

INTERACT –building capacity for research and monitoring of Arctic environment, biodiversity and ecosystems

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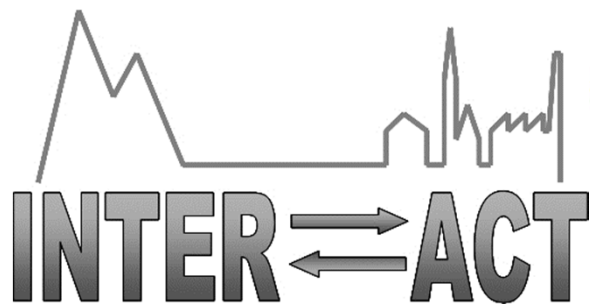
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On behalf of INTERACT





INTERACT

- The International Network for Terrestrial Research and Monitoring in the Arctic
- EU-FP7 Infrastructures project 2011-2014
- Aims to build capacity for research and monitoring of environment, biodiversity and ecosystems in the Arctic
- **Contributor to the GEO Cold Regions (WA-01-C3) with linkages to several Societal Benefit Areas (climate, ecosystems, biodiversity, health...)**





Drivers of ecosystem change -such as climate change- are profound

- Biodiversity has lost resilience and provisioning ecosystem services are threatened
- Arctic regulatory ecosystem services are fundamental as biospheric feedbacks that potentially have global implications

Need to **monitor** and **understand** rapid changes and their multiple consequences on Arctic Environment, Ecosystems and Biodiversity

Complexity: There are many drivers of change and multiple responses to a particular driver at different scales

- Pan-arctic scale vs. Regional scale vs. Local scale → Local view is needed to explain the big picture!
- Magnitude of change: Major changes - Minor changes - No change

Detecting change can be easy, but attribution is difficult: multiple approaches are needed!

3Ms concept: Three approaches are essential to get the "big picture", and facilitate adaptation and mitigation

