INTERACT

Building capacity for research and monitoring in the Arctic

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Thule Institute, University of Oulu

on behalf of INTERACT Consortium

INTERACT as a project…

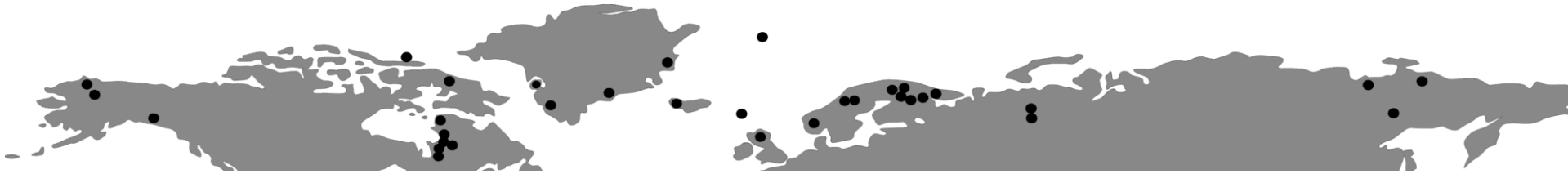
INFRA-2010-1.1.19: Research Infrastructures for Polar research
A project under this topic should aim at integrating the key research infrastructures for polar research: interdisciplinary observation and monitoring stations for atmospheric, terrestrial and/or marine studies.

- Total EU contribution 7.3 M€ for 2011-2014
- Need to **monitor** and **understand** rapid changes and their multiple consequences in Arctic Ecosystems and Biodiversity
- Based on SCANNET –a network of field stations established in 2001

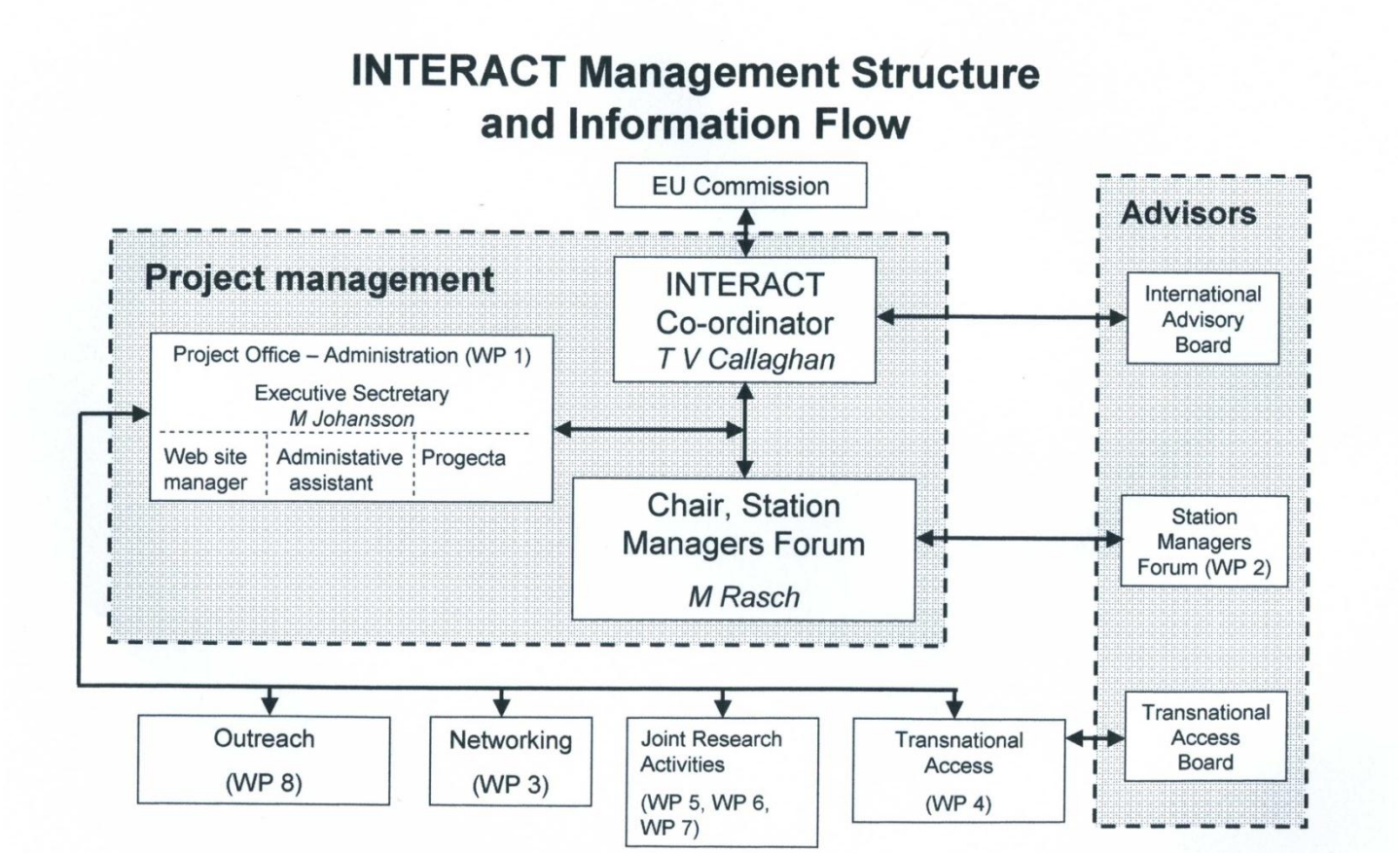
INTERACT Consortium

- 33 Partners from 14 countries, including all Arctic countries
- Coordinator prof. Terry Callaghan, KVA, and project office at Lund University (SWE)

