INTERACT II: An advanced community steps into a global role

Morten Rasch, Margareta Johansson, Terry Callaghan and Elmer Topp-Jørgensen on behalf of INTERACT Friends

INTERACT - Building capacity for monitoring, research and education throughout the Arctic

- **Biodiversity**
- **Glaciology**
- **Permafrost**
- **Climate**
- **Hydrology**
- **Ecology**
- **Biogeochemistry**
- **Human dimension**
- **Etc.**

The first phase of INTERACT: Presentation of Research Stations

STATION NAME AND OWNER

The Chokurdakh Scientific Tundra Station is owned by the Institute for Biological Problems of the Cryolithozone (Siberian Branch of the Russian Academy of Sciences).

LOCATION

The Chokurdakh Scientific Tundra Station (70°49'28" N, 147°29'23" E; elevation 11 m a.s.l.) is situated in the Kytalyk Wildlife Reserve, located on the north bank of the Elon' (Berelekh) River in Northeastern Yakutia, Republic of Sakha (Yakutia), Russian Federation, approximately 25 km north of the Chokurdakh settlement and around 480 km north of Arctic Circle.

BIODIVERSITY AND NATURAL ENVIRONMENT

The research area consists of three different morphological units, i.e. (i) the present, frequently flooded river floodplain, (ii) the river terrace with tundra vegetation, and (iii) higher (10-30 m) plateaus with well-drained soils. The ice-rich continuous permafrost reaches more than 300 m depths. The levees on the floodplains are overgrown with Salix brush. The backswamps consist of meadows with low grass (*Arctophila fulva*) and sedges (*Carex arctisiberica, C. glacialis*) grading into shallow lakes. In the tundra, the main vegetation types are dry heath with *Betula nana* on higher sites (polygon rims, palsas); moist tundra with *Eriophorum tussocks*; wet sites with Sphagnum and *Carex* sp., and wet sites with a species-poor vegetation of Carex and some *Eriophorum*. At several sites the Sphagnum vegetation overlies a very thin active layer of loose moss peat (<20 cm thickness).

HISTORY AND FACILITIES

The station was established in 2001 by the Siberian Branch of the Russian Academy of Sciences and the Vrije University of Amsterdam (Netherlands) with financial support from the government of Netherlands and with permission and help of the Ministry for Nature Protection of the Republic of Sakha (Yakutia).
For accommodation, there is one 4×8 m large living house with four beds and firewood and kerosene heating. Additional tent accommodation for 4-6 peoples is possible during summer time.
Kitchen is available. In addition, a big house for 10-12 peoples and a sauna can be rented from the Kytalyk Wildlife Reserve. There are two 5 m high observational towers for meteorological and flux measurements. Basic instruments are available at the station. Electrical power supply is provided by solar power and wind generator (12 V DC) and portable electrical generators (220 V AC).

GENERAL RESEARCH AND DATABASES

The interdisciplinary research at the Chokurdakh Scientific Tundra station mainly focuss on studies of the environmental conditions and the role of permafrost ecosystems in Climate Change. This includes the interaction between the atmosphere, the biosphere, the hydrosphere, and the cryolithosphere with respect to biodiversity and global environmental change. Short-term monitoring data exists for different aspects of human activity. Data is available at the web-sites of PIN-MATRA and TCOS-Siberia projects.

