



# The International Network for Terrestrial Research and Monitoring in the Arctic

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on behalf of INTERACT

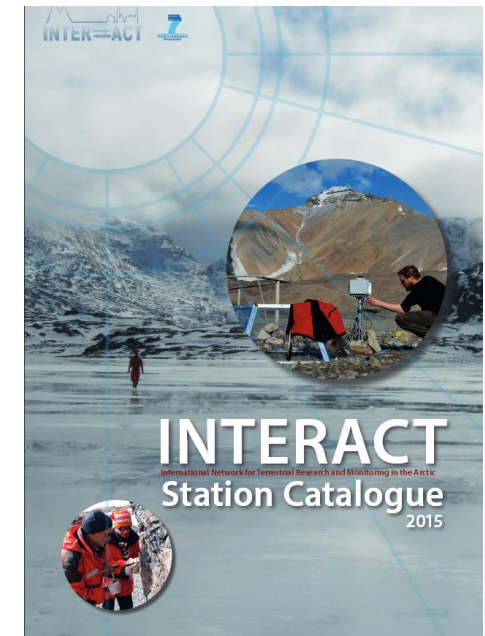
SAON CON meeting  
ASSW2016, Fairbanks  
14th March, 2016

# INTERACT Station Catalogue (2<sup>nd</sup> Edition)

INTERACT 2015. INTERACT Station Catalogue – 2015. Eds. Elger, K., Opel, T., Topp-Jørgensen, E., Hansen, J., Tairova, Z. and Rasch, M. DCE - Danish Centre for Environment and Energy, Aarhus University, Denmark. 305 p.

<http://doi.org/10.2312/GFZ.LIS.2015.001>

Category	Sub-Category	Oulanka Research Station
Website		<a href="http://www.oulu.fi/oulu/keskustasema/station">www.oulu.fi/oulu/keskustasema/station</a>
Country		Finland
Opening year		1966
Operational period		Year-round
Permitting issues categories	Permits required for access to the station Permits required for studies Contact (permit issues)	- Yes (study permit required for some activities/species) oulu/keskustasema
Facility owner and manager	Name of the facility owner Owner status Institution responsible for managing the station Contact (access to station) Website (institution)	University of Oulu Government The Institute oulu/keskustasema <a href="http://www.oulu.fi/oulu/institute">www.oulu.fi/oulu/institute</a>
Other institutions	Name Country	- -
Location	Geographical coordinates Altitude of station Max. altitude within study area Nearest town/settlement Distance to nearest town/settlement Map	66°22'N, 29°19'E 165 m a.s.l. 155 m a.s.l. 500 m a.s.l. Rausamo (16-300 inhabitants) 55 km Aerial images, satellite images, plus paper and digital maps (1:10 000)
Climate	Climate zone Permafrost Years measured Mean annual temperature Mean temperature in February Mean temperature in July Mean annual wind speed Max. wind speed Dominant wind direction Total annual precipitation Precipitation type Ice break-up	Subarctic (boreal zone) - 1966-2011 -0.4 °C -14 °C 14.9 °C - - - 540 mm Rain, snow Lakes and rivers: May
Station facilities	Area under roof Scientific laboratories Logistic Number of rooms (beds) Number of self-service stations (peak/off season) Max. number of visitors at a time Showers Laundry facilities Power supply (type) Power supply	1405 m² 95 m² 117 m² 18 accommodation (82 beds), 6 kitchen, 1 dining room, 2 lecture rooms, sauna, 2 laboratories, 4 administration (3 offices, computer room), laundry Up 14.5 °C 94 - Showers Laundry facilities Yes 230 V/50 Hz (Finland two-hole-pin plug) 24 hours per day
Scientific equipment	Specific device Scientific services offered	Advanced weather station, differential GPS, lab. laboratory equipment at, diff. at at surveying equipment at, state-of-the-art microscope systems (phase, light, polarizing, phase contrast, fluorescence, Z-stack, and time-lapse, imaging system), highly equipped analytical lab. (EMP station) (FMI owned) Tech support, some field support, access to time-series biological and physiochem data, analysis lab access/instrumentation See: -
Medical facilities	Medical suite No. of staff with basic medical training/doctor Distance to hospital (estimated time) Compulsory safety equipment Recommended safety equipment	Medical suite 3 35 km (1 hour by car) Mobile phone First aid kit, satellite communication device
Landing facilities	Arrival (arrival to the West) Arrival (arrival to the East) Helipad Ship landing facilities	Arrival to Rausamo town, not station cars Arrival to Rausamo town, not station cars Arrival to Rausamo town, not station cars Arrival to Rausamo town, not station cars
Vehicles at station	Motor boat, canoe Land transportation	Motor boat, canoe Van, snowmobile, bicycles
Transport and freight	Transport to station Number of ship visits per year (period) Number of flight visits per year (period)	Car (please to Rausamo town possible and cheap) - -