34 infrastructures (research stations and field sites) around the Arctic, plus 14 stations with an observer status



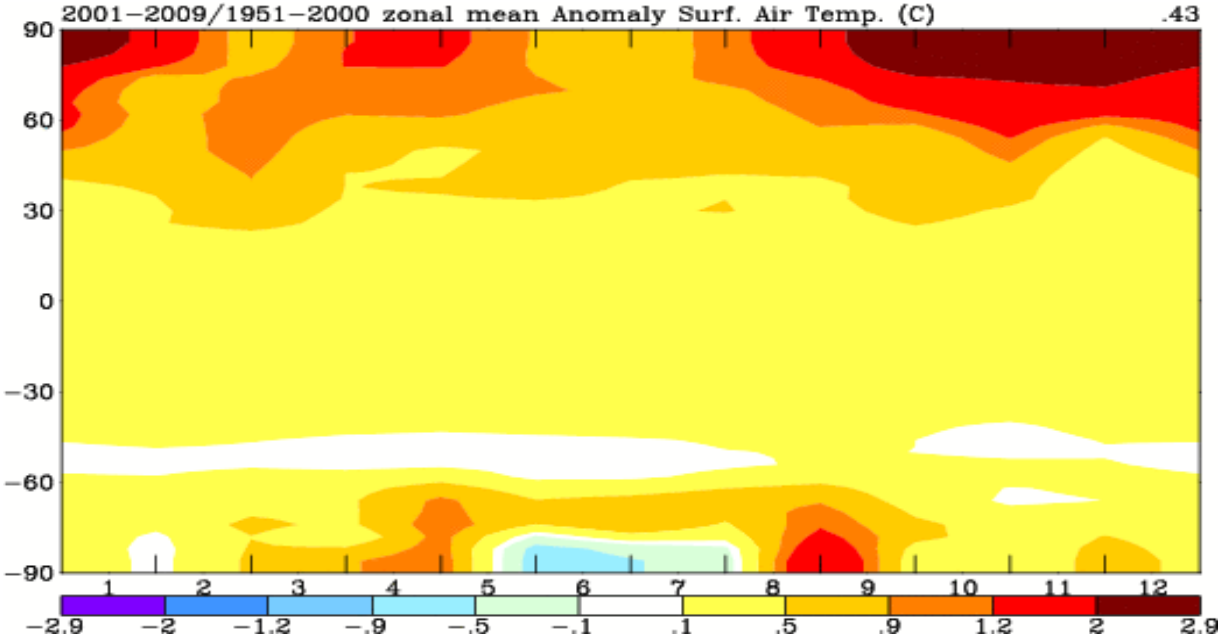
Management Structure



Why focus on the Arctic, and why the urgency?