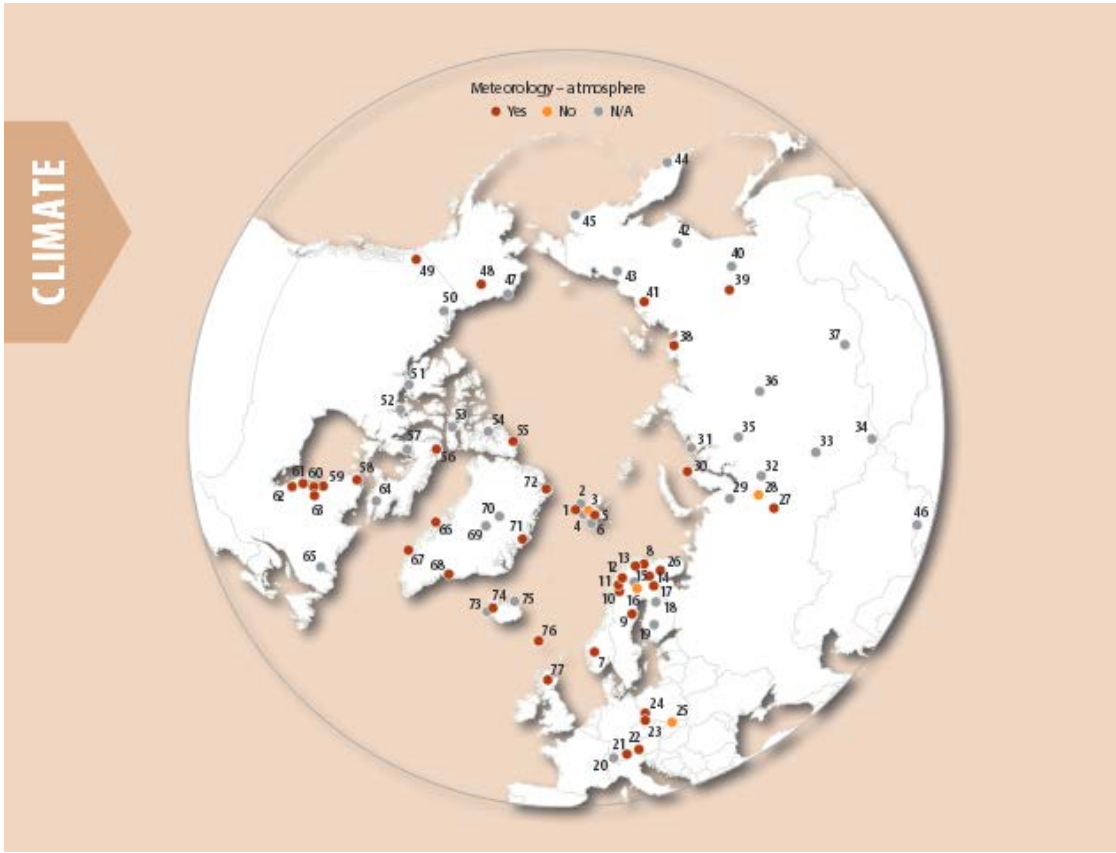
HUMAN DIMENSION

The Chokurdakh Scientific Station is situated in the Kytalyk Wildlife Reserve of the World Wide Fund for Nature, which is dedicated to the preservation of the white crane (*Grus leucogeranus*). Human activity is restricted to fishing and reindeer herding.

