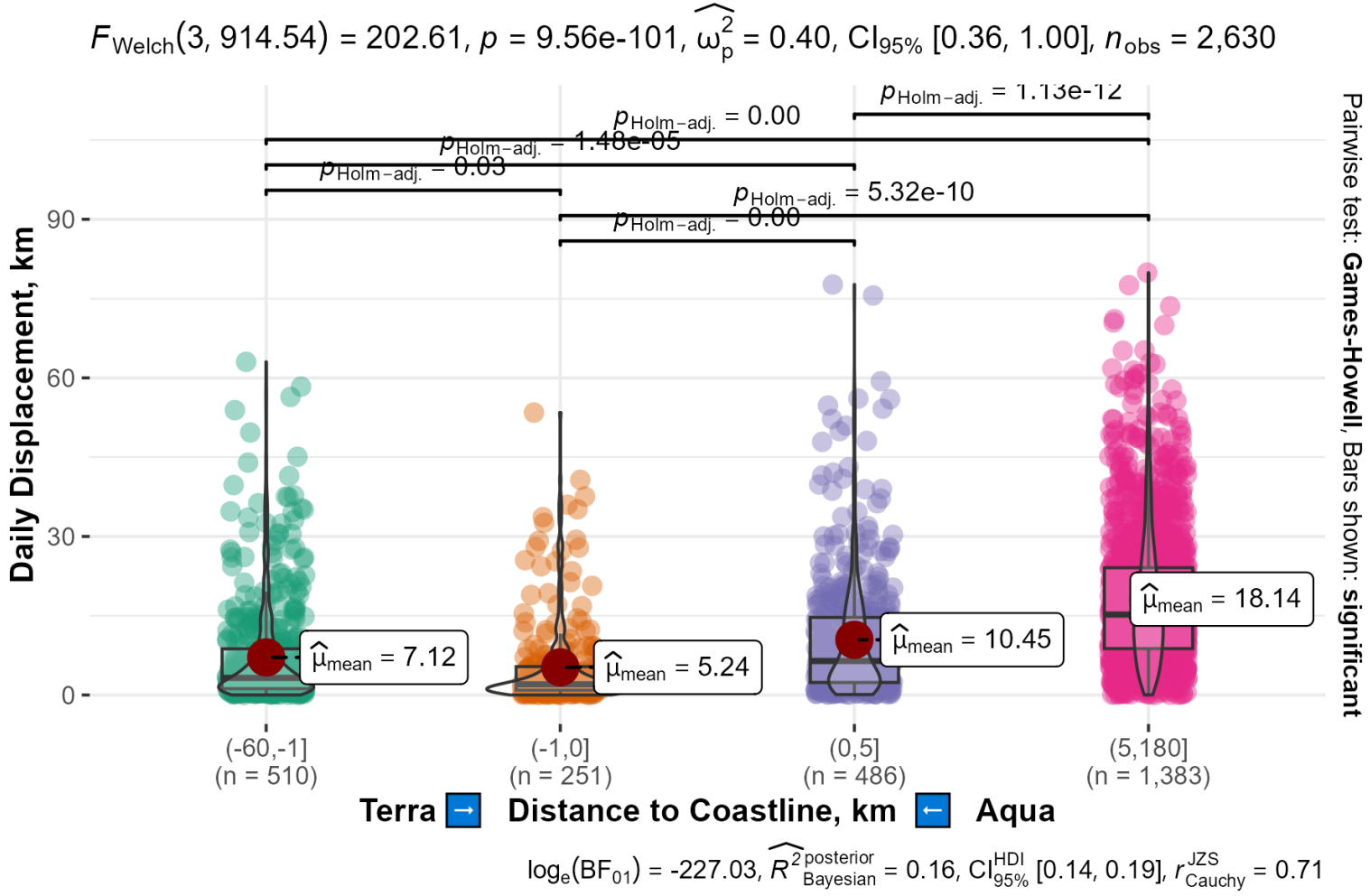
Polar bears daily displacement



Daily displacement was low until mid-October 2024, with values close to zero. Then, polar bear mobility increased, with non-zero values prevailing until December 2024. The next active period was between February and April. In May, the number of points increased as a result of new tagging. A decrease in mobility is observed in August and September 2025.

