

## Integrating Activities for Advanced Communities



### M2.4- Station Managers' Forum 5

Project No. 871120 – INTERACT

H2020-INFRAIA-2019-1

Start date of project: 2020/01/01

Duration: 48 months

Due date of milestone: 2023/01/d31 (Mx)

Actual Submission date: 2022/12/10

Lead partner for milestone: AU

Author: Marie Arndal

Dissemination Level		
PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the Consortium (including the Commission Services)	
CO	Confidential, only for members of the Consortium (including the Commission Services)	

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## Publishable Executive Summary

The fifth meeting of the INTERACT Station Managers' Forum (SMF) in INTERACT III was held at Keflavík, Iceland on 27-28 September 2022 – held back to back with INTERACT General Assembly.

74 people attended this meeting arranged by Sudurnes Science and Learning Centre.

At the meeting, station managers discussed and provided input to milestones and deliverables within the SMF and Joint Research Activities work packages. The minutes of SMF meeting is presented below.

# Minutes INTERACT III Station Managers' Forum V

27-28 September 2022  
Keflavik, Iceland



## Contents

<a href="#">Welcome</a> .....	5
<a href="#">Activities since last meeting</a> .....	5
<a href="#">Book publications</a> .....	5
<a href="#">International workshop</a> .....	5
<a href="#">INTERACT GIS developments</a> .....	6
<a href="#">Safety Guide</a> .....	6
<a href="#">Tourism Pocket guide</a> .....	8
<a href="#">Comments to CAFF Extreme Events and rapid biodiversity changes guidance tool</a> .....	8
<a href="#">Seminar on Geopolitics in the Arctic</a> .....	9
<a href="#">Environmental impact survey at stations</a> .....	10
<a href="#">Repository for selected climate variables</a> .....	11
<a href="#">Ideas for upcoming seminar on state of the art Environmental monitoring</a> .....	11
<a href="#">INTERACT GIS</a> .....	12
<a href="#">AECO Tourist guide template</a> .....	12
<a href="#">Course on local involvement in research and monitoring by NORDECO</a> .....	13
<a href="#">INTERACT – Minimum Monitoring System. How well do INTERACT stations represent a changing Arctic towards 2100?</a> .....	14
<a href="#">AMAP emerging contaminant monitoring</a> .....	14
<a href="#">Open floor</a> .....	15
<a href="#">Sonnblick Observatory</a> .....	15
<a href="#">An update on Kilpisjärvi monitoring data</a> .....	16
<a href="#">Wrap up of meeting</a> .....	17

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# Minutes

## Welcome

Morten Rasch welcomed all participants to the meeting - 74 people attended this meeting in Keflavik, Iceland. Sudurnes Science and Learning Centre were thanked for hosting the meeting. A short introduction round was made.

## Activities since last meeting

*By Morten Rasch*

### Book publications

A new INTERACT guidebook has been published and are now available on the INTERACT website - <https://eu-interact.org/publication/>

Overall idea with all INTERACT handbooks and guidebooks is to make INTERACT the place to seek information concerning fieldwork in the Arctic and run of arctic and northern alpine research stations.

One of the new guidebook presented during this meeting is entitled: INTERACT Reducing the CO2 Emissions in Arctic Science

Upcoming products:

- 'INTERACT Reducing the Environmental Impact of Arctic Research Stations' - ready for layout.
- INTERACT safety guide

Open Station events material:

- Three posters about INTERACT and the topic of Climate change.
- Roll-up displays of INTERACT and individual stations (to be translated into non-English languages).

### International workshop

FARO, ARICE, APECS and INTERACT facilitated a workshop on International Access to Research Infrastructure in the Arctic during ASSW 2021. The report from this workshop has been accepted for publication by Polar Record entitled "International Access to Research Infrastructure in the Arctic". *Kate Ruck, Marie Frost Arndal, Nicole Biebow, Justiina Dahl, Stig Flått, Mats Granskog, Svenja Holste, Josefine Lenz, Jennifer Mercer, Franziska Pausch, Anna-Maria Perttu, Morten Rasch, Maria Samuelsson, Arild Sundfjord, Femi Anna Thomas, Elmer Topp-Jørgensen and Veronica Willmott (2022)*. International access to research infrastructure in the Arctic. Polar Record 58. Open access, link: [International access to research infrastructure in the Arctic | Polar Record | Cambridge Core](#)

On October 27, 2022, FARO, ARICE, EPB and INTERACT arrange a workshop about 'The future of Arctic research infrastructure in the Arctic' that will take place in Brussels. During this one-day event, experts from science, policymaking, industry, and infrastructure organizations will come together to discuss key topics related to research infrastructure in the Arctic.