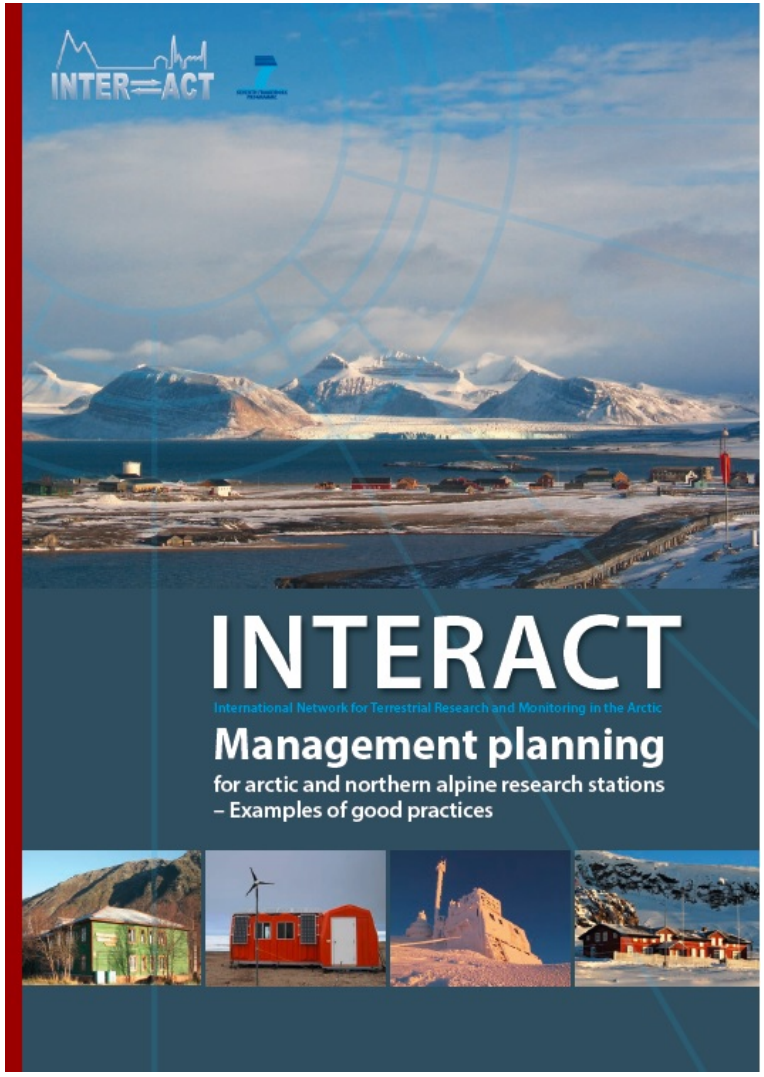
ACCESS

The Chokurdakh Scientific Tundra Station can be reached from Chokurdakh settlement which is 3.5 hours by airplane from Yakutsk. From June to September, the transport to the station is possible by boat (2 hours from Chokurdakh along Berelekh River). In winter-time (November-April), transport takes place by snowmobile/sledge (2 hours from Chokurdakh).

