



INTERACT

International Network for Terrestrial Research and Monitoring in the Arctic

Practical Field Guide

EMERGENCY PROTOCOL



Stop work or travel and gather nearby members of your group, **keep calm**

Prevent the situation from getting worse

Assess casualties and provide first aid:

Stabilise injured/sick persons, keep them dry, warm and protected from wind

Make sure that no one can be harmed any further, move away from the danger zone

Gather all basic information about the accident/emergency situation

Assess all self-help options and think about the best measures

Contact the station/rescue operator to get advice or plan a rescue mission
(see Emergency calls below)

Keep a log of all actions

Follow the advices and instructions given



Emergency calls

Who is calling?

Where are you?

What happened?

Are people **injured**?

What type of injuries?

Wait for questions.

FIRST AID PROCEDURES

Stop the accident

- What happened? Quick survey.
 - Is the site of injury safe for the medical examiner and the injured person?
 - Is the injured person conscious and alert?
 - Is emergency evacuation needed?
-

A Airways

- In-line-stabilization: the position of the head is secured.
 - Secure free airways.
-

B Breathing

- Assess breathing ability (observe – listen – feel).
-

C Circulation

- Do you feel a pulse? Frequency and quality?
 - Assess the skin colour and temperature.
 - Re-assess **ABC**.
-

D Disability

- Assess the level of consciousness.
 - Examine pupil reaction to light (close and re-open eyelid).
 - Assess if threatment can continue on the site of injury.
-

E Exposure

- Possibly a top-to-toe examination on the site of the injury.
 - Fixation in a stretcher – if possible.
 - Transfer to safe/protected place.
-

Protected place

- Re-assess **ABC**.
 - Monitor the patient objectively.
 - Contact Project Leader/Field Leader.
 - Continue observations and standard First Aid.
 - Follow prescription from Project Leader/Field Leader.
 - Write a short report about the course of event of injury and your observations.
-

Normal values for adults

Pulse: 60-80 /minute.

Breathing: 12-16 /minute.

Capillary response: less than 2 second.

Eds. Morten Rasch et al.

INTERACT

Practical Field Guide



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About this book

The ***INTERACT Practical Field Guide*** contains information on best practices and safety aspects in relation to fieldwork in the Arctic.

The book was developed as a handy tool to be used both during the preparation of your fieldwork and particularly for use while in the field. For a more thorough description of all aspects relating to proper planning and accomplishment of Arctic fieldwork we refer to the ***INTERACT Fieldwork Planning Handbook*** which is available for download from the INTERACT and APECS websites.

We advise thoroughly reading through the ***INTERACT Practical Field Guide*** before going into the field. This book can then be used as a handy guide to the main aspects relevant while in the field, particularly safety issues. In addition, you can also use the index for a fast search of all topics covered.

We wish you a productive, adventurous, and, most importantly, safe fieldwork!

Disclaimer: This book is not intended to replace proper safety training. Its purpose is solely to serve as a handy resource to remind you about the main safety aspects related to fieldwork in the Arctic and Alpine regions. INTERACT and APECS take no responsibility for its content or for actions that you may take as a result. In case you discover any discrepancies between the advice provided in this book and possible safety regulations stipulated by your workplace, you should always follow the rules of your workplace.

1 General safety guidelines



General safety guidelines

Your safety and that of your team is always highest priority during any fieldwork.

- Properly plan your fieldwork.
- Safety always come first, assess risks before and during fieldwork.
- Be properly trained for the tasks you set out to do.
- Never head into the wilderness on your own.
- Bring relevant safety gear and emergency contact info.

Preparing for safe fieldwork

- Always wear or bring warm and waterproof clothing.
- Always bring general and activity-specific safety equipment.
- Always bring relevant navigation equipment.
- Always bring at least two independent communication devices.
- Check that your equipment is in good working condition.
- Know how to use the equipment that you have.
- Be aware of potential risks and how to prevent them.
- Always bring relevant emergency contact details and make sure that your entire team knows where to find them.
- Discuss your fieldwork plan with local contacts and team members.
- Be present and aware of where you are and what is happening around you.
- Pay attention to changes in weather, terrain, and snow and ice conditions.
- Obtain the latest weather/avalanche/sea or lake ice report/forecast and arrange to have updates sent to you.
- Sign out in the appropriate place when leaving for the field.
- Sign in at the appropriate place when you return.
- Be aware of how to interact with local communities.
- Bring enough food, snacks, and water, and pay attention to food allergies, vegetarian/vegan dietary preferences.