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## INTERACT GIS developments

*By Elmer Topp-Jørgensen*

SMF lead the development of the system with UMEÅ IT as the technical developers, and Elmer showed new developments what they have been working on for the past months.

Recent developments include restructuring of the system with focus on:

- improved GIS platform (map)
- station catalogue info integration and search function
- simplicity and usability
- Scientific networks and thematic maps features
- Development of upload function for project metadata

Hereafter a session was run to get stations registered in the system and starting to use it in the station managers workspace. This enables station managers to edit information whenever needed, to provide up to date information about their station on the INTERACT GIS platform.

INTERACT GIS currently as registered station manager user for 52 of 68 stations (not counting Russian stations that are on pause). The majority of the missing stations are observer stations that have never participated in INTERACT meetings. Six of 21 Russian stations were registered prior to the pause.

## Safety Guide

*By Morten Rasch*

At the last SMF meeting at Kilpisjärvi research Station, Finland, in 2021, it was decided that SMF should produce an INTERACT Safety Guidebook, using the safety book from University of Copenhagen as a starting point.

This session discussed contents and format of the guidebook:

Inputs from break-out groups:

### **Group 1**

#### Format and structure:

Potential ways of structuring the guide would be:

- a) According to safety levels – individual, group level, leadership level, institutional level
- b) Decision-tree or questionnaire to guide people to the relevant resources.

Also, hyperlinks in the online version to appendices may be helpful so that readers get quickly to relevant information. Both printed and online versions would be great.

Who is the audience for this book – station managers or researchers? Need to have a clear target group.

#### Contents:

1. Winter field work: this has been not explicitly mentioned in the guide, but group members voiced that this becomes more and more common. Thus, special safety rules for this season may be important to include.

2. Local guides: It should be mentioned that visitors should expect to be self-reliant and not count on station staff to be responsible for their safety.
3. Drone permits and handling: As the use of drones become more and more common, a section on this could be added (e.g., permits, use at international borders and around airports/helicopter fields).
4. Animals: Include/adjust guides for additional animal species like moose, brown bear, others
5. Lab work safety: In addition to field safety, it would be good to add a chapter on lab safety as a lot of guest researchers do follow up work.
6. Electrical accidents: open battery use and leaks.
7. Swim course: At sea or freshwater research – can all participants swim? Seems that this is not always the case.
8. Everyone in the group (or at least several people) needs to know what to do in case of an accident. The group leader is responsible for ensuring preparedness and making sure that there always someone to take charge in case something happens.

## Group 2

### Format and structure

- a) A shorter manual might be more likely to be used.
- b) Checklist would be helpful, to touch on important areas that should be included.
- c) a specific document for each station developed by station managers from this guidance might be a good idea; then phone numbers, etc. would be current.

### Contents:

1. Multiple employers/institutions create overlapping regulations, can be challenging if something happens (safety incident, e.g. helicopter accident) – some guidance for clarifying responsibilities ahead of time.
2. General document for station managers, things to add.
  - a. Communication devices should be added; suggested options, make sure that they actually work, take a spare battery, put phone numbers on a laminated card with the phone numbers.
  - b. Check-in guidelines – general guidelines that can be made specific for each station
    - i. Disclaimer on legal responsibility.
  - c. Temperature guidelines for extreme events (e.g. very cold, and/or very warm) – likely station specific.
  - d. Field leader experience required, minimum safety training (e.g. WFR, firearms training).
  - e. Safety/rescue insurance information.
  - f. Navigation; some sites may require a local guide (delta), bear guard, etc.
  - g. Safely working on lake ice (a bit different from crossing ice).
  - h. Contract for people to sign online.
  - i. COVID-19/severe infectious disease guidelines.
  - j. Code of conduct, sexual misconduct, creating a community of respect.
  - k. Health issues, do you need to protect yourself from diseases spread among animals, is the water drinkable, do you have to have permafrost thaw in mind regarding the spreading of diseases.

## Discussion

It was suggested that the goal would be to make a paradigm of a safety manual – people can then pick what is relevant and make their own manual with relevance to their station. As there are many different stations, it is difficult to make a guide that will cover all.