The First phase of INTERACT: Inventory of Research and Monitoring

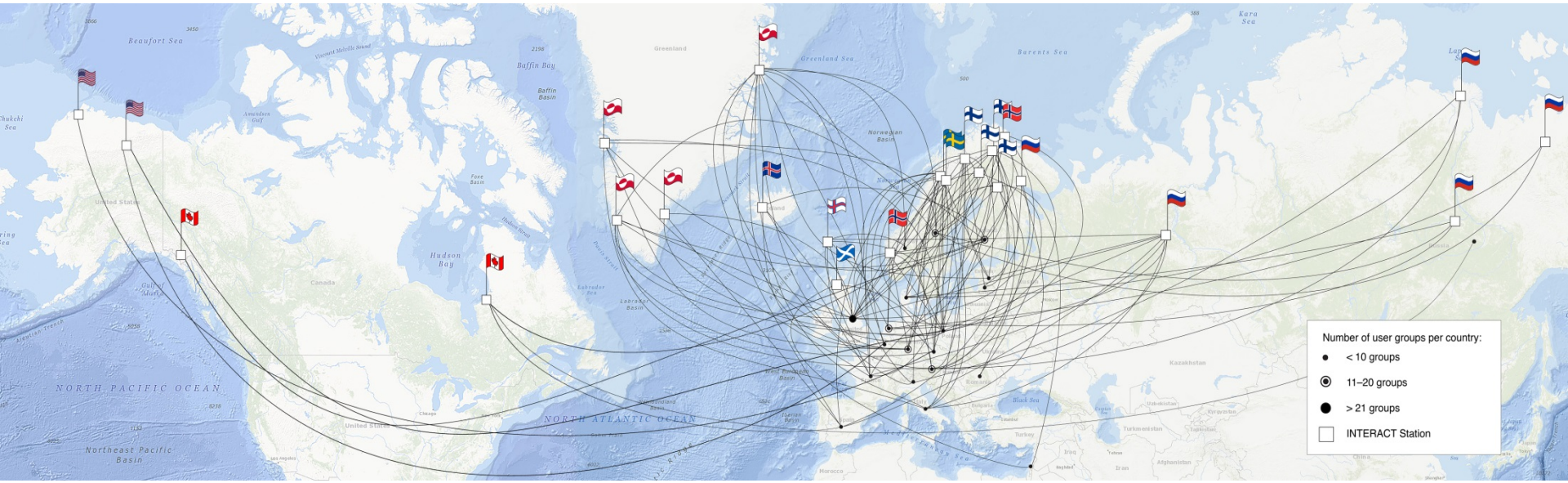


The First phase of INTERACT: Best practices report on management



Between 2011 and 2015 - Increased Access to the Arctic through Transnational Access to 24 stations – pan Arctic!

Russia	5 Stations	Iceland	1 Station	**>520 researchers**
Finland	4 Stations	Greenland	4 Stations	**=10,000 Research days**
Sweden	2 Stations			
Norway	2 Stations	*Canada*	*2 Stations*	
Scotland	1 Station	*US*	*2 Stations*	**150 journal publ. since 2010**
Faroe Islands	1 Station			



Outreach of Arctic Science: Stories from TA project

- Aims of the project
- What did we do?
- Where did we work and why there ?
- What did we find?
- Why is it important?
- The adventure
- Contact info

Controls on volatile organic compound emissions from northern plants

Riikka Rinnan & Hanna Valolahti

Plants release reactive gases (gases that react easily with other chemicals)- some with and some without odour. These gases (so called volatile organic compounds, VOCs) have various functions including attracting pollinators to flowers and deterring herbivores from eating leaves.

AIMS OF THE PROJECT

We wanted to see whether herbivory or climate warming would alter the release of reactive gases (VOCs) from northern plants.

WHAT DID WE DO?

We used bilberry (Vaccinium myrtillus) as a model plant, and measured VOCs emitted from plants growing in experiments mimicking future warmer conditions. These experiments used clear plastic hexagons to warm plots of forest floor and tundra. Herbivory was mimicked by cutting leaves on newly produced plant shoots with scissors.

WHERE DID WE WORK AND WHY THERE?

We worked at the Kilpisjärvi Biological Station and Oulanka Research Station in northern Finland. Both stations have a long-term experiment combining warming and herbivory treatments in their surroundings. The long duration of the experiments (about 20 years) is vitalto be able to detect changes that take place slowly.

WHAT DID WE FIND?

The results of our VOC measurements are still under investigation. We expect that warming by a degree or two increases the VOC release from bilberry. Herbivory, which is predicted to increase during climate change, normally causes a burst of VOCs from the plants when they are harmed. We expected that this burst would be larger in the warmed plants. We also expected that after the burst, the herbivory-damaged plants would suffer so that VOC release in the long-term would be less than from the undamaged plants.

WHY IS IT IMPORTANT?

VOCs are not only important for plant-animal interactions. Through complex chemistry in the air they form tiny sub-micron particles (aerosols) that can build clouds and scatter solar rays cooling the climate. While there are huge uncertainties, climate cooling by cloud building may be a way in which plants can mitigate global warming.

THE ADVENTURE

Meeting reindeer and experiencing the vast and barren wilderness of Lapland during the total drive of 10,000 km back and forth between Oulanka and Kilpisjärvi stations during the summer 2013 was an adventure itself. Misty early mornings, midnight sun, clouds of mosquitoes – and Finnish sauna after a hard day in the field made this a memorable period of field work.

Reindeer are one of the largest herbivore species in northern latitudes, here grazing on summer pastures in Swedish Lapland (Niels Rogiers).

Riikka Rinnan studies plants growing inside a plastic hexagon, which works as an open greenhouse and warms the environment, resulting in increased growth (Hanna Valolahti).

Anne Tolvanen applies the yearly herbivory treatment of the bilberry plants (Riikka Rinnan).

Hanna Valolahti measures photosynthesis, which indicates the general performance of the plants (Riikka Rinnan).

Further information

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Tiwet al., 2008, New Phytologist
Faubert et al., 2010, New Phytologist
Rinnan et al., 2014, Plant, Cell and Environment

2nd phase of INTERACT – An advanced community!