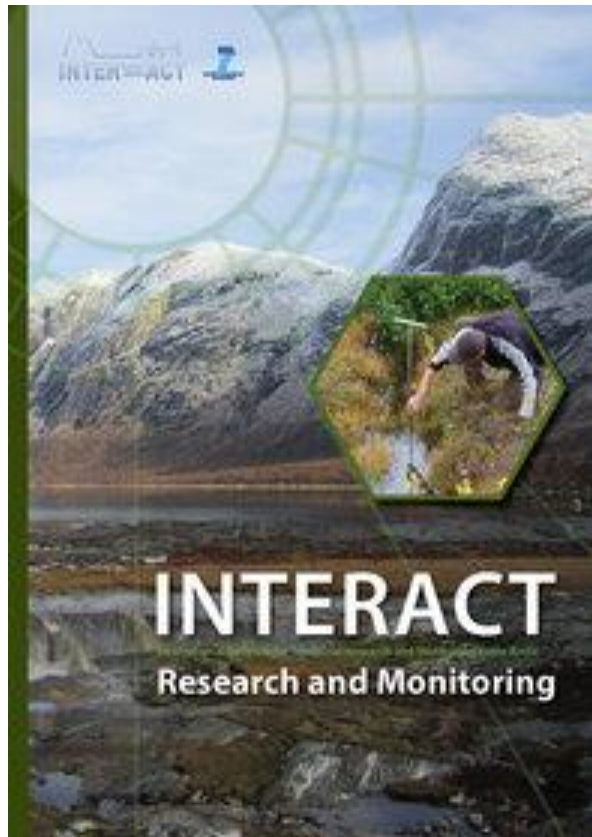


Catalogue of research stations, including descriptions of the physical setting, facilities and services offered at the stations.

# Report on Research and Monitoring at INTERACT stations

INTERACT 2015. INTERACT Research and Monitoring. Eds.: Topp-Jørgensen, E., Tairova, Z., Rasch, M. and Hansen, J., DCE - Danish Centre for Environment and Energy, Aarhus University, Denmark.

<http://doi.org/10.2312/GFZ.LIS.2015.004>



A book about research and monitoring activities that are carried out at arctic and northern alpine research stations in the INTERACT network

- ✓ recommendations for a minimum monitoring programme
- ✓ best practices for monitoring selected parameters through established scientific networks and programmes
- ✓ an overview of scientific disciplines and monitored parameter groups covered by the stations