Drivers of ecosystem change such as climate change are profound

The past years (2005-2010) have been the warmest recorded in the Arctic



Latitude-month dependence of temperature anomalies, 2001-2009

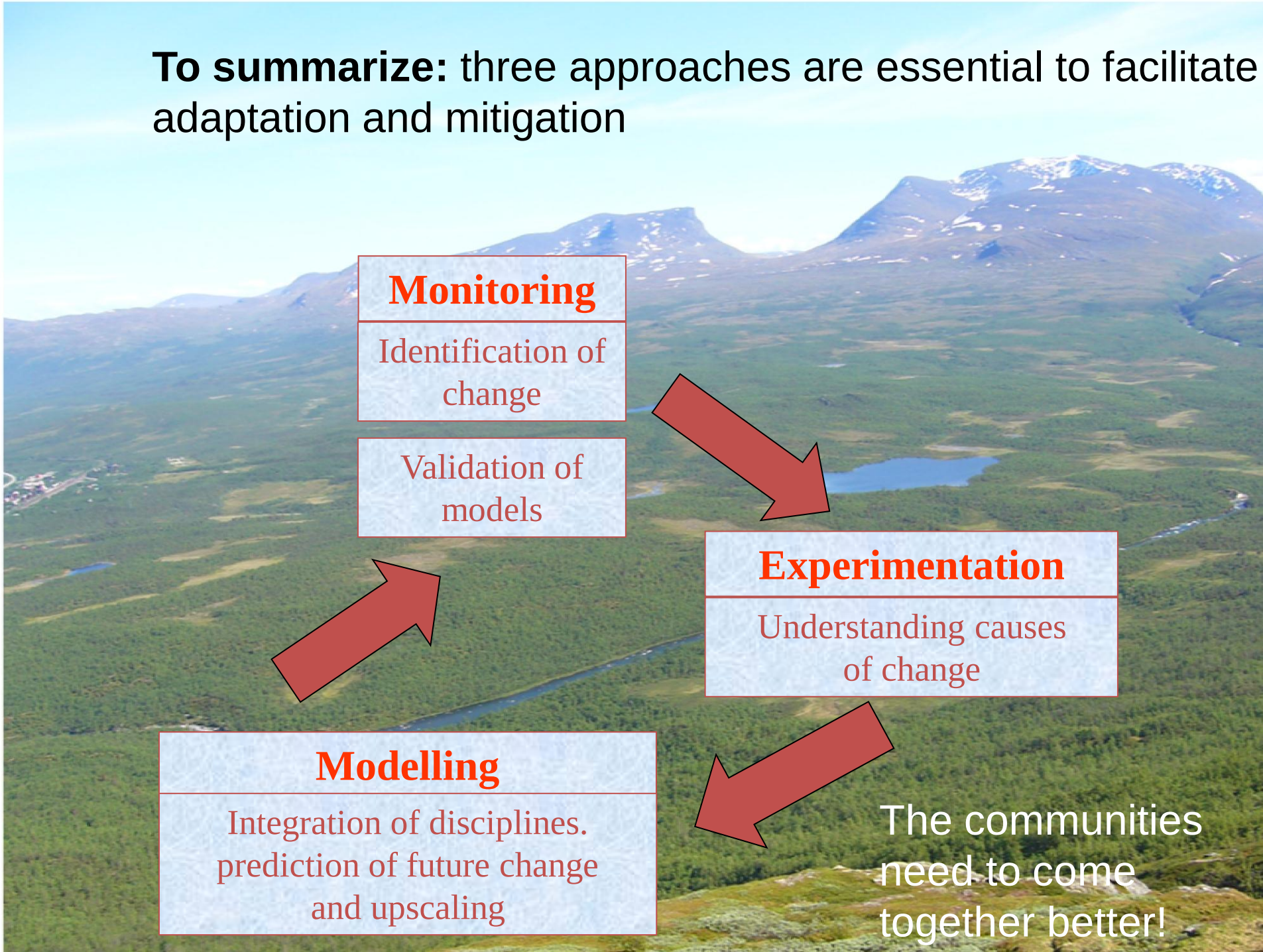
(Walsh et al., Ambio 2011)

Why focus on the Arctic, and why the urgency?

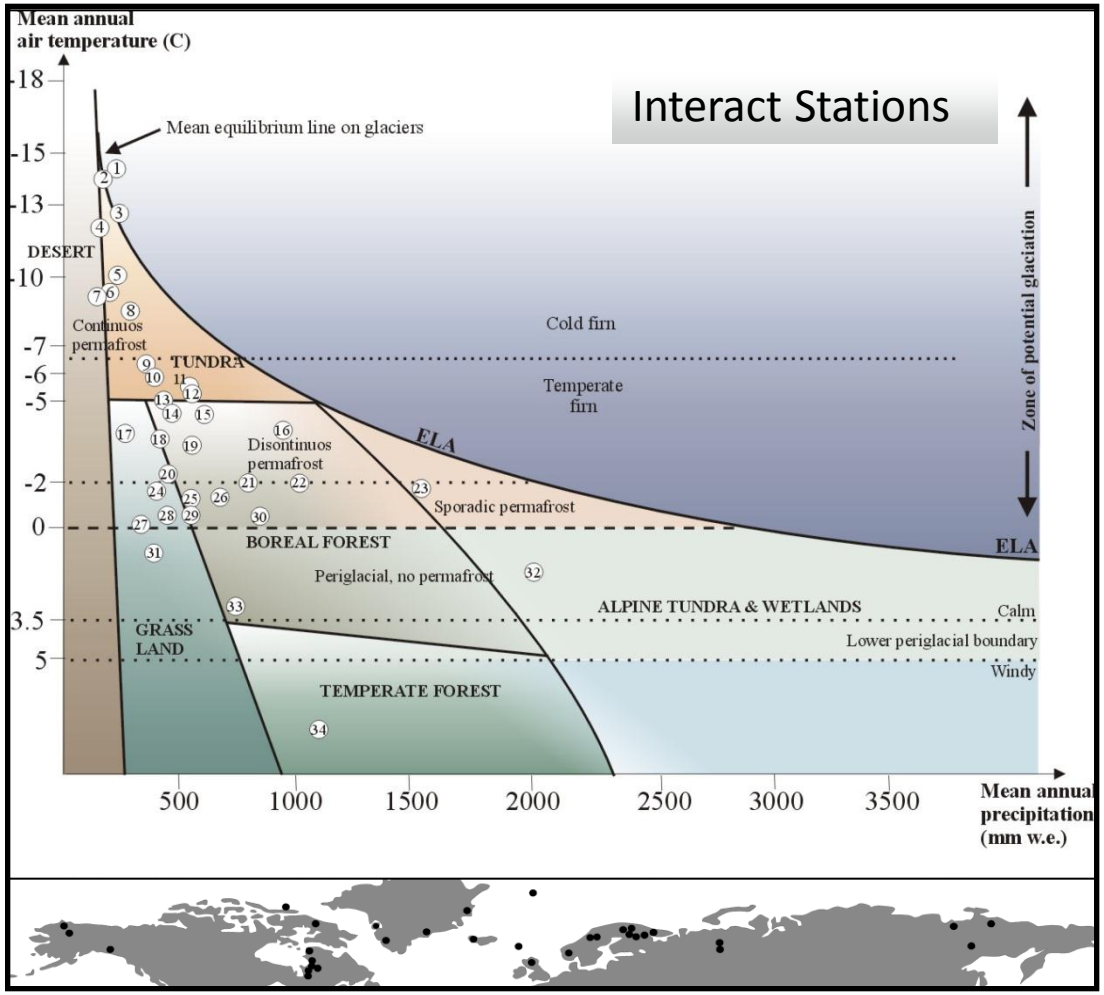
- Biodiversity has lost resilience and current changes in some ecosystems are profound
- Provisioning ecosystem services are threatened
- Arctic regulatory ecosystem services are fundamental
    - biospheric feedbacks potentially have global implications
- **Complexity:** There are many drivers of change and multiple responses to a particular driver
    - pan-arctic scale vs. Regional scale vs. Local scale
    - local view is needed to explain the big picture!
    - major changes - minor changes - no change: for example changes in tree line