Daily movements of 15 polar bears over a period of more than 12 months

Polar bears daily displacement

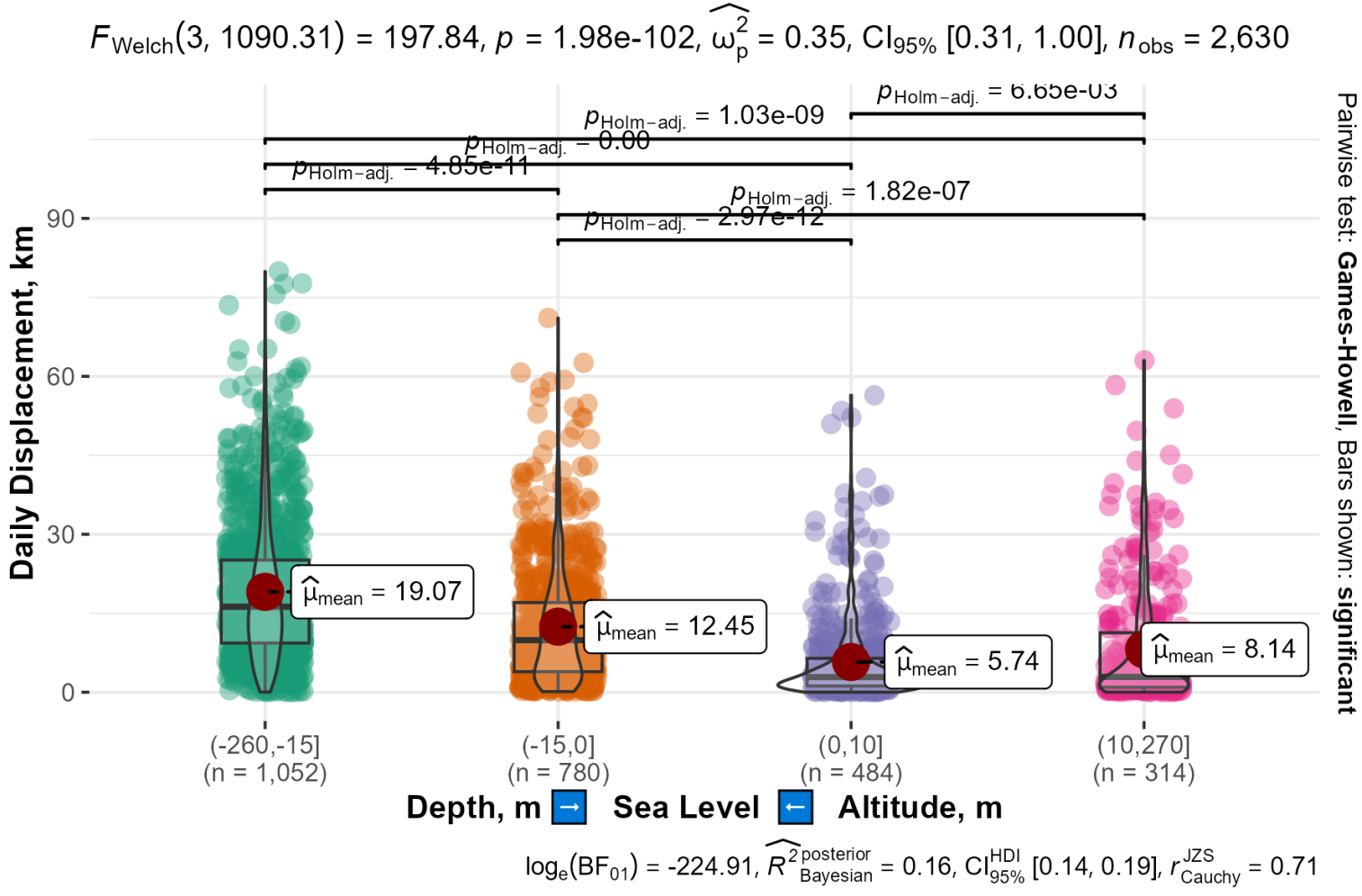


The differences in daily displacement are statistically significant between categories of distance to the coastline: inland, coastal area within 1 km, nearshore waters within 5 km, offshore waters. Polar bears exhibit an energy-saving behavioral strategy in coastal areas and don't frequently use inland for relocation. Mobility increases in offshore waters.

Pearson's product-moment correlation

$$\rho(log(\text{daily}), log(|\text{dist2land}|)) = 0.43, df = 2628, p < 0.001.$$

Polar bears daily displacement

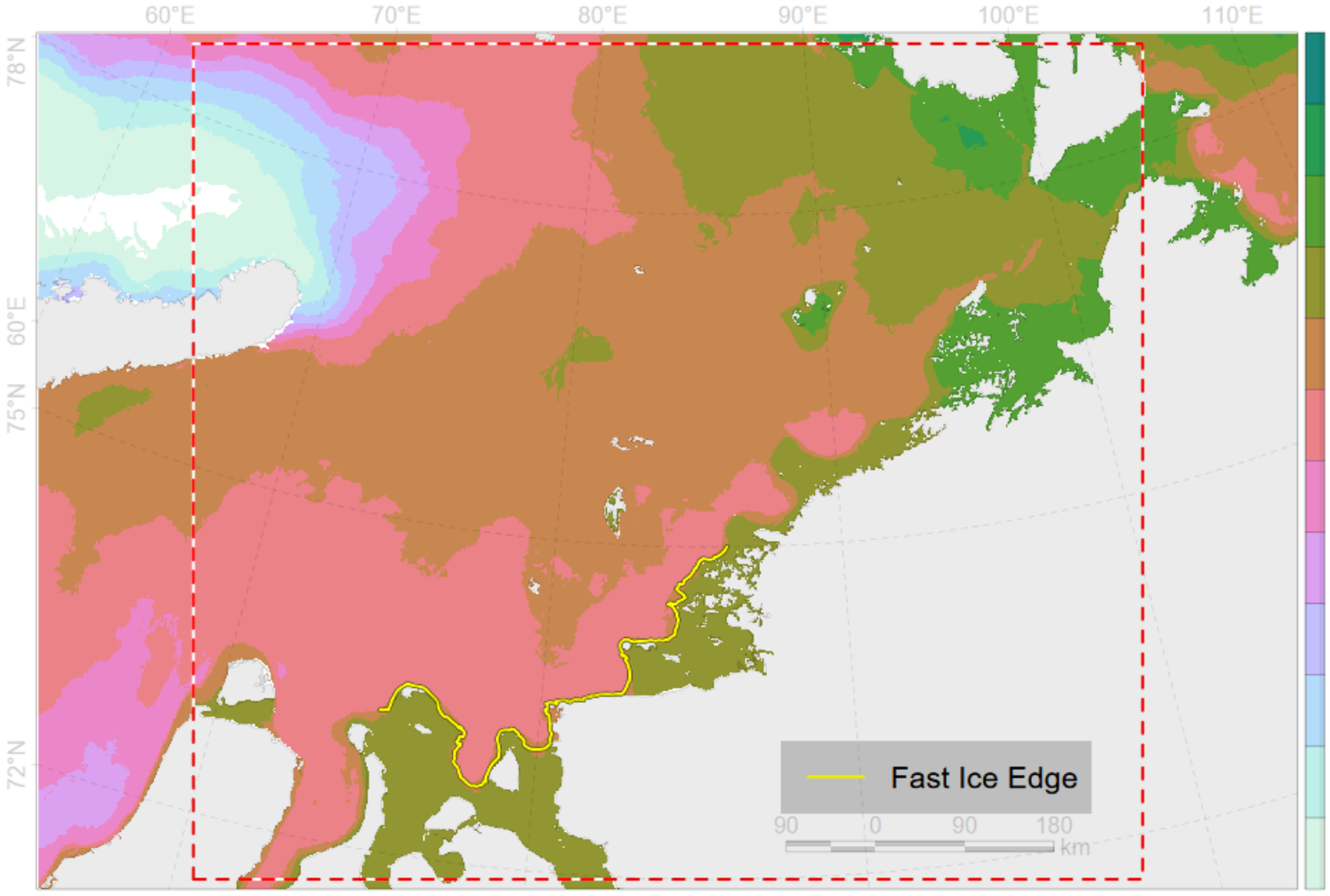


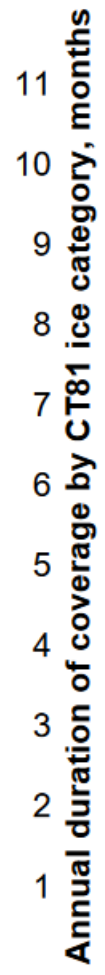
The differences in daily displacement are statistically significant between categories of aquatic and terrestrial topography: water deeper than 15 m, shallow waters, lowlands and highlands over 10 m. Mobility in deep waters is higher. Incidentally, no presence outside the 300 m isobath was detected.