Volunteers that signed up for writing or editing:

Susanne Hansson, Katrine Raundrup, Donie Bret-Harte, Bjarne Jensen, Tanja Lindholm, Emily P. Pedersen

## Tourism Pocket guide

*By Jan Dick*

Jan suggested that a peer reviewed academic paper could be the outcome of this SMF task. The paper would be based on a survey. There was general support for this idea. Important that all research stations then fill out the survey, so there is input from an adequate number of stations. This includes also stations who have no experience or is not accessible for tourists.

Katharina will send out an email with the outline so people can get involved in the writing process.

## Comments to CAFF Extreme Events and rapid biodiversity changes guidance tool

*By Elmer Topp-Jørgensen and Susse Wegeberg*

This task will develop ways for research stations to monitor extreme events and their ecosystem impacts. It will include test implementation of guidelines developed jointly by INTERACT and CAFF/CBMP (WP4). A framework has been developed where different types of extreme events are described (spatiotemporal impacts, monitoring of the extreme event itself and ecosystem impacts to monitor) alongside implementation guidelines for integrating extreme event monitoring into the station's own monitoring programme. The definition of an Extreme Event will be different between the stations that therefore may need to define extreme events in accordance with the local context.

The aim is to identify extreme event variables and Focal Ecosystem Components to monitor in line with CBMP monitoring plans.

A Review paper on studies of extreme events in the Arctic (van Beest et al 2022) and input from INTERACT test stations was recently published <https://www.frontiersin.org/articles/10.3389/fenvs.2022.983637/full>.

### Plenum discussion

1. It was suggested to look into a submitted papers about 'Browning of the Arctic', on how quickly species may recover after an extreme event.
2. Also 'compound events' were mentioned, as an established concept.
3. In order to be able to distinguish climate change from an extreme event, long term monitoring is needed. If an extreme vent increase in time, is it then still an extreme event?



4. 'Baseline' might be difficult to identify as things are changing so fast. Need for long term monitoring.
5. Also possible to do experiments to reflect extreme events – monitoring is not the only method.
6. Introduction of invasive species could be considered an extreme event.  
Why exclude human impacts as extreme?
7. As this extra monitoring might be a huge workload for a station manager, an idea would be to attract scientists to do this.
8. The Arctic Passion project recommends methods to monitor essential variables, and ICOS and LTER have also automatic, standardized equipment.
9. A coordinated biodiversity monitoring across the Arctic is a wish list for CAFF in the long run.
10. What are the minimum monitoring for extreme events? Could images be used, with less costs?

#### Next steps:

Finalising draft framework documents, including suggested methods for monitoring extreme events and their impacts.

Further consultation in CAFF/CBMP → prioritize the FEC's to monitor impacts of extreme events.

Develop an interactive guidance tool that could be incorporated into CAFF/CBMP's 'Tool kit' that is under development.

Test implementation in 2023 at selected INTERACT stations.

Integrate in CBMP online tools.

## Seminar on Geopolitics in the Arctic

*By Martin Breum*

Martin Breum talked about what the war in Ukraine is doing to the Arctic. The Russian Arctic is half of the Arctic Region, so an Arctic without Russia is not really Arctic? Russia took over the Arctic Council chairmanship last year, but the Arctic Council is now on pause. The political consensus that the Arctic would be an area for peaceful cooperation is now over.

The two pillars of the Russian Arctic is: 1) economic wealth and 2) Geostrategic strength

Group work to discuss :

- What regulation have you been presented with?
- Are the regulations transparent? Do you know what to do?
- How do you deal with partners in Russia?
- Professional contacts? Institutions? Private? Partner safety? Social media? Encryption? Exchange of data? Funds?

Discussion on how different countries handle the pause in the Arctic Council

- Some countries have strict regulations preventing any type of cooperation, others leave it up to institutions to decide, while others again are free to cooperate. The EU has terminated contracts with Russian partners in EU funded projects.

## Environmental impact survey at stations

*By Susse Wegeberg and Marie Frost Arndal*

The task 2.5 will together with WP8 explore ways in which research stations can reduce their pollution. Subtask 2.5.1 has made a survey on energy use and sources (heat and electricity), plastic types and usage, and waste handling at INTERACT stations to document current consumption and emission levels. The results from the survey included responses from 25 stations was presented at this meeting and will be made into a Milestone report that will be circulated to all Station managers and submitted to the INTERACT News Letter.