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

To summarize: three approaches are essential to facilitate adaptation and mitigation



INTERACT: Strategically sampling 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 á L'eau Claire
13. Ny Aalesund
14. Boniface River
15. Whapmagoostui –Kuuijjuarapik
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

INTERACT Work Packages

WP1 Management and Coordination
WP2 Station Managers' Forum
WP3 International Cooperation
WP4 Transnational Access
WP5 Virtual Instrumentation
WP6 Measurements of terrestrial biospheric feedbacks to climate
WP7 Data management
WP8 Outreach

Station Manager's Forum (WP2)

Platform for exchange of information among research station managers and with other INTERACT participants. Coordinated by NERI/University of Aarhus (DK).

→ ecosystem monitoring, station management and administration

Station Managers' Forum meetings held twice a year at a consortium partner institution or field station. Three SMF meetings held by far.

Deliverables include reports on 'Research and Monitoring at INTERACT sites´, 'Abilities of the stations within INTERACT´ , 'Best practices of Station Management and Administration at Arctic Research Infrastructures´, and ´INTERACT Station Catalogue´

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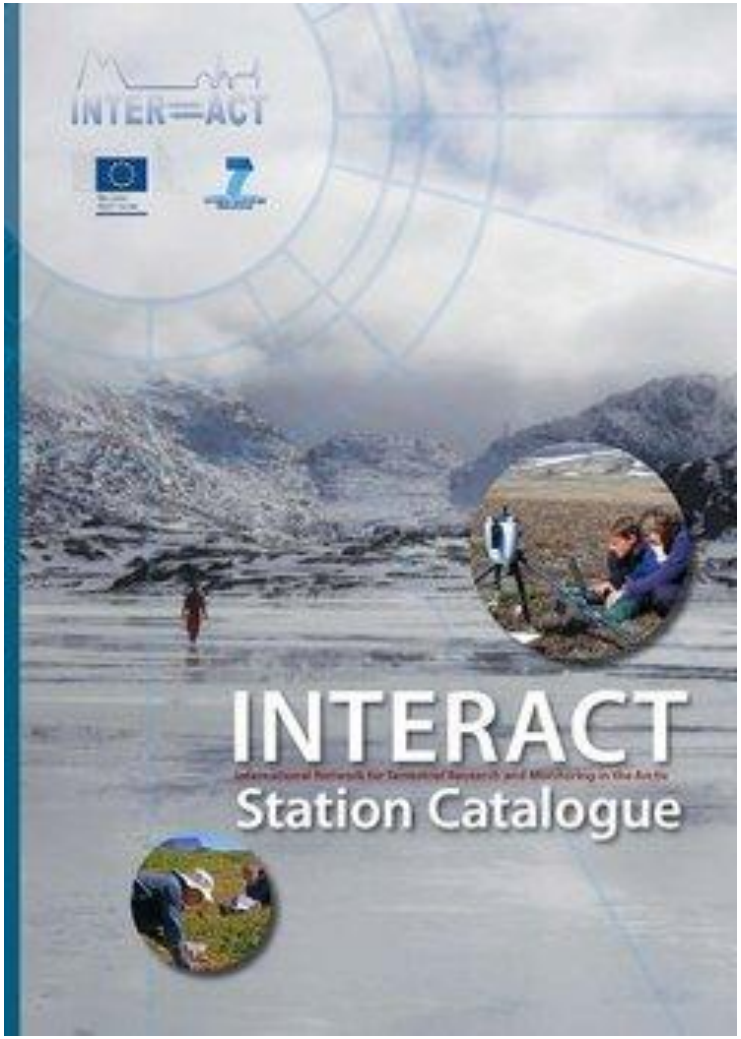
Station Manager's Forum (WP2)



INTERACT Station Catalogue:

- Published in July 2012
- Also found at www.interact-eu.org
- Describes the natural environment and facilities available at INTERACT Stations and Observer Stations
- Produced by WP2 with contributions from all stations participating INTERACT.