Pearson's product-moment correlation

$$\rho(log(\text{daily}), \text{topo}) = -0.34, df = 2628, p < 0.001.$$

Sea ice habitat availability and use

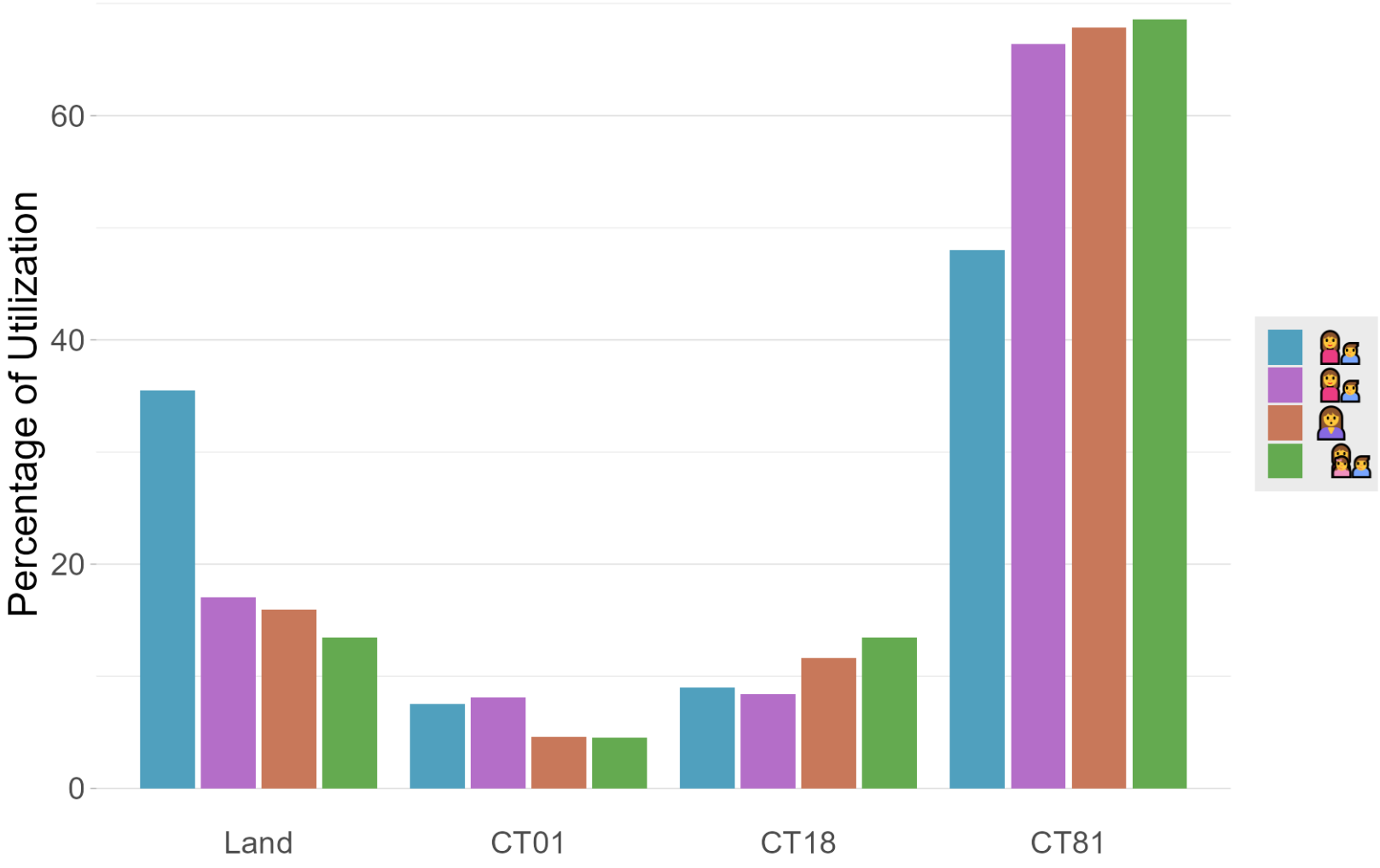




The area of reliable fast ice is highlighted on the map showing the spatial distribution of cumulative pack ice coverage for the annual period from September 21, 2024, to September 20, 2025. The zonal area between Novaya Zemlya and Severnaya Zemlya stands out with pack ice that lasts a month longer. Polar bears on it will be far from land after the ice melts.

Pack ice CT81 (ice concentration 80 and greater) is absent longer than half year on 11 % of aquatory.

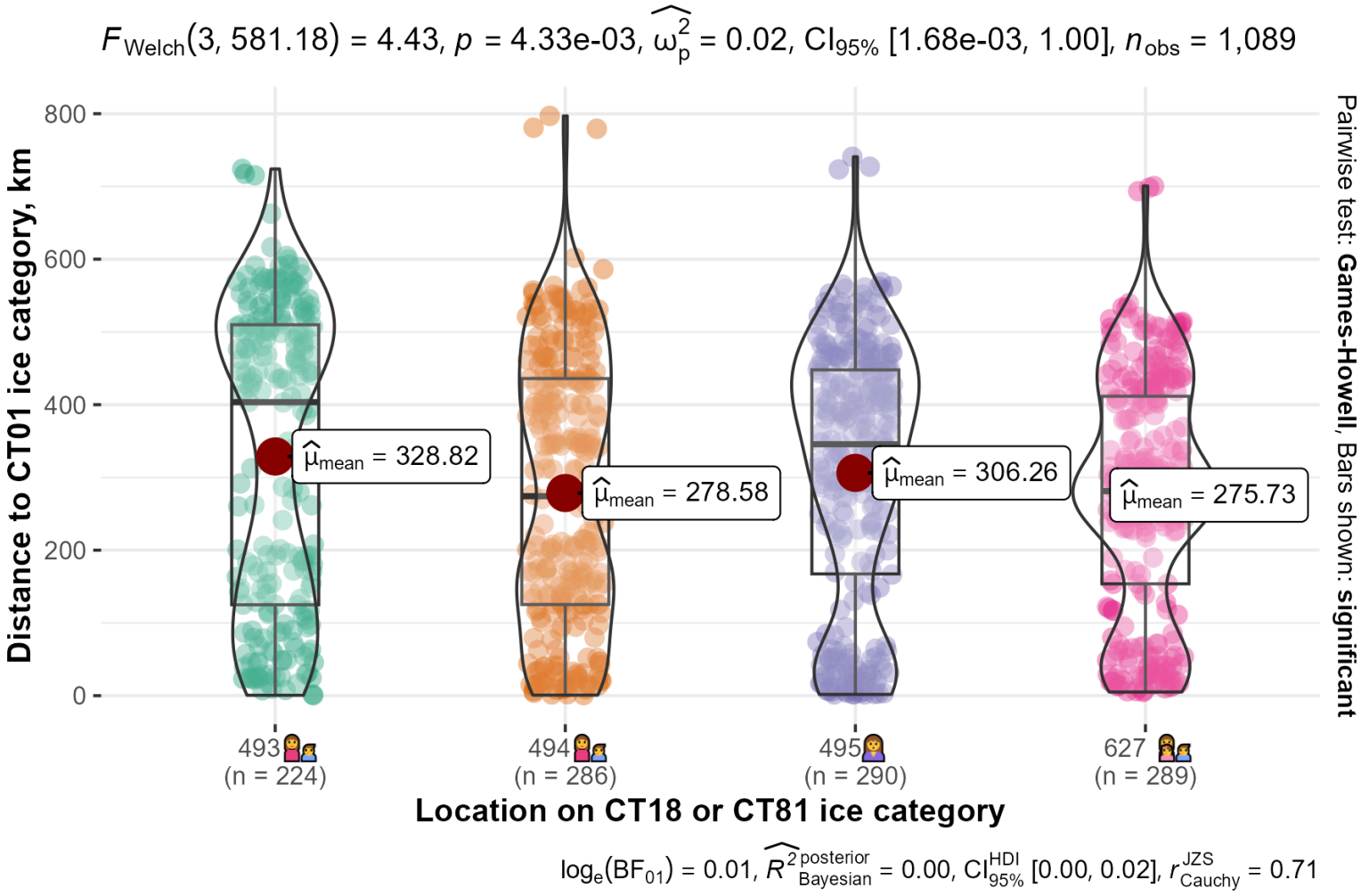
Sea ice habitat availability and use



For more than a year, female polar bears preferred sea ice with concentration over 8/10. The second most popular habitat is land. One individual compensated presence on pack ice by land presence. All individuals from this sample also used small floes of ice (ice concentration less then 1/10) and marginal ice zone (ice concentration between 1/10 and 8/10).