- 4 yr project in Horizon 2020
- Starting date 1 Oct 2016
- 9 WP's
- 10 mio. EURO
- 47 Partners
- 79 research stations

THE FRAMEWORK PROGRAMME FOR RESEARCH AND INNOVATION

HORIZON 2020

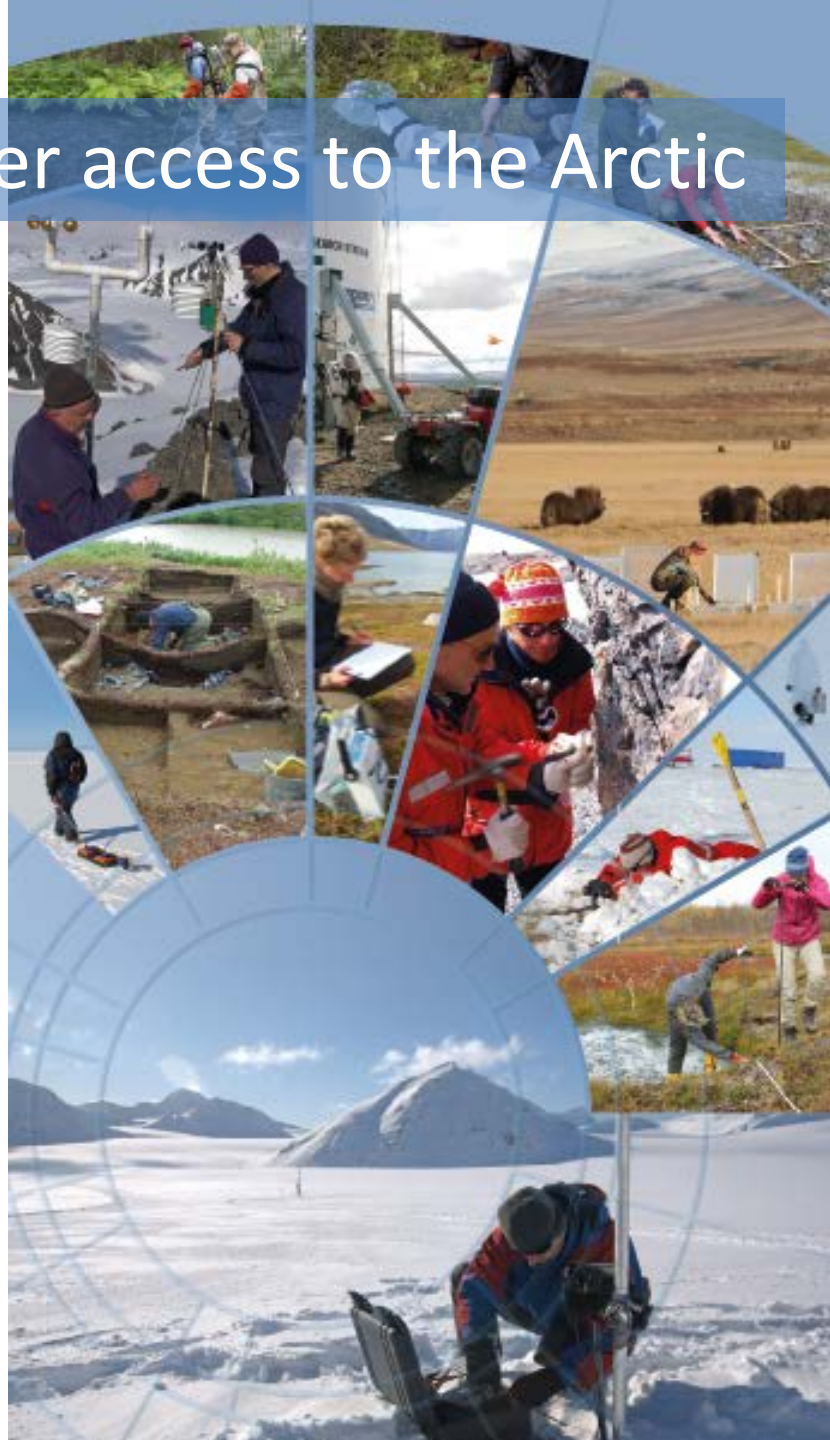
INTERACT

INTERACT will continue to offer access to the Arctic

In the second phase of INTERACT, transnational access will be offered to 43 research stations, in total ca 7800 days.