→ Applied in INTERACT to build capacity in research and monitoring

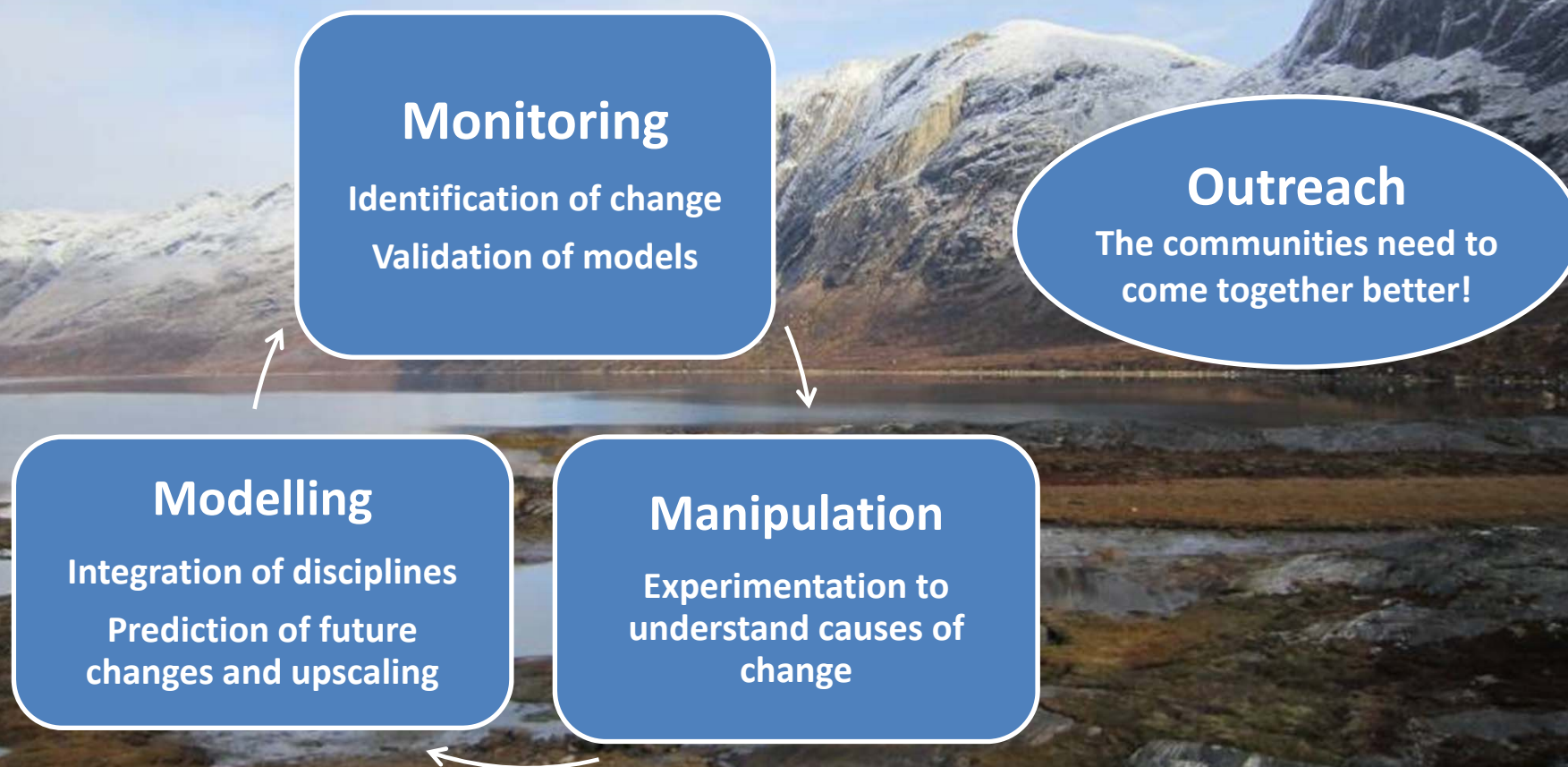


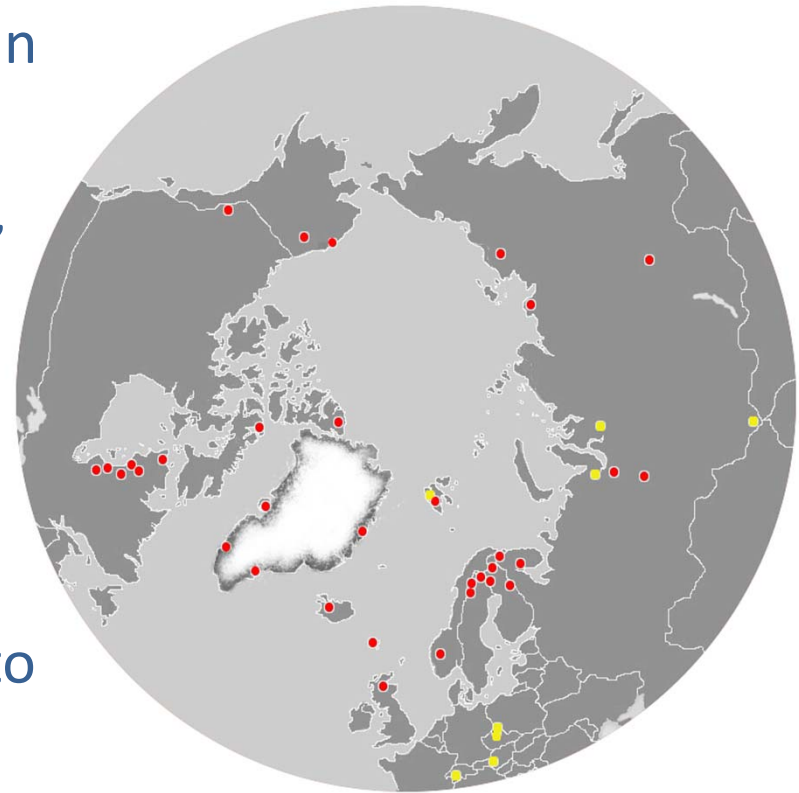
Photo by K. Raundrup, GINR





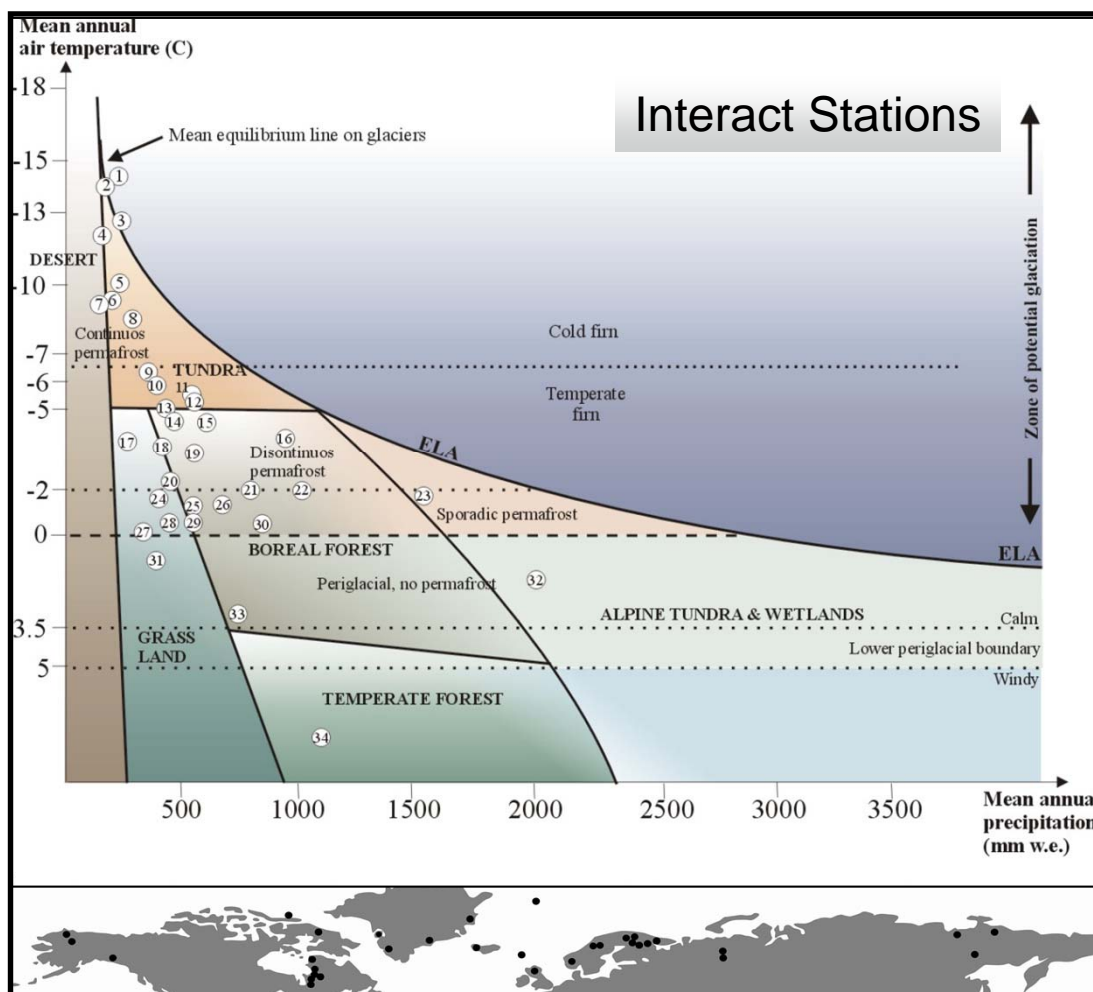
Capacity for monitoring: INTERACT network of stations

- 33 stations and 20 observer stations in 19 countries
- Data and monitoring of environment, biodiversity, and ecosystems
 - Climate records, hydrology, permafrost, vegetation, phenology, species richness, population counts, tourism impacts, etc.
- INTERACT partners' monitoring activities have been on-going for up to 100 yr!