Preferred long-term habitat categories for female polar bears.

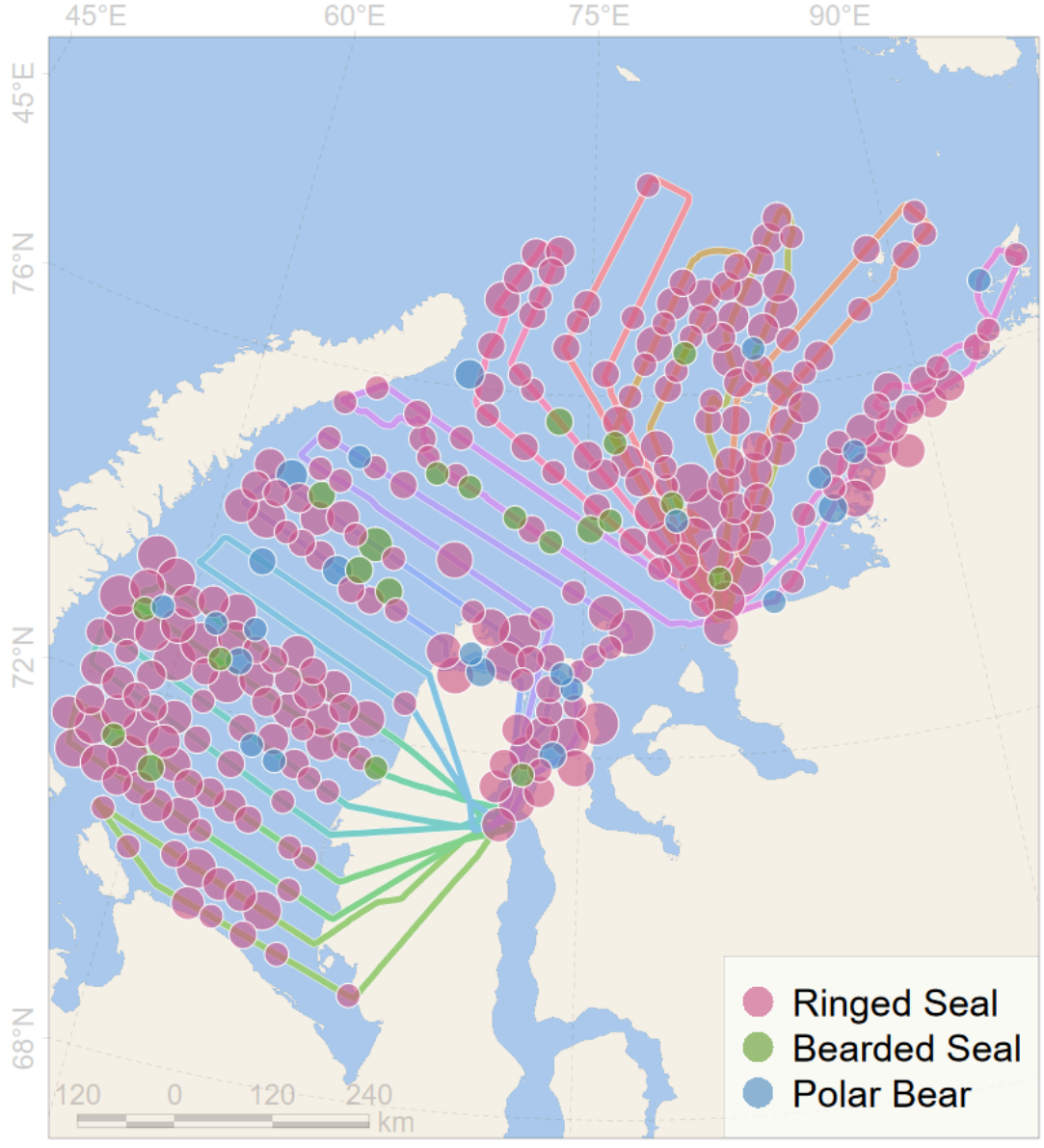
Sea ice habitat availability and use



Located on sea ice with a concentration of more than 1/10, polar bears usually avoid sea ice edge, staying 200-300 km away from it.

For polar bears in the Kara Sea region the distance to sea ice edge is not important abiotic parameter.

Aerial survey of the Kara Sea polar bear subpopulation in 2025



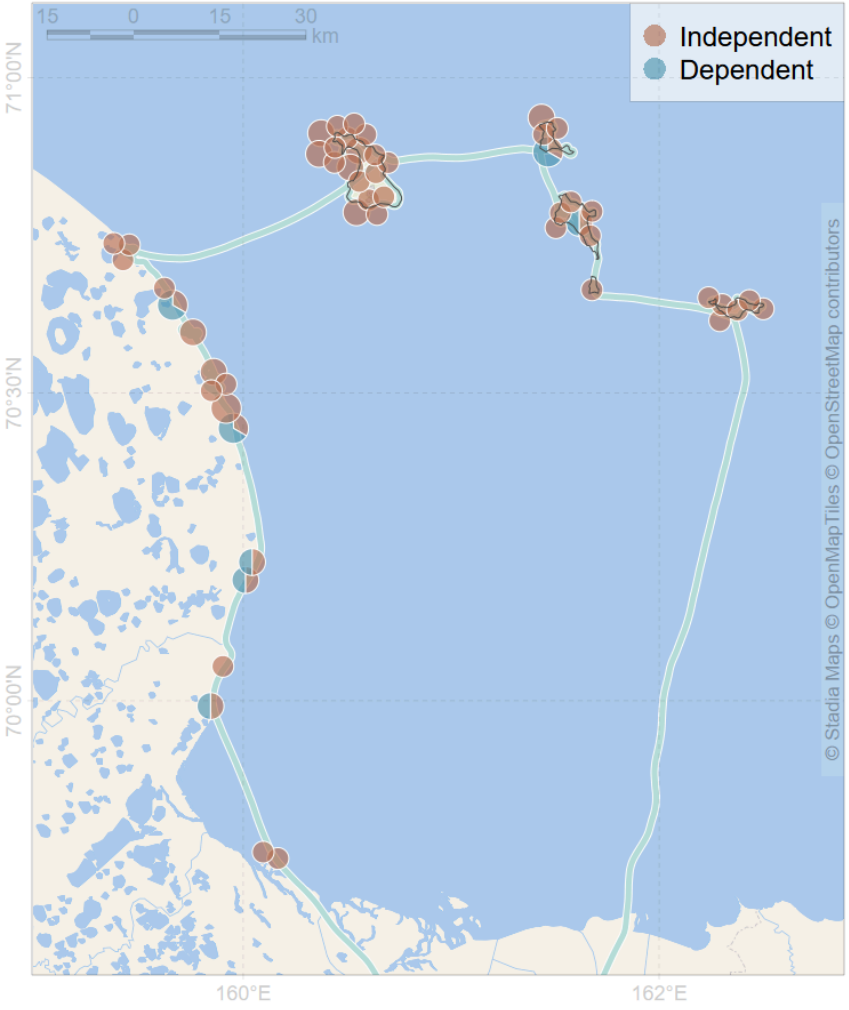
Polar bears and other marine mammals were counted from an AN-28 aircraft using visual and instrumental (surveying in visible- and infrared- ranges) methods in April-May 2025.