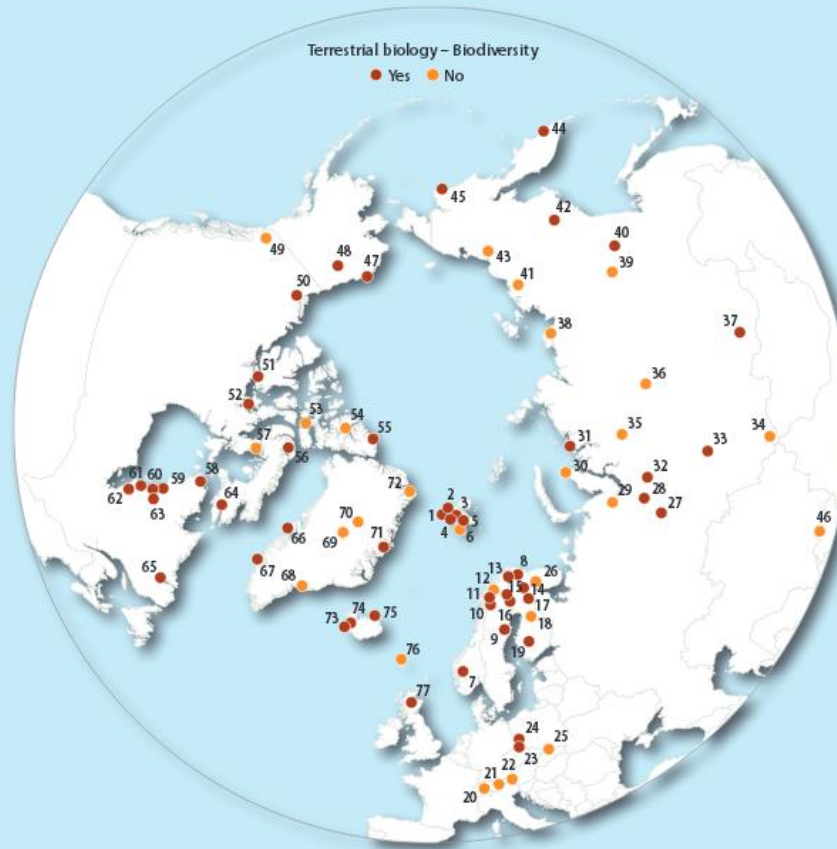
**Table 3.1.1. List over scientific disciplines included in the INTERACT Research and Monitoring database.**

1	Anthropology, Sociology, Archaeology
2	Astrophysics
3	Atmospheric chemistry and physics
4	Climatology, Climate Change
5	Community based monitoring, Citizen Science
6	Ecosystem services
7	Environmental sciences – Pollution
8	Geocryology, Geomorphology
9	Geodesy
10	Geology, Sedimentology
11	Geophysics
12	Glaciology
13	Human biology, Medicine
14	Hydrology
15	Isotopic chemistry
16	Limnology
17	Land-use change, Mapping, GIS
18	Marine biology
19	Microbiology
20	Oceanography, Fishery
21	Paleoecology
22	Paleolimnology
23	Soil Science
24	Terrestrial biology – Biodiversity
25	Terrestrial biology – Ecosystem function

**The Kobbefjord area,  
the field site of  
Greenland Institute of  
Natural Resources,  
Greenland (Koen Sabbe).**



INTERACT stations that have hosted or are hosting research or monitoring projects within the presented disciplines since the year 2000



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### 3.1.24 Terrestrial biology – Biodiversity

is the study of the diversity and variability among living organisms and the ecological complexes of which they are part. This includes diversity within species, between species and of ecosystems [13].

## 3.2 Monitored environmental parameter groups

In this section, the reader is introduced to the environmental parameters monitored at the INTERACT stations. In order to make the practical application of this chapter less laborious, the parameters were grouped into broader categories belonging to the four themes CLIMATE, GEO, GLACIER and BIO. The categories for each theme are presented in Table 3.2.1. Maps illustrate the geographical distribution of INTERACT stations that monitor at least one parameter in a parameter group. Hence, to learn which specific parameter is being monitored, you need to explore the INTERACT Research and Monitoring Database ([www.eu-interact.org](http://www.eu-interact.org)).

The parameters included in the different categories under each theme are presented in tables 3.2.2-3.2.5.