Monitoring and research over the wide environmental envelope of the North



Interact Stations

1. Chokurdakh
2. Bylot Island
3. Samoylov
4. Point Barrow
5. Spasskaya Pad
6. Zackenberg
7. Ward Hund Island
8. Toolik Lake
9. Sverdrup
10. Salluit
11. Nymto Park Station
12. Lac à L'eau Claire
13. Ny Aalesund
14. Boniface River
15. Whapmagoostui –Kuuijuarapik
16. Tarfala
17. Kluane Lake
18. Arctic Station
19. Umiujaq
20. Vindelfjällen
21. Kilpisjärvi
22. Finse
23. Sermilik Station
24. Kevo
25. Mukhrino Field Station
26. Radisson
27. Svanhovd
28. Kolari
29. Oulanka
30. Khibiny
31. Abisko
32. Sornfelli
33. Litla Skard
34. Cairgorms



Capacity for research: Transnational Access (WP4)

- Free access to research facilities, field sites, databases for EU-based user groups to conduct state-of-the-art research
- Support for travel and logistic costs
- 10 000 person-days of access provided to 20 terrestrial research stations in 8 countries
- 5400 days used/granted by far
- 360 users from 136 user groups from 19 countries
- Biodiversity, glaciology, permafrost, climate, hydrology, ecology, biogeochemistry, human dimension
- Articles in scientific journals (26), Abstracts (17), Master Thesis (4)...





**Transnational Access Call is open 1.8.-30.9.2013 at
www.interact-eu.org**

Apply Transnational Access to conduct research at the coolest places of the North!





Capacity for research: Joint Research Activities

Major gaps in the knowledge related to methods for automatic data collection, methods for studies of ecosystem feedbacks to climate change and methods for coordinated storage of data from many sites

- Virtual Instrumentation (WP5)
- Measurement of Northern terrestrial biospheric feedbacks to climate (WP6)
- Data Management (WP7)



Virtual Instrumentation (WP5)

- **Making in-situ sensing more manageable and effective by leveraging low-power wireless communication for automated data collection**
 - Identification of existing sensor networking and guidelines for best practice
 - Development and implementation of new networks and sensors at two INTERACT sites - Abisko in Sweden and Zackenberg in Greenland
 - Popularization of radio propagation tools and models
- Studies conducted at Zackenberg and Abisko → references to map radio links, implement telemetry or telecommand solutions over the Internet for remote maintenance of on-site data loggers
- Development of a new photo-based phenology workflow





Measurement of Northern terrestrial biospheric feedbacks to climate (WP6)

- ✓ Quantify interactions of snow/ice, temperature, moisture and exchanges of energy and CH₄/CO₂ and their intra- and inter annual variability
- ✓ 10 energy exchange stations established at 4 INTERACT sites (Abisko, Nuuk, Zackenberg, Svalbard), covering a large part of the climatic gradient within INTERACT
- Inter-comparable energy exchange data is now accumulating from all sites