37 polar bears (24 adults and 13 cubs), 1097 ringed seals, 32 bearded seals and were visually recorded.

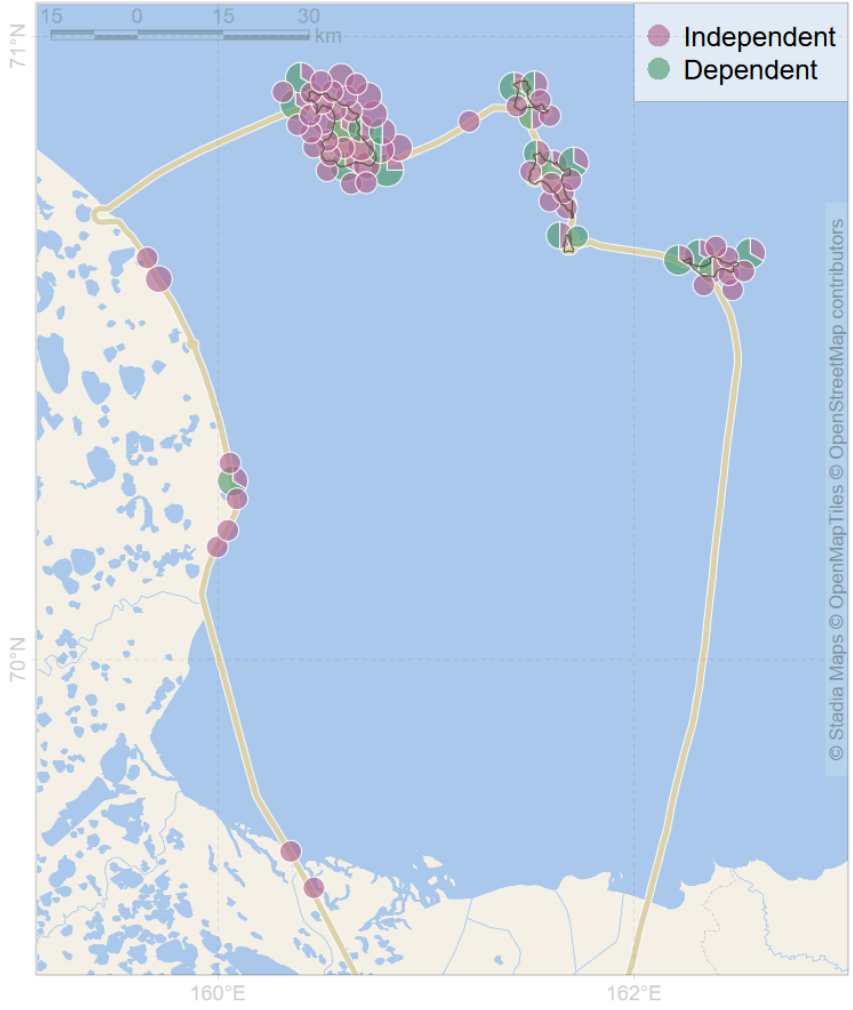
Results of the instrumental survey and population estimates will be available in 2026.

Aerial survey in the Medvezhyi Islands (East Siberian Sea)

Helicopter aerial monitoring performed by National Park «Lensky Pillars». Instrumental survey provided by «Ecofactor». Results after visual surveys:

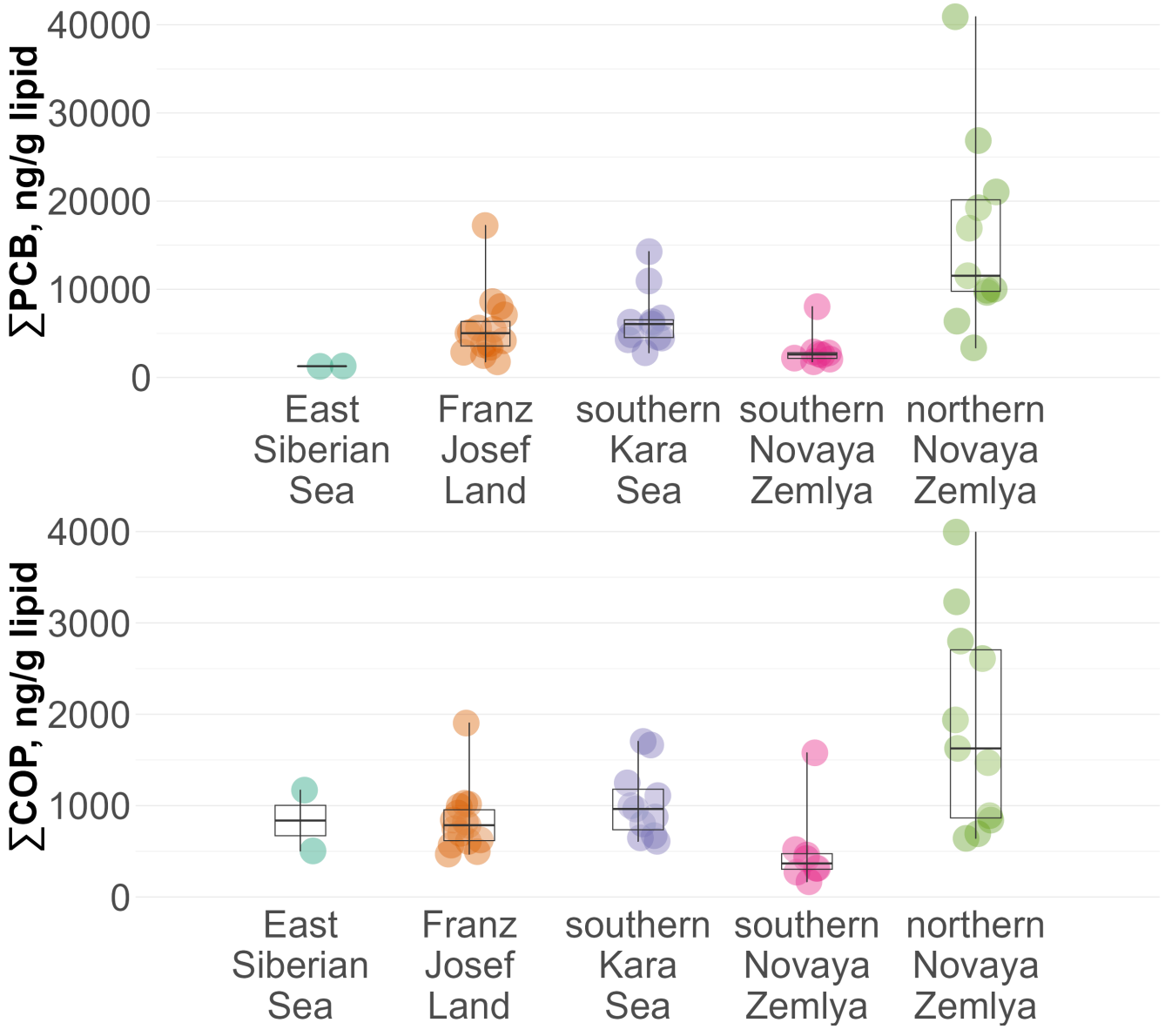


October 2024: 71 individuals (61 adults, 10 cubs).