In addition, virtual access will be offered to 29 research stations.

Summer 2017 - 57 user groups are currently preparing for their Transnational Access visits to 33 INTERACT stations



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HORIZON 2020

INTERACT

Station Managers Forum

Working with Safety

Zero Emission Stations

Mentoring

INTERACT GIS

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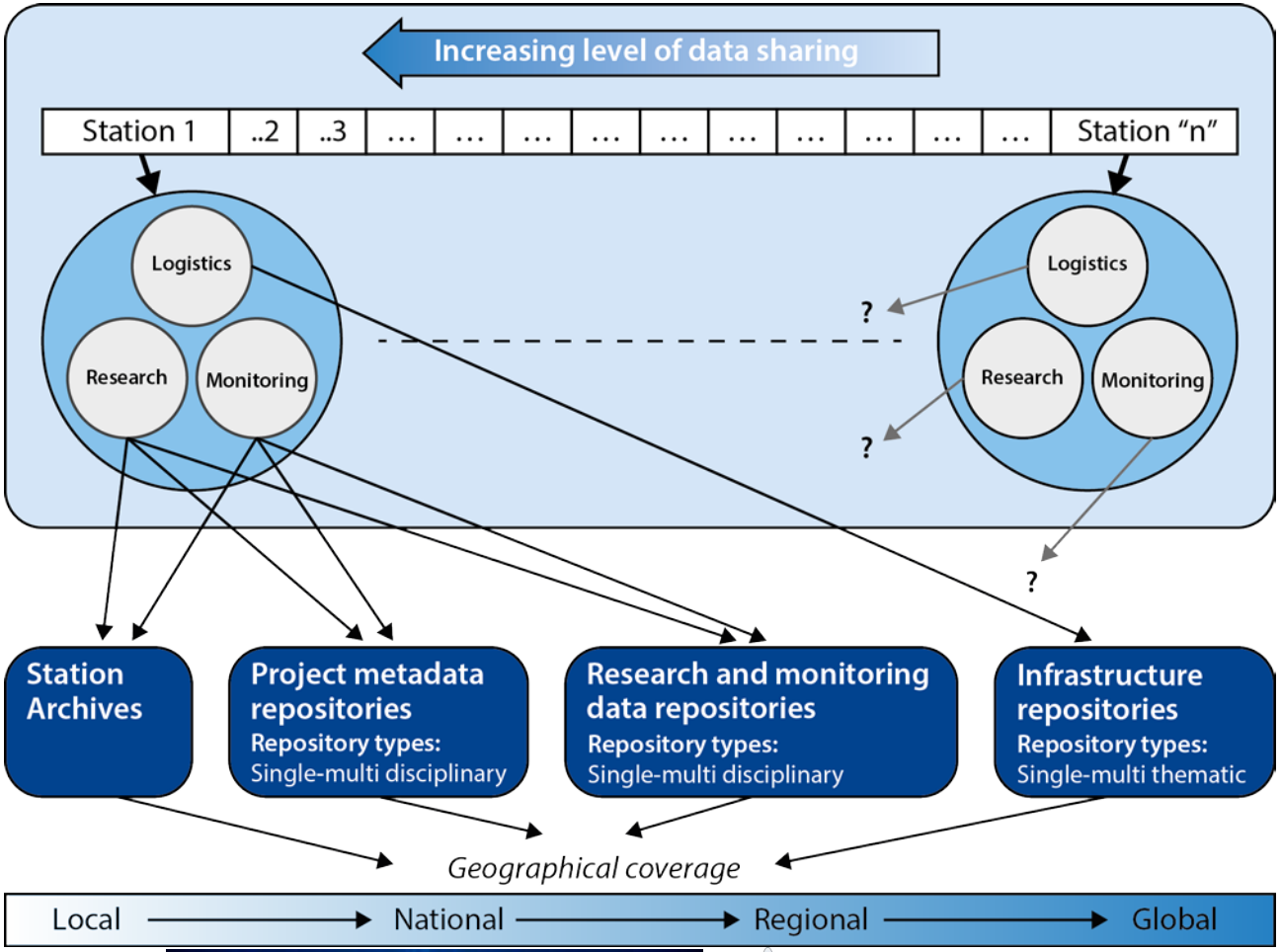
HORIZON 2020