Some of the environmental issues coming from the survey and that are of most concern to Station Managers, are dealt with in the recent or upcoming publications from INTERACT:

- a) CO<sub>2</sub> emissions and carbon footprint: the INTERACT/APECS **Guidebook on reducing CO<sub>2</sub> emission in Arctic Science** (launched at SMF meeting).
- b) Reducing environmental impacts / environmental impact assessment (EIA), are dealt with in the recent INTERACT guidebook on **Reducing environmental impacts of arctic science** and the upcoming INTERACT **Guidebook on reducing the Environmental Impact of Arctic Research Stations**.
- c) Plastic will be dealt with in the **Pocket guide on how to reduce plastic consumption and pollution at research stations and in local communities**.
- d) Tourist issues will be dealt with in the **Pocket guide for tourist on how to behave around research stations, incl. their study areas and local communities**

Input to **Pocket guide on how to reduce plastic consumption and pollution at research stations and in local communities**. Deliverable due in Spring 2023.

Suggested topics to include in this guidebook:

1. Introduction to Plastic
2. Plastic and climate change
3. Increasing plastic production and waste
4. Recycling of plastic
5. Break down of plastics, size
6. Sources and sinks in the Arctic
7. Physiological effects
8. Legislation
9. How to reduce the plastic consumption and pollution on a research station
10. How to reduce the plastic consumption in research labs
11. How to reduce the plastic consumption and pollution in field work
12. How to reduce the plastic consumption and pollution in local communities
13. Monitoring of plastic pollution

Volunteers needed for the writing and editing process of this guidebook about plastic. All ideas, inputs, comments and suggestions are welcome (mail Marie at: [mfa@ecos.au.dk](mailto:mfa@ecos.au.dk)). Email will be circulated.

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## Repository for selected climate variables

*By Elmer Topp-Jørgensen*

Subtask 2.3.2 will provide open access to selected scientific data by establishing an INTERACT repository for key climate related parameters to be integrated in INTERACT GIS.

Discussion points:

How can we make a common repository for selected climate variables with data from as many INTERACT stations as possible?

Data ownership can be an issue if INTERACT wants to host real data in a repository and should be investigated further. It may only be possible to host meta data.

What technical solutions exist to make it feasible and limit the workload for stations?

Live streaming and potential capturing of data could be an option, if there is a uniform way to present live data from stations. Challenge as the data sets are not unified.

Alternatively, ask stations for data each year.

Be aware of what is possible in the INTERACT Data Portal and avoid redundancies.

What variables are relevant and practically feasible to gather and present?

Temperature and precipitation suggested as initial variables to be presented in INTERACT GIS, where a link to the live stream data can also be inserted, for stations that have this possibility.

## Ideas for upcoming seminar on state of the art Environmental monitoring

*By Elmer Topp-Jørgensen*

Previous 'State of the art' seminars in INTERACT II included:

- CAFF Biodiversity monitoring (WP CAFF/CBMP experts)
- ITEX – International Tundra Experiment (SMF 4, Christine Barnard)
- LTER (SMF 4, Jan Dick)
- Herbivory network (SMF 4, Alexander Sokolov)
- Glaciology (SMF 5, Per Holmlund)
- Permafrost (SMF 5, Margareta Johansson)
  - International Permafrost Association (IPA)
  - Global Terrestrial Network of Permafrost (GTN-P)
  - Thermal State of Permafrost (TSP)
  - Circumarctic Active Layer Monitoring Network (CALM)

INTERACT III:

- AMAP Emerging pollutants (AMAP experts)
- AMAP Plastic monitoring (AMAP experts)

Technical state of the art seminars:

INTERACT I: Automated photography and image recognition. Energy flux towers

INTERACT II: Drones

INTERACT III: Machine learning

Suggestions for the future seminars included ICOS/Fluxnet and drones/remote sensing for monitoring changes.

## INTERACT GIS

*By Elmer Topp-Jørgensen*

New developments and migration of data from old to new system

- Logical structure
- Improved map function
- Improved search function
- Link to application systems/websites

<https://interact-gis.org/>

The data management plan developed lay out the principles and strategy on how data will be managed in INTERACT GIS.

The plan will be kept as a living document, and the appendices will be updated whenever the project reaches new achievements or a need for further work on data management is identified.

FAIR principles are guiding developments:

F – Findable

A – Accessible

I – Interoperable

R - Reusable

International cooperation:

- Polar Observing Assets Working Group under SAON - facilitates the discovery and interoperability of information about research and monitoring assets in polar regions: sites, transects, observatories, projects, and networks or systems.
- Conference presentations of INTERACT GIS (e.g. at Arctic Frontiers, ASSW).