September 2025: 113 individuals (79 adults, 34 cubs).

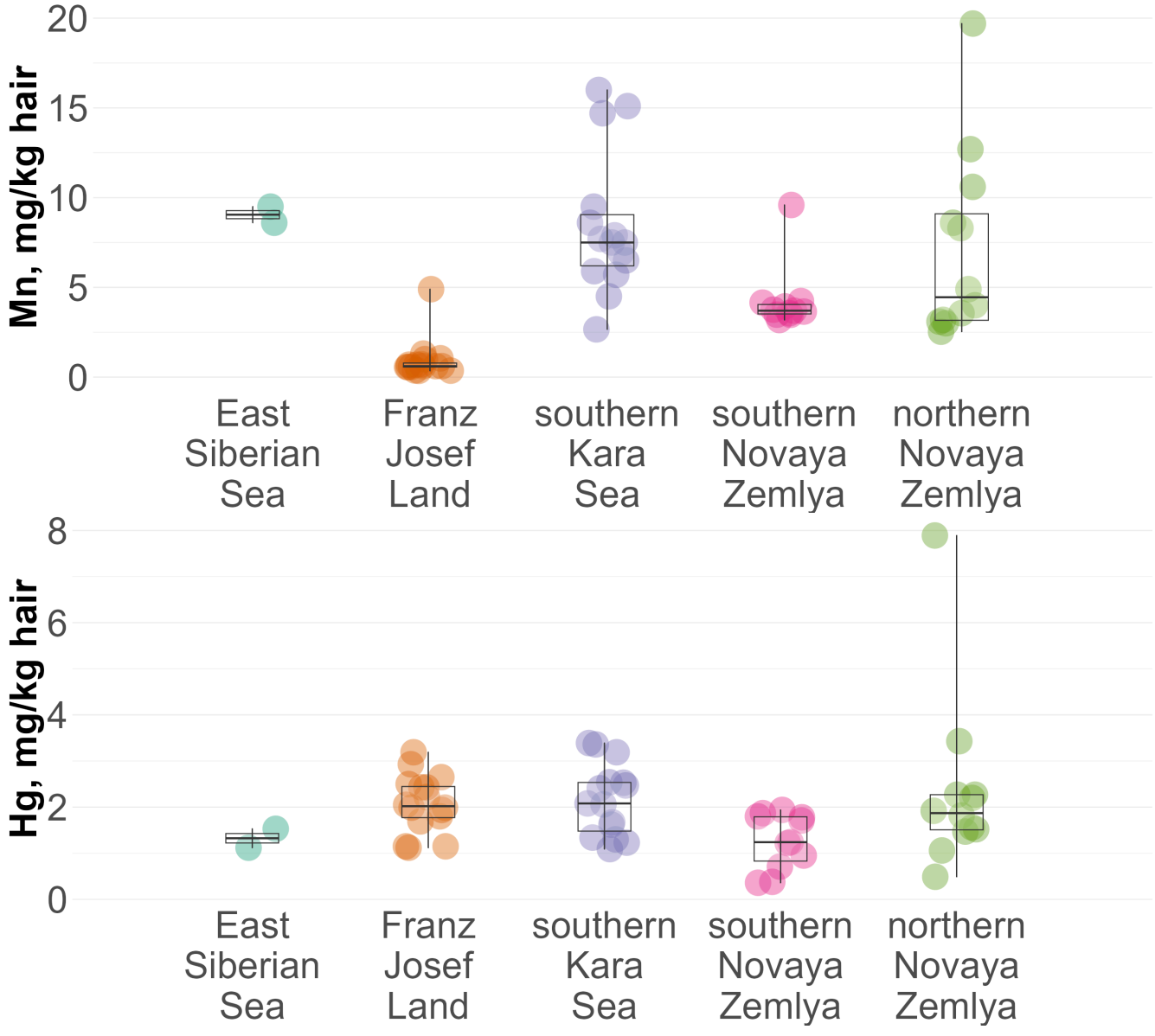
Organic pollutants in serum samples



Organic pollutants in serum samples from polar bears in Kara-Barents region and East Siberian Sea.

Samples from Franz Josef Land and southern Kara Sea most likely represents average values for the respective subpopulations while samples from Novaya Zemlya are some what extreme as bears sampled in northern part of archipelago were extremely thin, and bears from southern part feeds extensively on food waste from nearest settlement. First samples from East Siberian sea were average in terms of total pesticide content while contains lowest amounts of total polychlorinated biphenyls we obtained so far.