INTERACT

Data Forum



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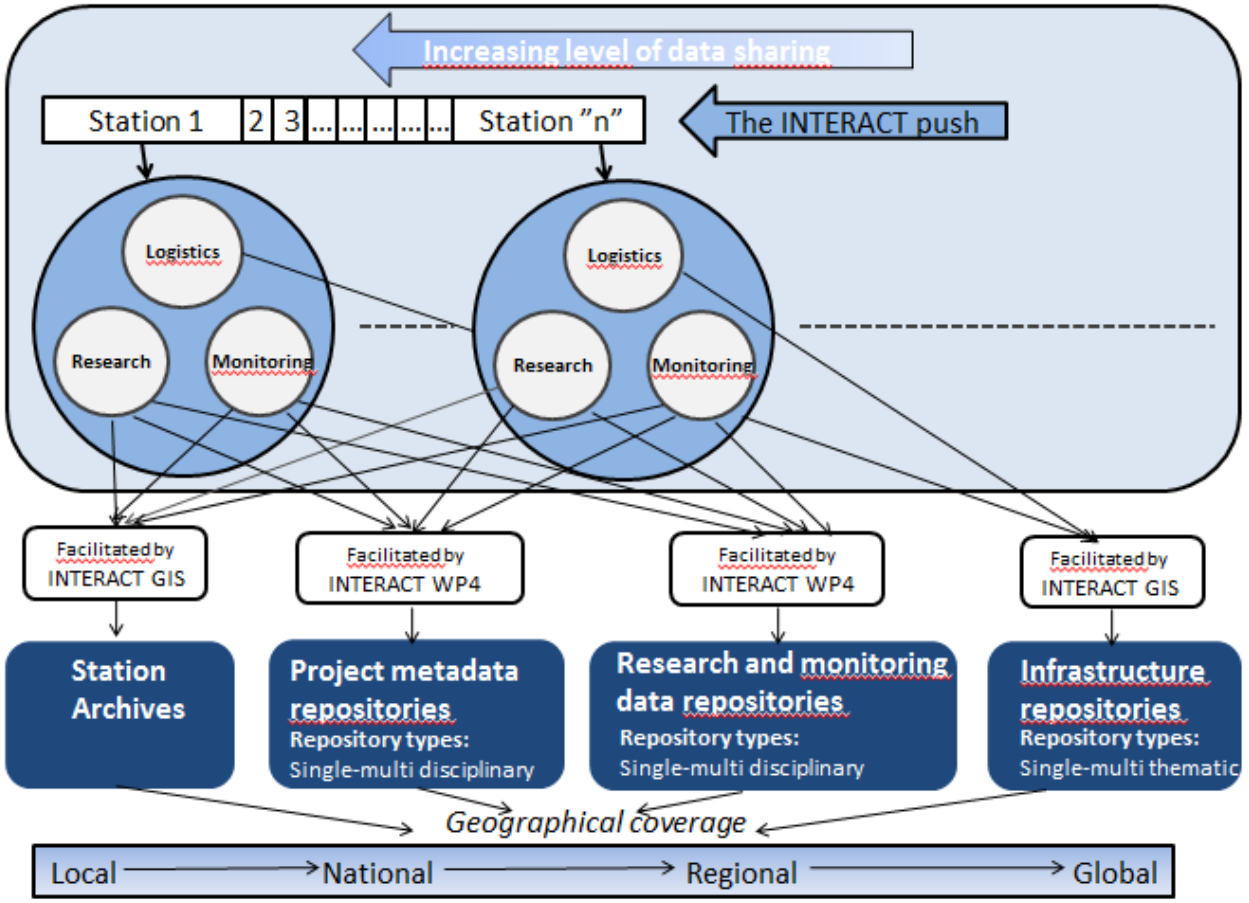
Data Forum



