Project information

Keywords

Tundra ecosystem, food web, adaptive monitoring, small rodents, arctic fox, geese, vegetation change, climate impacts, herbivory

Project title

Yamal EcoSystem (YaES) - Collaboration for monitoring of climate related ecosystem change on Yamal, Russia

Year

2017

Project leader

Dorothee Ehrich, UiT

Geographical localization of the research project in decimal degrees (max 5 per project, ex. 70,662°N and 23,707°E)

The three northern monitoring sites of YaES, which are located in a latitudinal gradient along Yamal Peninsula, Russia: Kharp in the forest tundra ecotone (66.7°N, 66.4°E); Erkuta in the low Arctic (68.2°N, 69.1°E); and Sabetta at the border between the low and the high Arctic (71.2°N, 71.5°E)

Participants

From the Polar Institute: Virve Ravolainen

From NINA: Ingunn Tombre

International participants: Aleksandr and Natalya Sokolov, Arctic Research Station of the Institute of Plant and Animal Ecology of the Ural Branch of the Russian Academy of Sciences, Labytnangi, Yamalo-Nenetsky AO, Russia.

Administrative responsible: Terje Aspen, UiT

Flagship

Terrestrial

Funding Source

Most of the field work of YaES is carried out by the Russian part and financed by Russian funding. The major infrastructure (boats, housing) is provided by the Arctic Research Station in Labytnangi and research support from the Yamal Government. The funding from the flagship (248 000 NOK) covered the expenses for collaboration

Summary of Results

In line with the proposal, we continued the collaborative work between Fram Centre Researchers working with COAT and the Arctic Research Station in Labytnangi (Yamal, Russia) on monitoring climate related changes in the tundra ecosystem on Yamal. This collaboration involved common field work at Erkuta and Belyi Island, a meeting in Tromsø in the end of August, and a meeting in Quebec after the “International Arctic Fox Conference”.

Concerning the four monitoring targets in focus of the project the following results were obtained:

Small rodents: trapping was carried out at all four monitoring site in the Yamal gradient. Work with climatic variables, notably snow cover, retrieved both from weather station data and reanalyzes, is in progress. These will be used as explanatory variables to test whether observed changes in the small rodent community can be attributed to climate change. *Arctic and Red fox*: All data from baited automatic cameras obtained in late winter during 9 years at Erkuta were assembled. Preliminary analyses using an occupancy approach indicated an increase of red fox use at the camera stations and a parallel decline in arctic fox use. *Vegetation changes*: We tested the use of a drone to measure the extent and configuration of willow thickets at Erkuta. Preliminary results are promising, and will be compared to the extent of willow thickets measured on a Quickbird satellite picture in 2008. *Geese*: A census protocol for white-fronted geese on Belyi Island was discussed and tested in the field.

Master and PhD-students involved in the project

Stijn Hofhuis (Msc student, Wageningen University, co-supervision with UiT)

Ivan Fufachev (PhD student, Perm State University, collaboration with UiT)

For the Management

The survey of protected species of geese, and in particular the finding that lesser white-fronted geese breed close to peregrine falcon along the Erkuta river, is relevant for the conservation of these species.

Concerning vegetation changes under the influence of climate warming and reindeer grazing, we don't have relevant information for management yet. However, the initiated work together with planned collaboration with reindeer herders will provide important information about grazing impact in a few years.

Published Results/Planned Publications

Ehrich D, Cerezo M, Rodnikova AY, Sokolova NA, Fuglei F, Shtro VG, Sokolov AA. 2017. Vole abundance and reindeer carcasses determine breeding activity of arctic foxes in low arctic Yamal, Russia. BMC Ecology 17: 32.

Elmhagen B, Berteaux D, Burgess RM, Ehrich D, Gallant D, Henttonen H, Ims RA, Killengreen S, Niemimaa J, Noren K, Ollila T, Rodnikova A, Sokolov AA, Sokolova NA, Stickney AA, Angerbjörn A. 2017. Homage to Hersteinsson & Macdonald: Climate warming and resource subsidies cause red fox range expansion and arctic fox decline. Polar Research 36: 3.

Berteaux D, Thierry AM, Alisauskas R, Angerbjörn A, Buchel E, Doronina L, Ehrich D, Eide NE, Erlandsson R, Flagstad Ø. Fuglei E, Gilg O, Goltsman M, Henttonen H et al. 2017. Harmonizing circumpolar monitoring of Arctic fox: benefits, opportunities, challenges, and recommendations. Polar Research 36: 1.

Barrio IC, Lindén E, Te beest M, Olofsson J, Rocha A, Soininen EM, Alatalo JM, Andersson T, Asmus T, Boike J, Bråthen KA, Bryant JP, Buchwal A, Bueno G, Christie KS, denisova YV, Egelkraut D, Ehrich D, Fishback LA, Forbes BC, et al. Background invertebrate herbivory on dwarf birch (Betula glandulosa-nana complex) increases with temperature and precipitation across the tundra biome. Polar Biology 40: 2265-2278.

Planned publications:

Sokolov AA, Sokolova NA, Ehrich D et al.: Changes in the predator community in late winter in a low arctic tundra site.

Sokolova NA, Ehrich D, Sokolov AA et al.: Are changes in small rodent community composition on Yamal over the last 40 years driven by climate?

Communicated Results

Oral presentation D Ehrich et al. «International Arctic fox conference», Quebec, 13 October: “Vole abundance and reindeer carcasses determine breeding activity of arctic foxes in low arctic Yamal, Russia”

Oral presentation A. A. Sokolov et al. «International Arctic fox conference», Quebec, 13 October: “Arctic foxes dominate the predator guild in low arctic Yamal, Russia”

Oral presentation N. A. Sokolova «International Arctic fox conference», Quebec, 13 October: “What resources subsidize arctic fox breeding in Sabetta, high arctic Yamal (Russia)?”

Poster S. Hofhuis «International Arctic fox conference», Quebec, 13-14 October: “Selection of breeding dens in different habitat types by Arctic foxes in southern Yamal, Russia”

Poster A. A. Sokolov «International Arctic fox conference», Quebec, 13-14 October: “Long-distance movements of the first Siberian Arctic Fox equipped with satellite collar”

Randi Solhaug: monitoring animal life on the Russian tundra. Fram Forum 2017: 30-33.

A journalist from the TV channel Yamal Region made a documentary in three parts about work at Erkuta:

https://www.youtube.com/watch?v=gVMBNqCzniA&t=26s

https://www.youtube.com/watch?v=B6SFCfcXtHw

https://www.youtube.com/watch?v=ewMhsp4QAwI&t=46s

Budget in accordance to results

The funding from the Fram Centre was used according to the project plan. It covered one month of salary for DE to work with the project, fieldwork expenses for DE and a master student (Stijn Hofhuis), and travel expenses for meetings.

Could results from the project be subject for any commercial utilization

No

Conclusions

Yamal EcoSystems is developing as a program for monitoring climate related ecosystem change on Yamal in close collaboration with COAT. Our activities are also becoming well integrated in International tundra monitoring networks (Berteaux et al. 2017; Barrio et al. 2017)