Being safe in the field

- Eat, drink, and rest enough.
- Communicate with others when you feel a situation is risky.
- Only move as fast as the slowest person in the team.
- Regularly check in with each other (e.g. for frostbite, level of exhaustion, need for breaks, health status, etc.).
- Remember to make all routine calls, e.g. with the local contact, research station, sub-teams, etc.
- Do not be afraid to point out any safety issues, however minor they might seem.
- In risky situations, teams should stay together, with the most experienced person as leader.

Safety equipment

First aid, rescue, and medical kits:

- First aid kit in waterproof packing.
- Special rescue kit for work in potentially dangerous terrain – see *Weather, terrain, and wildlife* (p. 33).
- Personal medication (if relevant).

Communication equipment (at least two independent devices):

- Mobile phone.
- VHF/HF radio.
- Satellite phone.
- InReach or SPOT.
- Personal Locator Beacon.
- Spare batteries and/or chargers.

Navigation equipment:

- GPS.
- Map(s)/satellite images, even when you have a GPS (the GPS might fail).
- Compass.
- InReach or SPOT.
- Spare batteries and/or chargers.

Essential personal equipment:

- Warm and waterproof clothing.
- Backpack.
- Whistle.
- Headlamp.
- Sunglasses.
- Knife/multi-tool.
- Water bottle.
- Headlamp (if relevant).
- Windproof and lightweight emergency bivouac bag.
- Firearms and pyrotechnics (if relevant).



*General safety, communication and navigation equipment
(University Centre in Svalbard).*

2 Communication



Fieldwork plan

- Provide your local contact (e.g. the station leader) and your home institution with your fieldwork/trip plan. Use this opportunity to obtain any relevant advice from the station manager (e.g. weather update, relevant hazards), and check that you are adequately prepared to go into the field.
- If you do not have a local contact (i.e. if you use an unstaffed station), leave your fieldwork plan at your last accommodation and with a person being informed to react in case you do not follow an agreed communication schedule.

Sign out/in procedures

Check the local sign out/in procedures. Note your departure time, names of all team members, where you intend to go, and when you expect to return.

- Follow the local protocol and sign out on the relevant sign-out board.
- Make sure to communicate to the relevant parties if you change plans for any reason.
- Remember to sign in when you return.

Routine calls

Arrange for routine calls to a relevant contact person when you are out in the field for longer periods to regularly confirm that everything is fine.

- Follow the agreed routine communication protocol.
- Use *Relevant contacts (p. 60)* in this book to fill-in telephone numbers, call time/frequency, etc.
- Use the routine calls to obtain updates on weather forecasts, sea-ice or snow conditions, polar bear sightings, etc.



Provide fieldwork/trip plan,
ask for relevant advice

Sign out

Routine calls OR inform the station of any
deviations from your plan (non-routine calls)

Sign in upon return



Always bring relevant communication equipment (Morten Rasch).

Non-scheduled calls

You may need to make non-scheduled calls to inform your contact person about any changes while in the field. Call your contact person if:

- You are deviating from the planned route of travel for any reason.
- Weather is deteriorating and you need to stay out longer than expected.
- You are returning to the station earlier than expected.
- You need assistance for safety or medical reasons.

Emergency calls

In case of an emergency, the team leader should call the relevant emergency contact. Always have a list of emergency contact details with you and make sure that everyone knows where to find this information. Use *Relevant contacts (p. 60)* in this book to fill-in telephone numbers, etc.

In the event of an emergency, follow the emergency protocol (see inside of front cover).

Be prepared to inform contact person, police, or Search and Rescue personnel about:

- Who is calling?
- Where are you?
- What happened?
- Are people injured?
- What type of injuries?
- Wait for questions?

3 Safety during transport



Aircraft

You may need to fly to a field camp, research station, or field site. The airline company should provide detailed instructions but keep a few important safety considerations in mind:

Risks:

- Loading/unloading.
- Embarking/disembarking.
- Aircraft accidents.

Safety tips:

- Always await the pilot's instructions. They are responsible for your safety.
- Do not go on to a heli-pad or airstrip unless authorized to do so.
- Never smoke in or near an aircraft.
- Remain seated with seat belts fastened during flights.
- Know the location and operation of emergency exits.
- Know the location of first aid kits and aircraft survival equipment.
- Ensure that you follow all safety procedures when loading and unloading aircraft.
- Always approach helicopters from the front and only after the signal has been given by the pilot. Never walk near the tail rotor.
- Loads carried towards a helicopter should be kept low and parallel to the ground.
- Ensure that any hazardous cargo is properly packed, labelled, and accepted by the aircraft crew.

Multiple flights may be needed to bring people and equipment to a field site. The first sub-team to arrive should have enough food and gear (including communication, navigation, safety, and camping equipment) to survive several days in case no further flights are possible.



Unloading field equipment from a small aircraft (Morten Rasch).

Boat

Many field sites are located near coasts, rivers, or lakes and are only accessible by boat.