Table 3.2.1. Overview of the categories included into the each theme.

CLIMATE	GEO	GLACIER	BIO
1 Meteorology – atmosphere	6. Geology/Geomorphology	15. Glacier characteristics	24. Vegetation
2 Radiation	7. Geophysics and Geodesy	16. Mass balance	25. Arthropods
3 Energy balance	8. Sub-surface characteristics	17. Climate	26. Birds
4 Precipitation	9. Snow characteristics	18. Glacier hydrology	27. Mammals
5 Soil	10. Atmospheric composition	19. Bio-geochemistry of snow, ice and water	28. Lake ecology
	11. Greenhouse gas exchange	20. Microbiology of snow, ice and water	29. Microbiology
	12. Energy budget	21. Particles and aerosols	30. Genetics
	13. Hydrology/Limnology	22. Pollutants e.g. POPs and heavy metals in snow, ice and water	31. Pollution
	14. Pollution	23. Isotope chemistry of snow, ice and water	32. Diseases
			33. Parasites
			34. Socio-ecological issues (disturbance)

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The area around Herdangvatn is a peat bog in the Alpine region of Norway. (A. S. Ørskov)

INTERACT

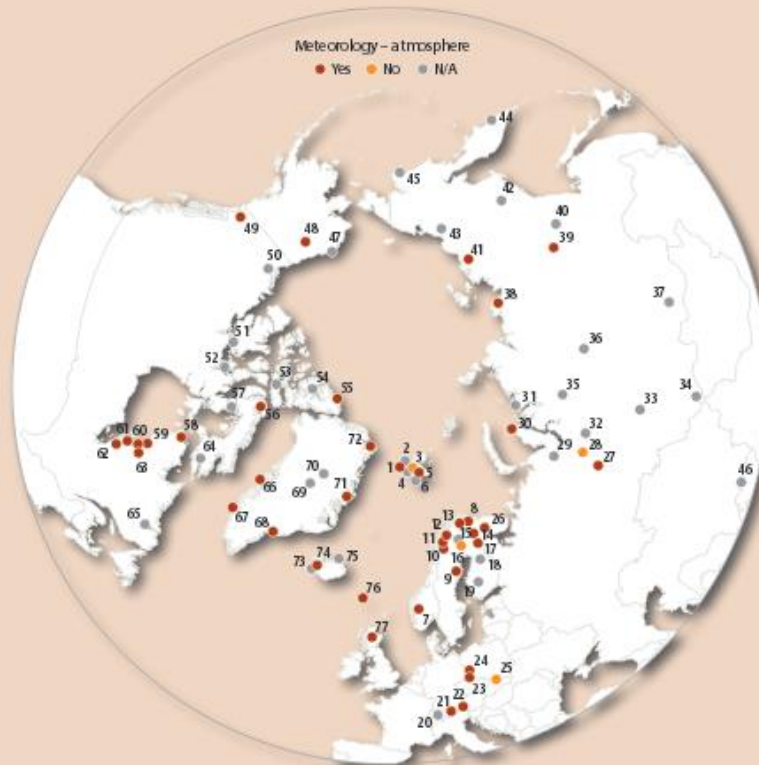
Table 3.2.2. Parameters included in CLIMATE theme categories.

CLIMATE	Parameters
1 Meteorology – atmosphere	Air temperature Air humidity Air pressure Wind velocity Wind direction Precipitation
2 Radiation	Short wave incoming Short wave outgoing Long wave outgoing Long wave incoming Net radiation UV-B Multi-spectral Cloud cover/ hours of sunshine
3 Energy balance	Energy balance
4 Precipitation	Rain precipitation Rain intensity Snow precipitation Snow intensity
5 Soil	Soil temperature Soil humidity (TDR)

### 3.2.1 Meteorology – atmosphere

- Air temperature
- Air humidity
- Air pressure
- Wind velocity
- Wind direction
- Precipitation