International Collaboration (WP3)

- External networking component of INTERACT
- Secures the further integration of INTERACT globally and within the EU
- Coordinated by NERI (Univ Aarhus, Denmark)

Transnational Access (WP4)

- Biggest work package of INTERACT: total EU contribution 3.2 M€
- Coordinated by Thule Institute, University of Oulu (WP4 leader and coordinator)
- Free access for user groups/users to research facilities and field sites, including support for travel and logistic costs
- Free access to information and data in the public domains maintained at the infrastructures
- 20 research stations in 8 countries offer TA in INTERACT
  → Finland (4), Sweden (2), Norway (2), Greenland (4), Iceland (1), Faroe Islands (1), Russian Federation (5), Scotland (1)
  → altogether 9955 person-days of access offered in 2011-2014
  → from 35 to 2120 person-days per station

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Transnational Access (WP4), cont.

- Available to user groups, where group leader and majority of group members work in an institution established in a EU Member State or Associated State
  →Scientists representing other nationalities are encouraged to attend as members of an EU based group!
  →New users, comparative studies at several stations, young scientists given priority
- Maximum amount of access is 90 person-days per user group
- TA Board evaluates the applications and selects projects recommended to stations

Statistics from the first 18 months of INTERACT TA:

- 3 TA calls; altogether 3872 person-days, of which 1511 used and 2361 granted to 19 stations (40 %). Altogether 68 user groups involved.
- 37 user groups from 12 countries (103 users from 14 countries) by June 2012.
- Disciplines: Global change and climate observation (59 %), ecosystems and biodiversity (30 %), water sciences and hydrology (5 %), other earth sciences (3%), life sciences (3 %)
- 65 % new users, 53 % young scientists (post-doc, post-graduate, undergraduate), 34% females

Transnational Access: examples of projects

Bio-geo-chemical cycling

A functional analysis of microbial diversity in sub-arctic soils
(R. Aerts, ANS, FINSE, Sweden & Norway)

Plant-soil interactions in greening arctic: effects of shrub expansion on carbon cycling
(T. Parker, ANS, Sweden)

Interactions between thawing permafrost and CO2, CH4 and energy exchange in Greenland
(A. Lindroth, GINR, Greenland)

Impact of arctic zone on the chemical and biochemical processes, conversions and Transformations in peat layers (L. Zjadak, MFS, Russian Federation)

Biodiversity and ecosystems

Strength of symbiotic interactions in extreme ecological environments
(K. Saikkonen and I. Zabalcolgeacazoa , KEVO, FINI, BIOFORSK, ARCST, LBHI)

Quantitative insect foodwebs for the sub- and high-arctic
(T. Roslin, ZAC, GINR, Greenland)

How predator-pray interactions impact biogeography and breeding systems of High Arctic waders under current climate change (J. Renerkens, ZAC, Greenland)


IHALP by M. Kozlov (Khibiny)


PHLAG by T. Maximov, CEN

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Transnational Access: examples of projects

Glaciology

Glacier monitoring in SE Greenland (*E. Hanna, SER, Greenland*)

Testing hypothesis on the response of small Arctic Glaciers to climate change (*D. Rippin, ANS, Sweden*)

Seismic assessment of basal glacier ice and its water content at Storglaciären, Sweden (*A. Booth, ANS, Sweden*)

A sedimentologocal investigation of palaeoglacier dynamics from Midtdalsbreen, south central Norway (*B. Reinardy, FINSE, Norway*)


DATECH, V. Rinterknecht, ARCST, SER

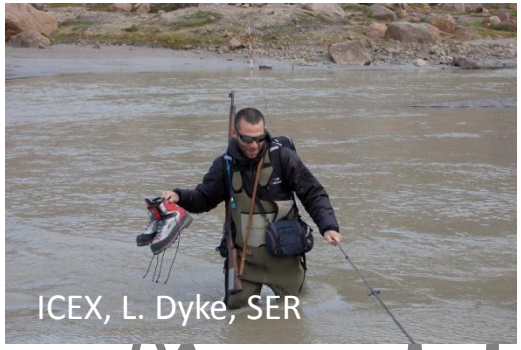

HOLOGIS, A. Long - GINR

Hydrology, freshwater biology

Sediment and meltwater dynamics in glaciated catchments of Arctic Permafrost *(K. Adamson, ARCST, Greenland)*

Spatial expression of millennial-scale Holocene climate changes: a multi-proxy lake sediment approach (*D. Fower, KEVO, OULANKA, KILPIS, KOLARI*)

'Winter survival strategies of freshwater zooplankton in subarctic ponds (*M. Striebel, KILPIS, Finland*)


ICEX, L. Dyke, SER

Transnational Access: examples of projects

Life Sciences, Ecosystem services

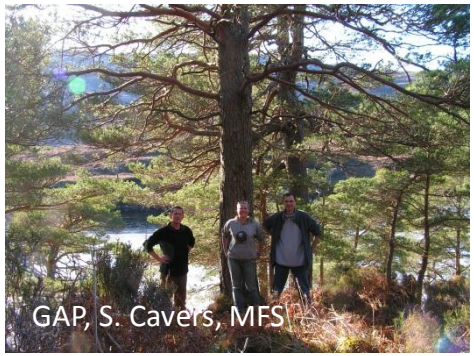
Rodent-borne Ljungan virus in migrating Norwegian lemmings
(*H. Hauffe & A.P. Rizzoli, KILPIS, Finland*)