INTERACT GIS Data Management Organisation meet online twice a year and give advice to the Daily Management Team. Existing members from the advisory group will continue.

Time was set aside for stations to register or update the information already in the system.

All stations are encouraged to join INTERACT- GIS and update the information in the system

## AECO Tourist guide template

*By Troels Jacobsen*

As part of station specific tourism guidelines (WP9) a template for brochure that indicates what is allowed /not ok at research stations are being developed as a tool for stations to mitigate disturbance and enhance knowledge of research to tourists. A risk assessment should guide the contents and stations should include

a map with sensitive areas with information on behavioural guidelines, e.g., cultural heritages, bird colonies, expected behaviour and recommended paths for nudging and regulation.

Station specific guidelines should, where relevant, be developed in an open dialogue with local communities and tourist operators, and be in accordance with potential Community Specific Guidelines developed by local communities, tourism operators and research stations together.

A draft tourist guide was developed for Kobbefjord Research Station based on the template. Katrine Raundrup presented the guide mentioning that text should probably be shortened, the list of 'do nots' should be amended with nudging elements, more photos and a map inserted.

The discussion brought following points forward:

- Poster/sign with information that visitors could take a photo of (instead of producing paper brochures that costs resources and potentially end up in the environment).
- The AECO rule, that max 100 persons at a time can visit a site, lead to the suggestion on including research station capacity in guidelines.
- No formal monitoring of tourist impact was initiated by AECO, which find it difficult to include, but AECO is open for the approach.
- AECO is part of the CAPARDUS project (task on coastal archaeology).

The tourist guidelines template can be found: <https://www.aeco.no/guidelines/>

## Course on local involvement in research and monitoring by NORDECO

*By Michael Køie Poulsen*

Expertise and experience with citizen science (CS) and Community Based Monitoring (CBM) and their principles were presented.

After the presentation, comments/questions were brought up:

- To communicate with locals, a local anchor person with language skills may be necessary.
- In decision making processes, it can be difficult for management to integrate information from different knowledge sources. Need for integration of knowledge systems in the advice to authorities or a decision making framework that allow authorities to include different knowledge sources in management decisions (e.g. conventional science and local knowledge). In political systems, it is seen that individuals/organisations in some cases may short cut decision making processes by contacting the political level directly asking for change of management practices/quotas.
- In Nunavut, CS and traditional knowledge are transmitted into traditional science (TS), which means that it can be integrated with science. TS and scientist should integrate with locals.
- There may be a need for conceptualising the integration of knowledge types, as a lot of knowledge is embedded in communities but rarely makes it into science or management.
- It is often a good idea to involve the local community an early stage when research questions are phrased – this will aid local relevant and applied science.
- All knowledge types should come forward and be respected, thus you should listen to everybody, and the discussion be transparent, even if knowledge/science systems are not comparable/compatible.
- Scientists are funded, and it is difficult to get funding for involving indigenous knowledge holders thus funders need to be educated on this.

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## INTERACT – Minimum Monitoring System. How well do INTERACT stations represent a changing Arctic towards 2100?

*by Efren Lopez-Blanco*

An analysis of whether the INTERACT network of research stations are representative of the change expected in the entire terrestrial Arctic towards year 2100 was presented. Using the newest IPCC climate models, a comparison was made between grid cells containing INTERACT stations and all grid cells in the terrestrial Arctic.

Take home messages:

- The INTERACT network represent relatively well the variability of key abiotic and biotic responses characterizing the terrestrial pan-Arctic domain. There are a few cases where INTERACT do not fully represent the arctic, but the analysis can point towards need for additional sampling areas (area characteristics that are under/over sampled).
- The INTERACT network of stations can potentially monitor the forecasted future variability of the Arctic if that stations monitor all relevant variables (depends on current monitoring activities at the stations and there is a need to identify relevant sampling areas for individual variables).
- The high and low Arctic INTERACT sites will be more exposed to climate change by the end of 2100 while boreal INTERACT sites will be more exposed to vegetation changes.
- Even with the obvious scale mismatch and current model uncertainties (e.g. permafrost and vegetation dynamics), numerical models can help to point areas with large expected variability where future monitoring may be needed.
- Numerical models are key (and the only) tools to explore future variability.
- Synthesize the state of knowledge and identify gaps to guide empirical studies.
- It is very important to strengthen integration between observations and models.