## CLIMATE



## Appendix 2

### Overview of monitored parameter groups

● Yes   ● No   ● N/A

Appendix 2

Overview of monitored parameter groups

• Yes

• No


• N/A

		CLIMATE					GEO									
		Meteorology – atmosphere	Radiation	Energy balance	Precipitation	Soil	Geology/geomorphology	Geophysics and geodesy	Sub-surface characteristics	Snow characteristics	Atmospheric composition	Greenhouse gas exchange	Energy budget	Hydrology/Limnology	Pollution	
Station name																
1	Sverdrup Research Station	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
2	Netherlands' Arctic Station	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
3	UK Arctic Research Station	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
4	CNR Arctic Station "Dirigibile Italia"	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
5	Czech Arctic Research Station of Josef Svoboda	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
6	Polish Polar Station Hornsund	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
7	Finse Alpine Research Centre	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
8	Bioloski Swanhovd Research Station	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
9	Svartberget Research Station	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
10	Tarfala Research Station	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
11	Abisko Scientific Research Station	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
12	Kilpisjärvi Biological Station	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
13	Kevo Subarctic Research Station	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
14	Värriö Subarctic Research Station	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
15	Pallas-Sodankylä Stations	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
16	Kolari Research Unit	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
17	Oulanka Research Station	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
18	Kainuu Fisheries Research Station	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
19	Hyttilä Forestry Research Station (SMEAR II)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
20	Alpine Research and Education Station Furka	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
21	Station Hintereis	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
22	Sonnblüch Observatory	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
23	Krkonoše Mountains National Park	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
24	Karkonosze National Park	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
25	M&M Klapa Research Station	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
26	Khibiny Educational and Scientific Station	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
27	Mukhrino Field Station	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
28	Nurmo Park Station	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
29	Labytnangi Ecological Research Station	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
30	Bely Island Research Station	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
31	Willem Barents Biological Station	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
32	Khanymey Research Station	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
33	Kajbasovo Research Station	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
34	Aktru Research Station	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
35	Igarka Geocryology Laboratory	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
36	Evenkian Field Station	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
37	International Ecological Educational Center "Istomino"	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
38	Research Station Samoylov Island	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•



# INTERACT Metadata Database

- ✓ Metadata database with information on the different research and monitoring projects at the INTERACT stations
- ✓ INTERACT website and <http://gis.au.dk/interact/Default.aspx>



**INTERACT** INTERNATIONAL NETWORK FOR TERRESTRIAL RESEARCH AND MONITORING IN THE ARCTIC

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**INTERACT STATIONS METADATA**

Where clause:

Country	Station Name	Category	Variable	Data_YES_NO	Season_Start	Season_End	Frequency	Special_info	monitoring
	Kilpisjärvi Biological Station	Arthropods	Abundance						
	Kilpisjärvi Biological Station	Arthropods	Emergence phenology						
	Kilpisjärvi Biological Station	Arthropods	Insect herbivory						
	Kilpisjärvi Biological Station	Arthropods	Species list (community composition)						
	Kilpisjärvi Biological Station	Atmospheric composition	CH4 concentration						
	Kilpisjärvi Biological Station	Atmospheric composition	CO2 concentration						
	Kilpisjärvi Biological Station	Birds	Abundance	1	5				Ecology of hole nesting passerine birds in subarctic conditions
	Kilpisjärvi Biological Station	Birds	Breeding birds	1	5				Ecology of hole nesting passerine birds in subarctic conditions
	Kilpisjärvi Biological Station	Birds	Distribution	1	5				Ecology of hole nesting passerine birds in subarctic conditions
	Kilpisjärvi Biological Station	Birds	Nest initiation phenology	1	5				Ecology of hole nesting passerine birds in subarctic conditions

## Appendix 3 INTERACT Project metadata template

The metadata template for both research and monitoring projects, that INTERACT station managers agreed to follow and recommend for implementation at all stations.