Possible rage expansion of Plasmodium in bird populations of the Northern Europe (*I. Krams, KEVO, KILPIS, OULANKA, Finland*)

Ecosystem service social assessments in Extreme Environments
(*D. Orenstein, CEH, Scotland, UK*)

Testing methodologies to monitor the ecosystem services and establish large Forest dynamics plots at two Eurasian Boreal forest sites
(M. Smith, MFS, SPA, Russian Federation)


ECO-SEE, D. Orenstein, CEH


GAP, S. Cavers, MFS

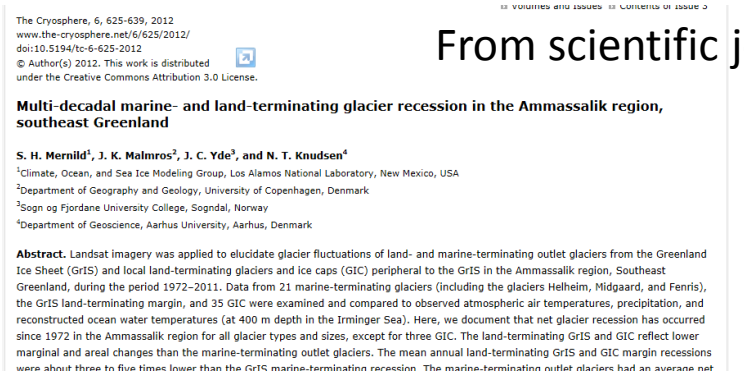
Human dimension

Spatio-temporal risk management for arctic mountain regions (S. Fuchs, KHIBINY)

Valuing ecosystem services in the Abisko area (P.-P. Franzese, ANS)

Transnational Access: publications

Publications by user groups recorded into Access Database



The Cryosphere, 6, 625-639, 2012
www.the-cryosphere.net/6/625/2012/
doi:10.5194/tc-6-625-2012
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Multi-decadal marine- and land-terminating glacier recession in the Ammassalik region, southeast Greenland

S. H. Mernild[1], J. K. Malmros[2], J. C. Yde[3], and N. T. Knudsen[4]

[1]Climate, Ocean, and Sea Ice Modeling Group, Los Alamos National Laboratory, New Mexico, USA
[2]Department of Geography and Geology, University of Copenhagen, Denmark
[3]Sogn og Fjordane University College, Sogndal, Norway
[4]Department of Geoscience, Aarhus University, Aarhus, Denmark

Abstract. Landsat imagery was applied to elucidate glacier fluctuations of land- and marine-terminating outlet glaciers from the Greenland Ice Sheet (GrIS) and local land-terminating glaciers and ice caps (GIC) peripheral to the GrIS in the Ammassalik region, Southeast Greenland, during the period 1972–2011. Data from 21 marine-terminating glaciers (including the glaciers Helheim, Midgaard, and Fenris), the GrIS land-terminating margin, and 35 GIC were examined and compared to observed atmospheric air temperatures, precipitation, and reconstructed ocean water temperatures (at 400 m depth in the Irminger Sea). Here, we document that net glacier recession has occurred since 1972 in the Ammassalik region for all glacier types and sizes, except for three GIC. The land-terminating GrIS and GIC reflect lower marginal and areal changes than the marine-terminating outlet glaciers. The mean annual land-terminating GrIS and GIC margin recessions

From scientific journals….

INTERNATIONAL JOURNAL OF CLIMATOLOGY

Research Article

The influence of North Atlantic atmospheric and oceanic forcing effects on 1900–2010 Greenland summer climate and ice melt/runoff

Edward Hanna[1,*], Julie M. Jones[1], John Cappelen[2], Sebastian H. Mernild[3], Len Wood[4], Konrad Steffen[5], Philippe Huybrechts[6]

Issue

International Journal of Climatology
Early View (Online Version of Record published before inclusion in an issue)

Article first published online: 30 MAR 2012
DOI: 10.1002/joc.3475
Copyright © 2012 Royal Meteorological Society

PRESS RELEASE FOR IMMEDIATE DISTRIBUTION

Mittivakkat Gletscher, the longest-observed mountain glacier in Greenland, experiences its fourth largest mass loss year since 1995

Sebastian H. Mernild (Los Alamos National Laboratory, USA, mernild@lanl.gov)
N. Tvis Knudsen (Aarhus University, Denmark, ntk@geo.au.dk)
Edward Hanna (University of Sheffield, UK, ehanna@sheffield.ac.uk)

We report our 11-21 August 2012 fieldwork surveys of Mittivakkat Gletscher in southeast Greenland (17.6 km^2; 65°41'N, 37°48'W), which has the longest observational mass bala

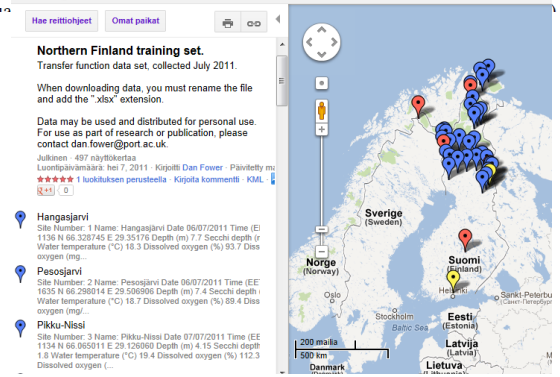
To press releases….