Heavy metals in hair damples

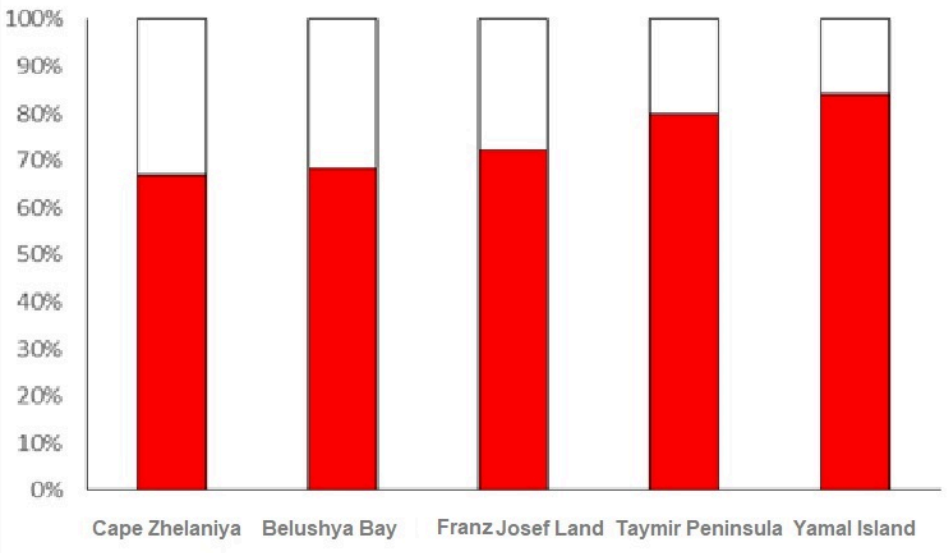


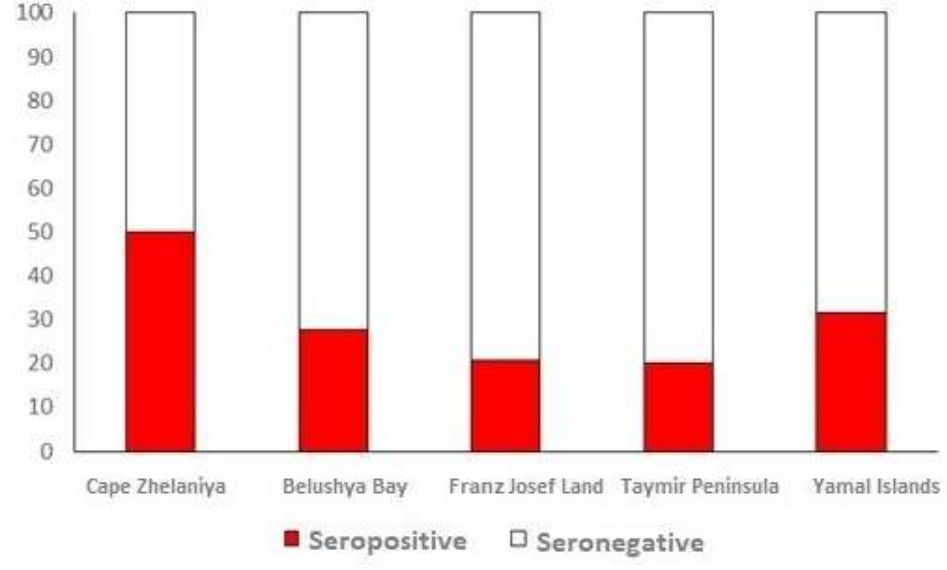
Heavy metals in hair damples from polar bears in Kara-Barents region and East Siberian Sea

There is a tendency for manganese concentrations to increase in an easterly direction. At the same time, it was not found any clear trends for mercury, as bears from Franz Josef Land did not differ from bears from the southern part of the Kara Sea in terms of mercury concentrations.

Original analysis of mercury samples in (Gremyachikh et al., 2025).

Analysis of polar bears seropositivity





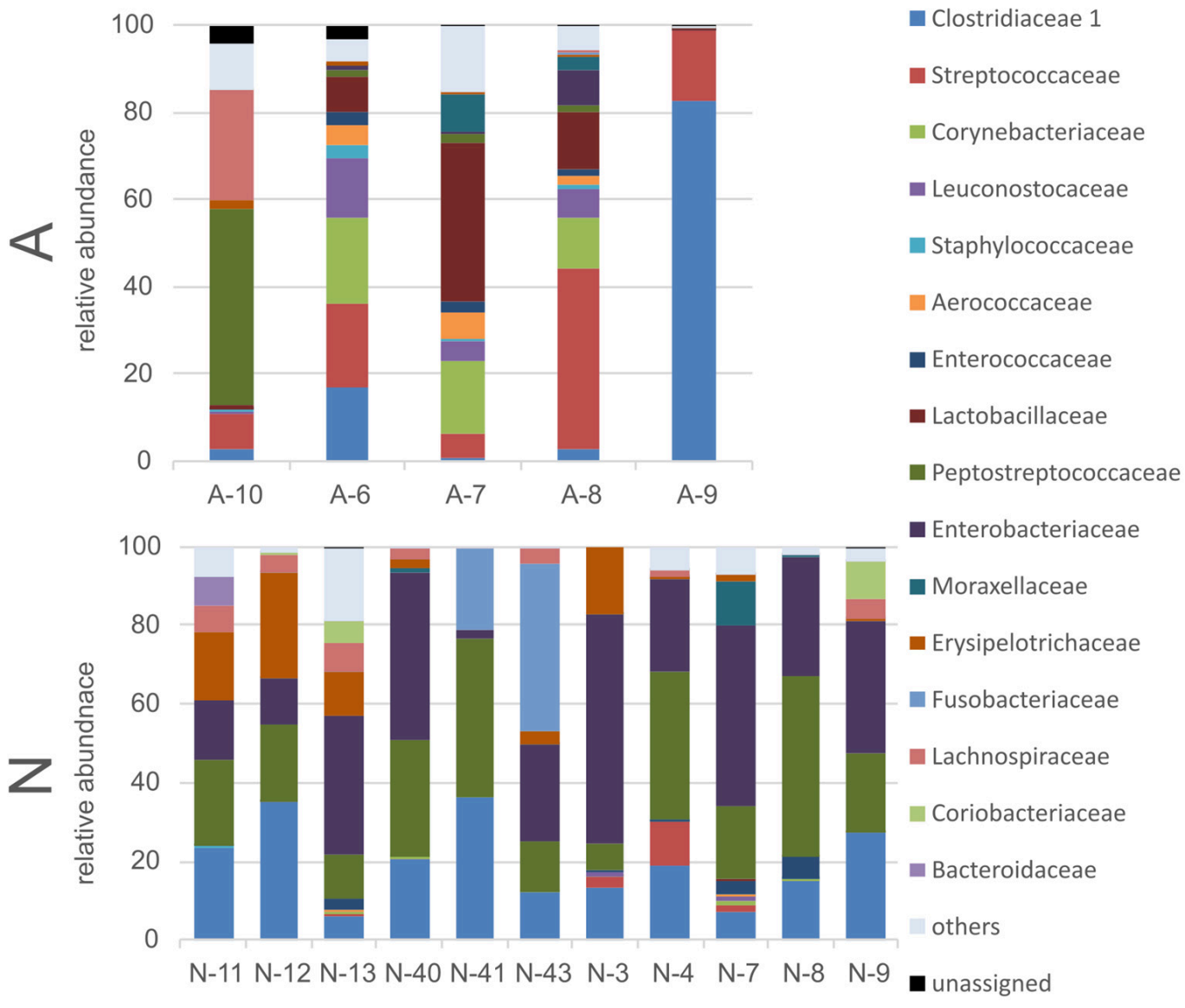
Main results are published (Naidenko et al., 2023).

Pathogens:

- Canine distemper virus
- Herpes simplex virus
- Parvovirus
- Toxoplasma
- Trichinella (*Trichinella sp.*)
- Mycoplasma (*Mycoplasma sp.*)
- Candida (*Candida sp.*)
- Chlamydia (*Chlamydia sp.*)

Seropositive proportion for Trichinella (*top*) and Canine distemper virus (*bottom*)