Column title	Information required
Station name	Scroll down list: Station name (full name, spelled out).
Project #	Project number assigned by INTERACT. Enter one project per line.
Project title	The project title (full name, spelled out).
Optional Project short title	Short title of the project.
Project start (yyyy-mm-dd)	Start of the project in the format "yyyy-mm-dd". If dd is unknown, state yyyy-mm-01. If mm-dd is unknown, state yyyy-01-01.
Project end (yyyy-mm-dd)	End of the project in the format "yyyy-mm-dd". If dd is unknown, state yyyy-mm-01. If mm-dd is unknown, state yyyy-01-01.
PI full name	Full name of the Principal Investigator (PI). Must include first name and surname spelled out.
PI home institution	Full name of the institution.
PI home institution country	Scroll down list: Full name of the country. Arctic states are followed by European states and then the rest of the world.
PI contact e-mail address	PI contact e-mail address.
Discipline 1	Scroll down list: Choose the primary discipline of the project.
Optional Discipline 2	Scroll down list: Choose the secondary discipline of the project.
Study location (WG 584) decimal degrees – Latitude	<p>The N/S location should be given in decimal degrees using World Geodetic System – WG 584 (number of decimals is optional, but at least two is recommended).</p> <p>This is not ideal for multiple plot/transect surveys. Where plots/transects are located nearby one another, you may write the coordinates of a central plot. Where plots and transects are distributed widely, you may enter the coordinates of the station.</p> <p>It is recommended that INTERACT stations collect spatial GIS information of all plots and transects for present and future projects.</p>
Study location (WG 584) decimal degrees – Longitude	<p>The W/E location should be given in decimal degrees using World Geodetic System – WG 584 (number of decimals is optional, but at least two is recommended).</p> <p>This is not ideal for multiple plot/transect surveys. Where plots/transects are located nearby one another, you may write the coordinates of a central plot. Where plots and transects are distributed widely, you may enter the coordinates of the station.</p> <p>It is recommended that INTERACT stations collect GIS information of all plots and transects for present and future projects.</p>

## Appendix 4

## INTERACT template for monitored parameter groups

Categories and environmental parameters template for monitoring projects, that INTERACT station managers agreed to follow and recommend for implementation at all stations.

Column title	Information required
Category	General category/grouping of variables – predefined by INTERACT.
Parameter	Measured variables – predefined by INTERACT.
Check Box	Choose: 1 – for YES; 0 – for NO
Season Start	Scroll down list: Choose the month number. Season “Start” and “End” months may vary between years – thus the extreme values should be included, meaning the earliest month and the latest month.
Season End	Scroll down list: Choose the month number. Season “Start” and “End” months may vary between years – thus the extreme values should be included, meaning the earliest month and the latest month.
Frequency	Frequency (select from scroll down list).
	Hourly $X < 1$ hour
	Daily $1 \text{ hour} < X < 1 \text{ day (24 hours)}$
	Weekly $1 \text{ day} < X < 7 \text{ days}$
	Every 2 weeks $7 \text{ days} < X < 15 \text{ days}$
	Monthly $15 \text{ days} < X < 1 \text{ month (28-31 days)}$
	Every 1-6 months $1 \text{ month (28-31 days)} < X < 6 \text{ months}$
	Yearly $6 \text{ months} < X < 1 \text{ year (12 months)}$
	Every 1-5 years $1 \text{ year} < X < 5 \text{ years (60 months)}$
Optional Special info (MAX 20 words)	Additional information may be provided, e.g. methodology used, scale (transect, plot, census area, landscape) or other
Project title as in MetaData table	Select from scroll down list the title of relevant project that monitor the specific parameter group (title will be added when you enter these in the metadata sheet for monitoring projects). If more than one monitoring project monitors a parameter group, please use the additional columns.