Are Carotenoid Pigments in Zooplankton Related to UV-protection or to Optimal Food Uptake?

To abstracts in scientific meetings….

T. Schneider[1], M. Rautio[1]
[1]*Université du Québec à Chicoutimi, Chicoutimi, Canada*

Studies of seasonal variations in carotenoid pigment accumulation in zooplankton are rare, especially in high-latitude systems, where observations of intensely colored copepods in absence of light (*i.e.*, during arctic wi…endent from solar radiation. Yet m…s been linked to different levels of u…ms. In addition there are other driv…tective



To podcasts….

…To sharing sampling sites and Data in Google maps!

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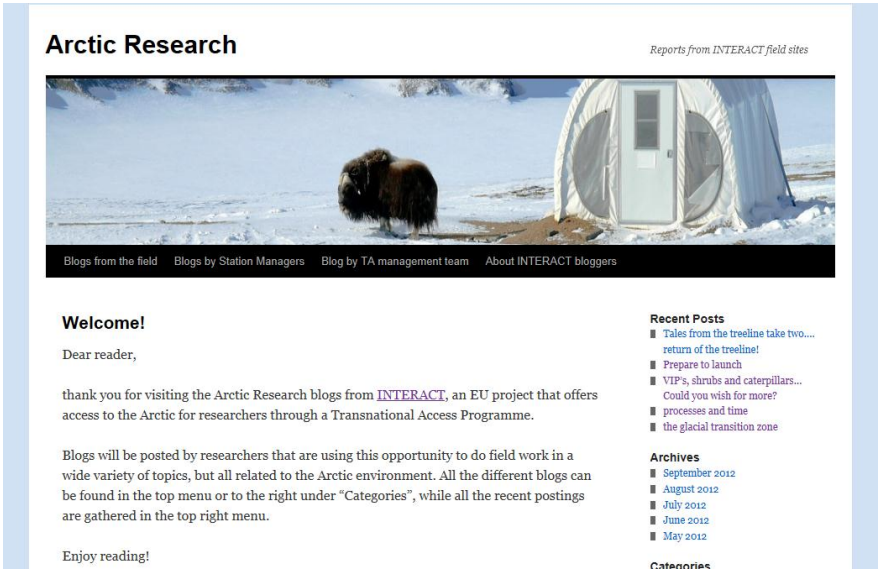
Transnational Access: outreach



INTERACT website

- www.interact-eu.org
- information about TA calls
- project and field site information
- news and feature articles
- publication information

- **Arctic Research blogs**
  http://arcticresearch.wordpress.com
- highlighting texperiences of researchers and station managers
- part of outreach activities

Transnational Access (WP4): Next call

TA call for summer 2013 and winter 2013/2014 opens in October

Photo by Wladimir Bleuten, Mukhrino Field Station (RUS)

Joint Research Activities (WP5-7)