Bacterial and fungal community

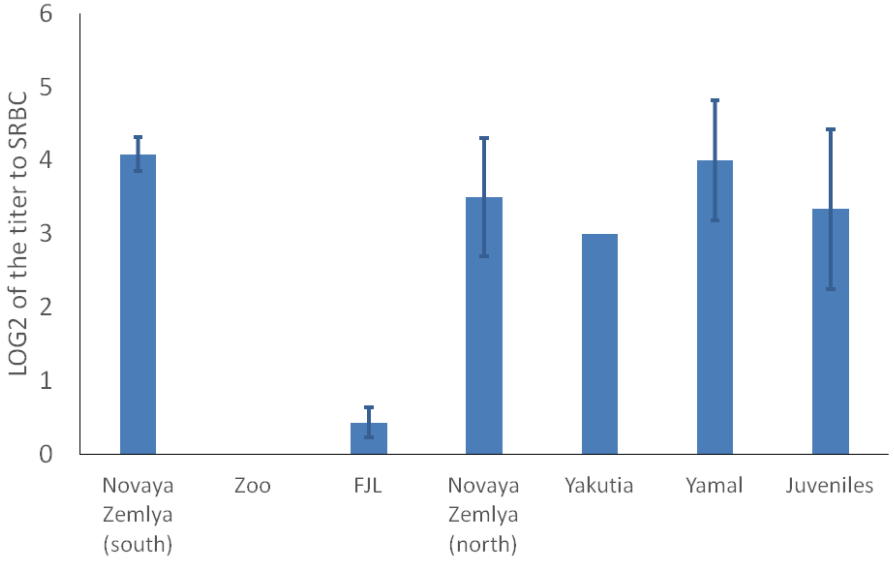


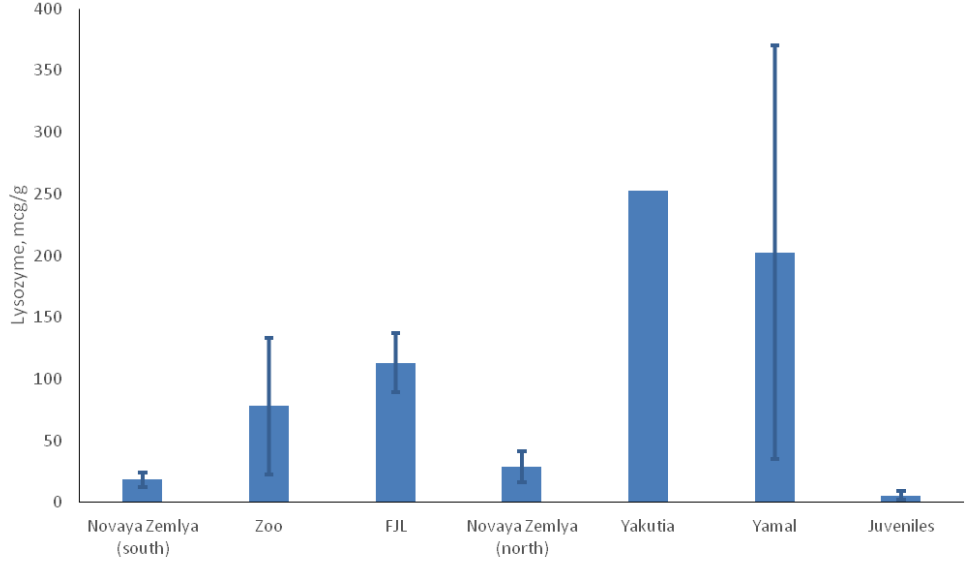
The hypothesis was that intestinal microbiome and metabolism may change as a result of the bears using new food items that are not typical for them due to climate change and an increase in the ice-free period in the Arctic, which is why they more often remain on the shore and visit human-populated areas.

Feeding on human waste does not cause any signs of dysbiosis and probably leads to adaptive changes in the bacterial microbiome.

Details in (Vecherskii et al., 2023)

Analysis of polar bears immunity at different points





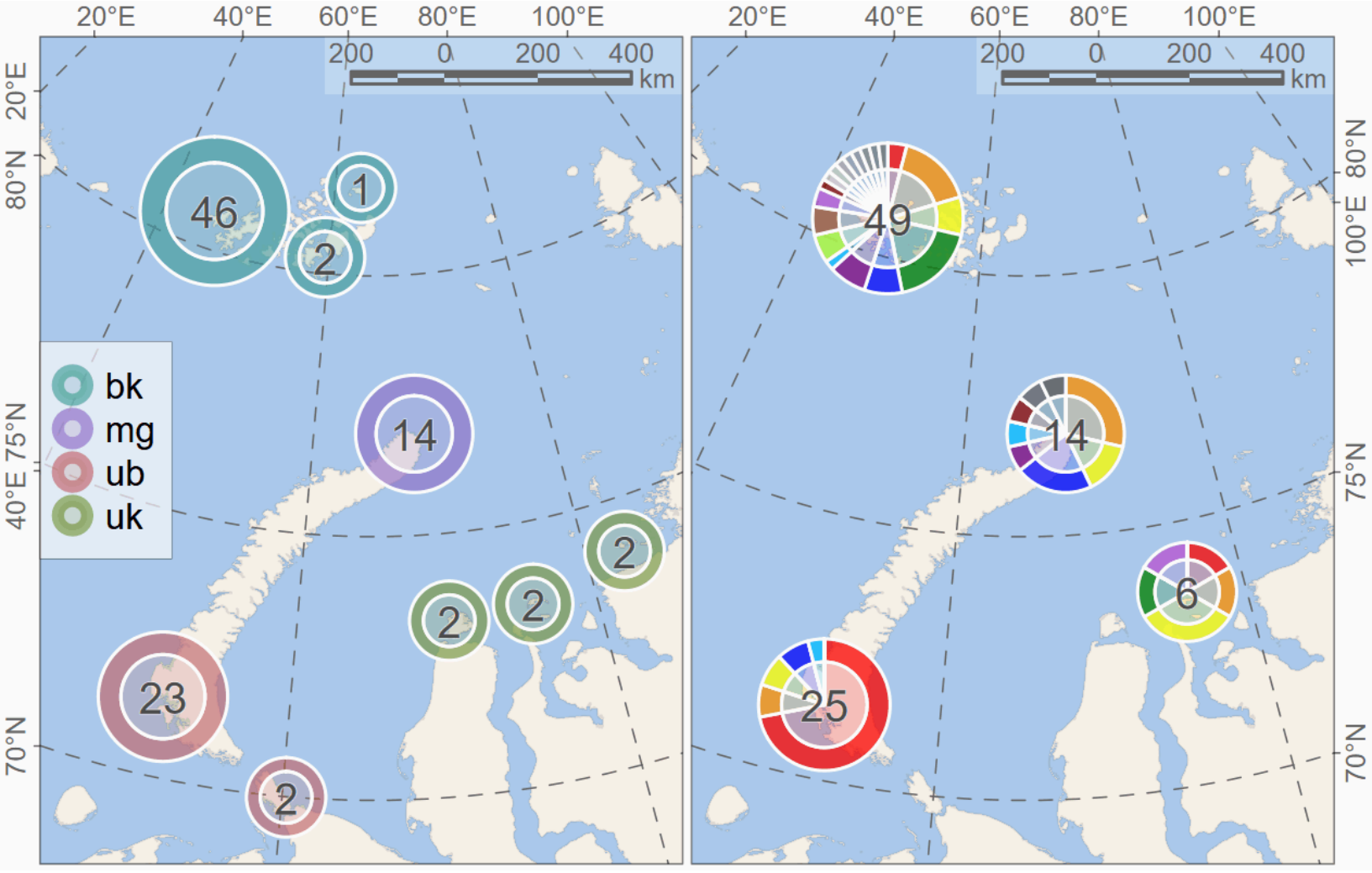
Total amount of natural antibodies was extremely low in zoos and on Franz-Josef Land.

The concentration of Lysozyme concentration (antibacterial protein) was very low at the Novaya Zemlya islands.

An activity of the system of complement was very low in all populations.

Details in (Alekseeva et al., 2025).

Population structure



Polar bears from the northern part of the Barents and Kara Seas were genetically homogeneous. Bears from the southeastern part of the Barents Sea differed markedly in mtDNA markers, while only weak differentiation was observed in microsatellites.

It is assumed that a small and rather isolated group of polar bears inhabits the Yuzhny Island area, which is confirmed by telemetry data.

Homogeneity for Kara Sea and northern Barents Sea. Heterogeneity for South-Eastern Barents Sea. Details in (Sorokin et al., 2023).

Publications 2023-2025

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