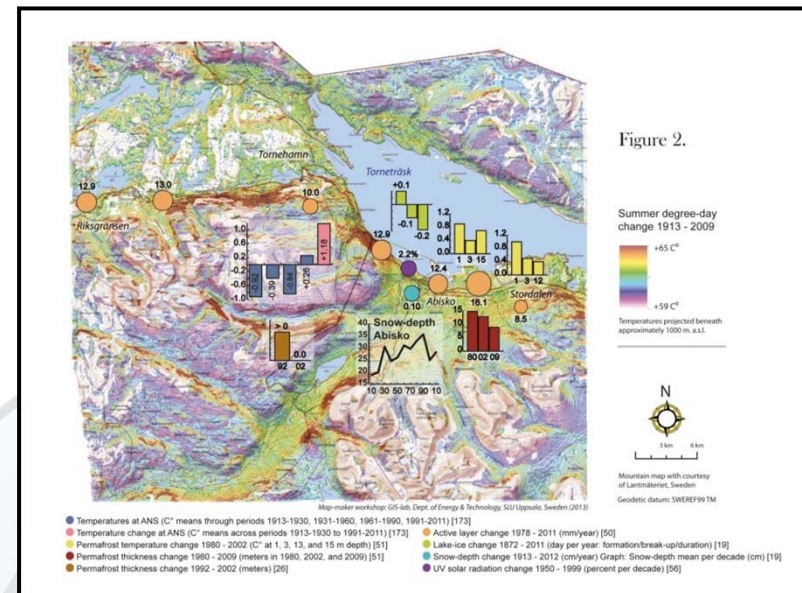
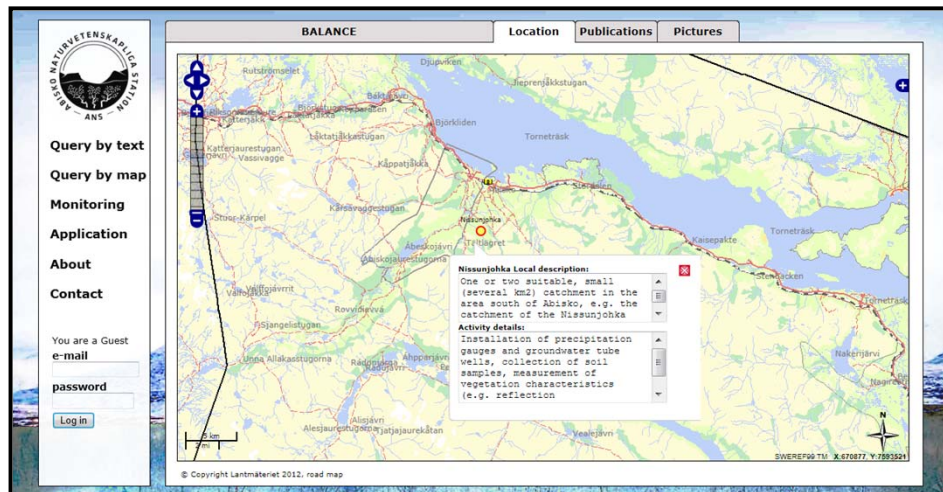




Data Management (WP7)

- ✓ Increase transparency and centrally available information through collective data archives
- ✓ Minimize risks for information gaps and unexploited synergies
- ✓ Provide standardised tools for data management, as well as for station management

- **Geographic database management system** (Abisko Scientific GIS)
- **Future implementation** beyond the INTERACT project
- **ScanDB software** for processing, storing, and sharing data products at INTERACT infrastructures



Vegetation change 1913-2009 in the Abisko region, sub-Arctic Sweden. Callaghan et al. (2013) Accepted for publication in Phil. Trans. Royal Soc.



Capacity for outreach

- Outreach work package (WP8)
- INTERACT website
- Arctic Research blogs



Arctic Research

Reports from INTERACT field sites



Blogs from the field Blogs by Station Managers Blog by TA management team About INTERACT bloggers

— A Siberian scientific team in Northern Canada! Part 2

CAPISCO on the road again! —

Khibiny 2012 Brief: What makes the Arctic an amazing place to live in?

Posted on September 14, 2012 by arcticvillia

The Arctic autumn runs by as a jackrabbit. It tries to stay alive for sometime moving from the desperate last days of summer to the encroaching advances of the long winter. In fewer than 3 weeks the surrounding landscapes will change from summer's green blanket through an orange-red-yellow-rust palette to grey and white snow-capped scenery.

This year we have had an amazing Indian Summer, and this reprieve has provided a great opportunity to stop and try to refresh our minds.