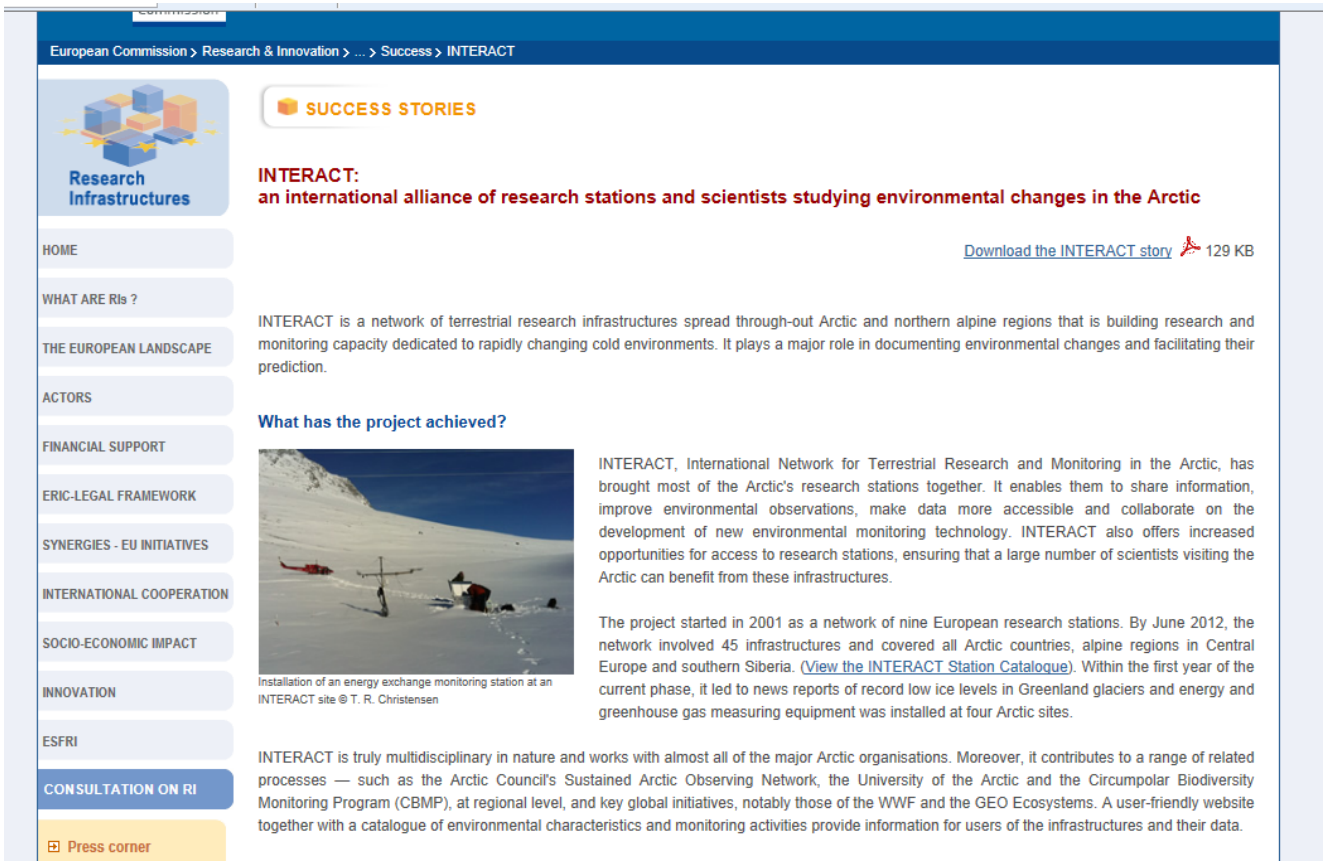
- Aim to improve methods for automatic data collection, studies of ecosystem feedbacks to climate change, and methods for coordinated storage of data from many sites
- close collaboration with INTERACT stations
- **WP5: Virtual Instrumentation** (*IT University of Copenhagen)*
  - leverage low-power wireless communication capabilities to make in-situ sensing easier to manage and more effective
- **WP6: Improved measurements of terrestrial biospheric feedbacks to climate** *(Lund University, Sweden)*
  - improve monitoring and research of key feedback mechanisms from northern terrestrial ecosystems in a changing climate
  - quantify interactions of snow/ice, temperature, moisture and exchanges of energy and CH4/CO2 and their intra- and inter annual variability at multiple sites
- **WP7: Data Management** (*SLU, Sweden)*
  - geo-referenced data service
  - design, development and testing of ScanDB, a repository of tools and products for environmental data management

Outreach (WP8)

Aims to inform and interact with the public, stakeholders and primary, secondary and tertiary students, especially people living in and around the Arctic by:

- **Sharing knowledge and discoveries** of the INTERACT partners in order to highlight the importance of the Arctic
- **Alert people to environmental changes** in and around the Arctic
- **Influence attitudes** towards Arctic environments and peoples' behaviours
- **Gather relevant information** from stakeholders such as traditional/indigenous knowledge and through community monitoring programs
- **Work together with local people** to contribute to local adaptation strategies to cope with the impacts of climate change in the Arctic.
- Coordinated by CEH (UK), POLAR (SWE), FINI (Faroe Islands)
- Lectures, visits to schools and institutions, webpages, Twitter, LinkedIn

From the present to the future…



European Commission > Research & Innovation > ... > Success > INTERACT

Research Infrastructures

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- CONSULTATION ON RI
- Press corner

SUCCESS STORIES

INTERACT:
an international alliance of research stations and scientists studying environmental changes in the Arctic

Download the INTERACT story 129 KB

INTERACT is a network of terrestrial research infrastructures spread through-out Arctic and northern alpine regions that is building research and monitoring capacity dedicated to rapidly changing cold environments. It plays a major role in documenting environmental changes and facilitating their prediction.

What has the project achieved?

Installation of an energy exchange monitoring station at an INTERACT site © T. R. Christensen

INTERACT, International Network for Terrestrial Research and Monitoring in the Arctic, has brought most of the Arctic's research stations together. It enables them to share information, improve environmental observations, make data more accessible and collaborate on the development of new environmental monitoring technology. INTERACT also offers increased opportunities for access to research stations, ensuring that a large number of scientists visiting the Arctic can benefit from these infrastructures.

The project started in 2001 as a network of nine European research stations. By June 2012, the network involved 45 infrastructures and covered all Arctic countries, alpine regions in Central Europe and southern Siberia. (View the INTERACT Station Catalogue). Within the first year of the current phase, it led to news reports of record low ice levels in Greenland glaciers and energy and greenhouse gas measuring equipment was installed at four Arctic sites.

INTERACT is truly multidisciplinary in nature and works with almost all of the major Arctic organisations. Moreover, it contributes to a range of related processes — such as the Arctic Council's Sustained Arctic Observing Network, the University of the Arctic and the Circumpolar Biodiversity Monitoring Program (CBMP), at regional level, and key global initiatives, notably those of the WWF and the GEO Ecosystems. A user-friendly website together with a catalogue of environmental characteristics and monitoring activities provide information for users of the infrastructures and their data.

INTERACT nominated as ”Success Story” by EC in July 2012

After the first 1.5 years of activity, INTERACT has reached its goals set by far, and is heading strong towards the future

Let’s INTERACT!

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