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Red Phone work package

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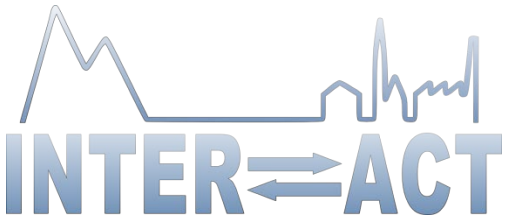
Monitoring scheme for biodiversity



Drone development

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Local Adaptation

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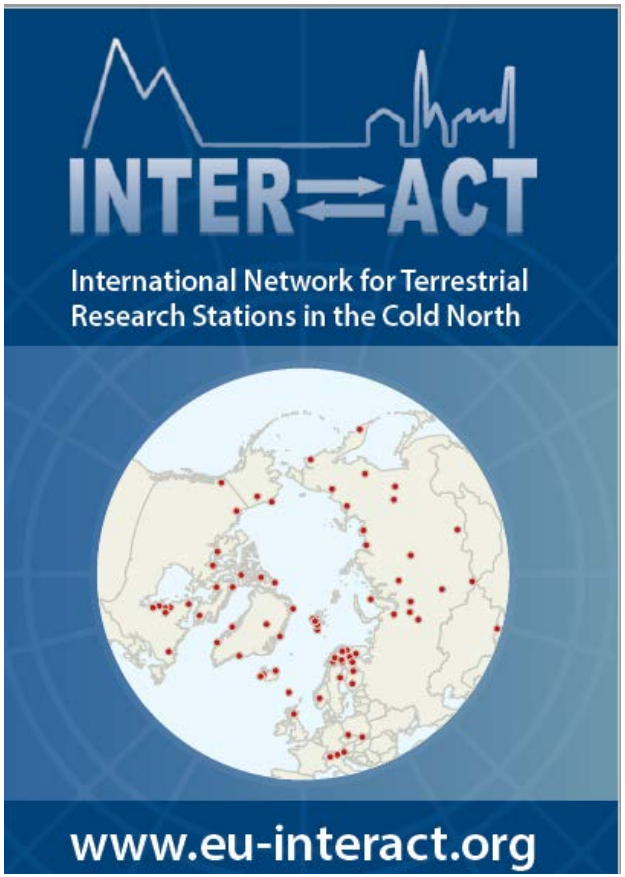
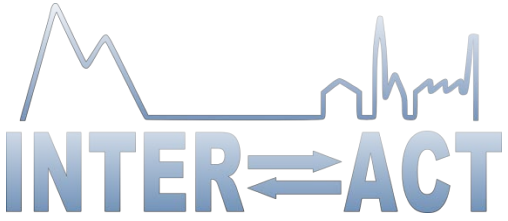
Outreach


INTER⇄ACT
International Network for Terrestrial Research Stations in the Cold North
www.eu-interact.org


GREENLAND
Arctic Station
Opening year 1906
Northern latitude 69°15′
Altitude of station 20 m a.s.l.
Distance to settlement 1 km
Annual temperature -3.2 °C
Annual precipitation 436 mm
Max number of visitors 26
Area under roof 955 m²
Disciplines studied 25/25


THE FRAMEWORK PROGRAMME FOR RESEARCH AND INNOVATION
HORIZON 2020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Thanks for your attention

www.eu-interact.org

THE FRAMEWORK PROGRAMME FOR RESEARCH AND INNOVATION

HORIZON 2020

INTERACT