Recent Posts

- CAPISCO on the road again!
- Khibiny 2012 Brief: What makes the Arctic an amazing place to live in?
- A Siberian scientific team in Northern Canada! Part 2
- A Siberian scientific team in Northern Canada! Part 1
- Tales from the tundra take two... return of the tundra!

Archives

- September 2012
- August 2012
- July 2012
- June 2012
- May 2012

Categories

- ARCTIC RISK - spatiotemporal development of snow avalanche risk
- Behind the scenes
- Transnational Access from the viewpoint of WP4 coordination
- Capisco? - Searching answers to large scale dynamics in insect populations
- Eco-SEE - ecosystem services social assessment in extreme environments
- GEONORTHS - studying glacial erosion on northern Shields
- Geoheritage in the Arctic



INTERACT could contribute to GEO/GEOSS by...

Monitoring

Ground validation of remotely sensed data
Retrospective monitoring (BTF, IASC, CBMP)
Building capacity for species identification
Real time monitoring (CBMP, SAON, WWF)
Sampling and inventoring (EBON?)

Manipulation

Experimentation
In-situ testing of models
Hosting experiments (LTER, ANAEE?)
Instrument design, testing and distribution

Modelling

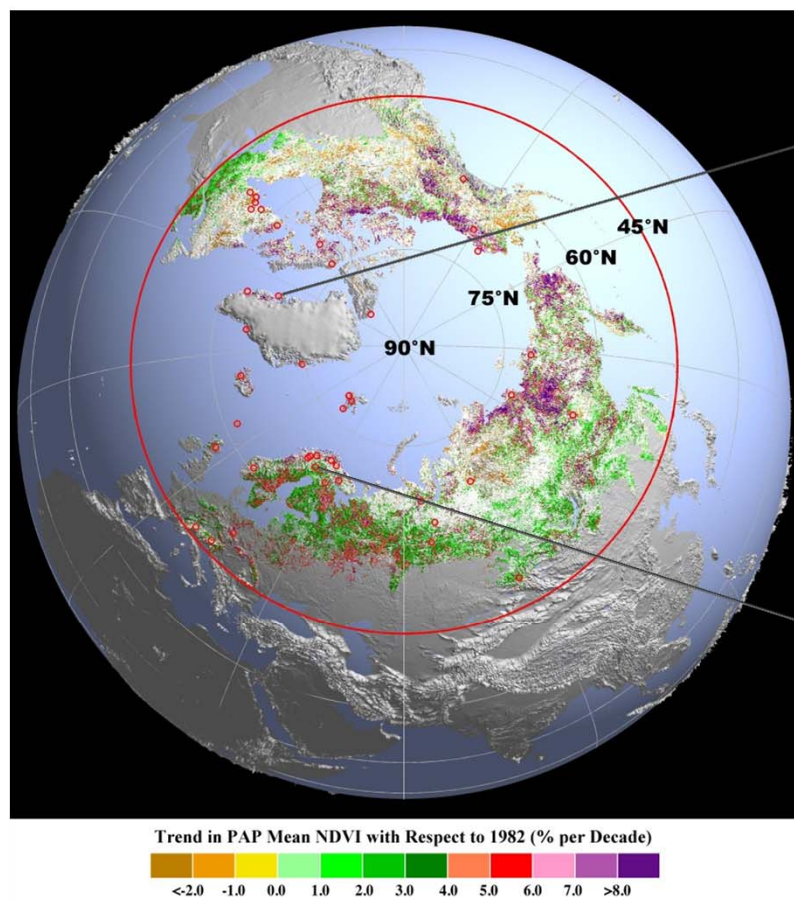
Improved data comparability and accessibility (IASC, GEO)
Improved models

Outreach

Attribution of remotely sensed data through local knowledge and access to stakeholders
Communicating results within the scientific community, to the general public and to stakeholders at various levels



INTERACT strategically samples the complexity of greening in the North



1982 to 2012

1970 to 2009
No change



From space
to the ground
Xu et al., NCC, 2013



1977 to 2009
change





Ideas how we can further contribute to GEO/GEOSS are welcome!