Following comments/questions were raised and discussed:

- Panarctic data in one database would be key for modelling, and if Russian data is not included it will give a biased picture of the Arctic.
- Research stations have their own environmental areas, should monitor the variability within their environmental envelope, e.g., with respect to time scale of vegetation change.
- Uncertainties of models are included in the average values presented in the slides.

## AMAP emerging contaminant monitoring

*By Simon Wilson*

WP8 Objectives are to work with station managers (WP2) to identify potential sources of emerging contaminants of concern and reduce their impacts by:

- Identifying/establishing screening monitoring protocols for emerging pollutants; field testing protocols at INTERACT stations.
- Working with INTERACT station-managers/researchers to promote and support screening monitoring studies.

- Refining existing systems at INTERACT stations to minimize introduction and use of new chemicals/pollutants of concern.

Access to any laboratory analyses is not included, hence station managers could consider the 'options' below, in case interested in undertaking pilot implementation of screening for CEACs or supporting POPs monitoring work.

A deliverable was made with focus on specific chemicals screening activities at INTERACT stations. The information contained in this deliverable could hopefully encourage station managers to consider pilot implementation of new contaminants monitoring/screening activities. The document aims primarily to provide practical guidance to managers of stations that are considering options to extend their stations involvement in this type of work. The options include:

- Option 1: Evaluating possible sources of station 'on-site' contamination using passive air sampler
- Option 2: Evaluating possible sources of station 'on-site' contamination using blank exposure studies
- Option 3: Evaluating whether the station constitutes a local source of POPs/CEAC air contamination
- Option 4: Evaluating whether the station constitutes a local source of POPs/CEAC water contamination
- Option 5: Evaluating POPs/CEAC contamination around sources of potential contamination in the local area using passive air sampler
- Option 6: Evaluating POPs/CEAC contamination around sources of potential contamination in the local area using passive water sampler
- Option 8: Evaluating POPs/CEAC contamination in the local area / around local sites of potential contamination using environmental media (e.g. fish, wildlife)

WP8 and SMF will take action to seek to establish linkages between station managers and AMAP related scientists working on contaminants. This may include a workshop with scientists and stations and potentially a session at Arctic Net.

Simon will send out an email to all station managers with the different options. All are welcome to contact Simon for further information.

## Open floor

Open floor presentations from SMF V (5) can be found on the INTERACT website <https://eu-interact.org/resources/presentations-interact-iii/>.

### Sonnblick Observatory

*By Elke Ludewig*

The ZAMG Sonnblick Observatory is a remote measuring and research station within the Austrian Alps that was established in 1886. Elke presented some of the challenges for the station, for example securing the site with thawing of permafrost threatening rock stability and installing new power supply (power 20kV cable).

Other issues include:

- Safety and security (thanks to INTERACT for templates and input!).

- scientists/media agree to the rules and notices before arrival.
- Tourists agree to the rules and notices before a guided tour.
- Public relation.
  - since covid about 20% more tourists.
  - museum exhibitions.
  - 360° virtual tour.
  - media requests have multiplied.
- Instrumentation.
  - Costs.
  - delivery times and availability.

### An update on Kilpisjärvi monitoring data

By Tanja Lindfors

Tanja gave an update on the work with several decades of data on birds, mammals, vegetation, phenology, forestry, hydrology, marine invertebrates, etc. (covering roughly 1000 variables) excluding atmospheric data.

Data are collected by the station personnel and are the responsibility of the stations themselves.

Datasets are unique and the observations cannot be repeated, as it is not possible to go back in time and collect data with the same methods.

#### Data processing challenges:

- Identification of what was in the data sets from the different stations.
- The data structure was somewhat consistent over the files and sheets
- Inconsistent variable formats.
- Missing data.
- Some corrupted files.
- Columns with same name but different contents.
- 0 vs NA.

#### Deliverables

- A clear structure for the data.
- Standard metadata.
- Scripts (R and Python).

A data science student took the tasks and cleaned the data. It was time consuming and 50 datasets, 1000 variables would take more than 14,5 years to complete!

Instead they will now try to get funding to build a database for all stations to host standardised meta data to feed a data portal. INTERACT Virtual Access could be an option in the future to get help on this.



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## Wrap up of meeting

*By Morten Rasch*

Morten Rasch thanked all participants for a great meeting with many new comers that have been welcomed to the SMF community and engaged and contributed constructively to the lively discussions. Morten hereafter closed the fifth SMF meeting in INTERACT III.