Risks:

- Icebergs and sea ice.
- Rapid weather changes.
- Landing boats on challenging shores.
- Wildlife.
- Cold injuries.
- Falling overboard.
- Engine problems/failures.

Safety tips:

- Always wear a life jacket and/or immersion/survival suit.
- Make sure you are aware of all emergency procedures.
- Always carry the relevant communication and navigation equipment with you.



Boat transport to a field site (Geir Ving Gabrielsen).



Snowmobile training site (Katrine Raundrup).

- Ensure all your equipment is in waterproof packing.
- Cover all open skin areas, including your face, in protection against cold injuries.
- Wear insulated or regular rubber boots and thick socks.

Safety equipment:

- Life jacket and/or immersion/survival suit.
- Goggles, boots, and gloves.
- Relevant navigation and communication equipment.
- Spare parts and basic tools for repair of the engine and boat.
- Extra fuel, engine oil, and relevant funnels.
- Emergency flares.
- Waterproof storage for safety equipment.

Snowmobile

Snowmobiles should always be used with appropriate caution.

Risks:

- Unsafe driving (accidents occur most frequently from driving too fast).
- Inexperienced drivers.
- Dangerous terrain/conditions (e.g. sea-ice, steep mountain slopes, rocky terrain, areas with risk of snow avalanches, crevassed glaciers, and low visibility).

General safety tips:

- Check local legislation in relation to snowmobile use.
- Learn how to drive a snowmobile before heading out.
- Make sure that the snowmobile is in good condition and has enough fuel.
- Wear a safety helmet.
- Ensure that you and passengers are dressed appropriately with all skin covered.
- Check the weather forecast and trail/snow/glacier/sea-ice conditions before heading out.

- Always have the relevant communication and navigation equipment with you.
- Always have spare parts, basic tools, and extra fuel with you.
- Travel with at least two snowmobiles in remote and difficult terrain, or when you are driving far away from inhabited areas (more than a few hours walk).

Safety tips while driving:

- Agree on clear signals for slowing down and stopping.
- Drive one by one and behind each other.
- Always maintain visual contact but make sure that you keep a safe distance between snowmobiles.
- Drive on snow to avoid damage to the snowmobile and the environment.
- Pay attention to changes in the terrain, snow, and ice conditions as well as visibility. Do not attempt to cross open water or slush.
- Adapt your driving speed and technique to the conditions, i.e. drive slower in difficult terrain and/or poor visibility.
- The second and last snowmobiles should carry relevant rescue equipment.
- If there is enough space, park snowmobiles side by side in a line.



Snowmobile as anchor point during rescue operation rehearsal (Simon Escalles).

Safety tips for transporting a sled:

- Place the heaviest items near the balance point of the sled.
- Pack smaller items in sled bags (if available), with any emergency equipment easily accessible.
- Use taut-line/ratchet straps or trucker's hitches to tie gear down.
- Drive slowly in uneven terrain.
- Periodically check your sled and cargo, in particular in uneven and/or steep terrain.
- Let a snowmobile without a sled drive first on sea-ice. Follow the same track and keep a good distance between the snowmobiles.

Safety equipment:

- Helmet, goggles, gloves, sturdy boots, and warm clothing.
- Extra clothing, spare goggles, and gloves.
- Sufficient food and drinks.
- Relevant navigation and communication equipment.
- Snowmobile repair kit, i.e. basic tools, spare parts, cooling liquid, start cables, axe, and rope.
- Extra fuel, engine oil, and relevant funnels.
- Ice spikes (when travelling across sea-ice or frozen lakes and rivers).
- Crevasse rescue equipment (when travelling across glaciers).
- Avalanche transceiver and rescue equipment (when travelling through avalanche terrain).
- Camp equipment (when travelling long distances).

Vehicle

Different kinds of vehicles (cars, trucks, ATV's, etc.) are often the most appropriate means of transport to field sites.

Risks:

- Road accidents.
- Snowy and icy roads.
- Accidents in rough terrain or stormy weather with poor visibility.

Safety tips:

- Make sure you have the relevant driving licence for the vehicle (and bring it with you).
- Always adhere to national traffic regulations.
- Use seatbelts.
- Drive safely according to the conditions, especially in stormy weather, poor visibility, and on snowy, icy, or otherwise difficult roads.
- In case of an engine failure or an accident, stay at the side of the road and wear a reflective vest.



Driving to a field site can be challenging in some areas (Morten Rasch).

4 Safety in the field



Accidents and emergencies are rare but can occur. See [Emergency procedures \(inside of front cover\)](#), [Emergency calls \(p. 12\)](#), and [Emergency preparedness \(p. 57\)](#).

Field camp

Field camps need to be set up properly and safety should be your top priority.

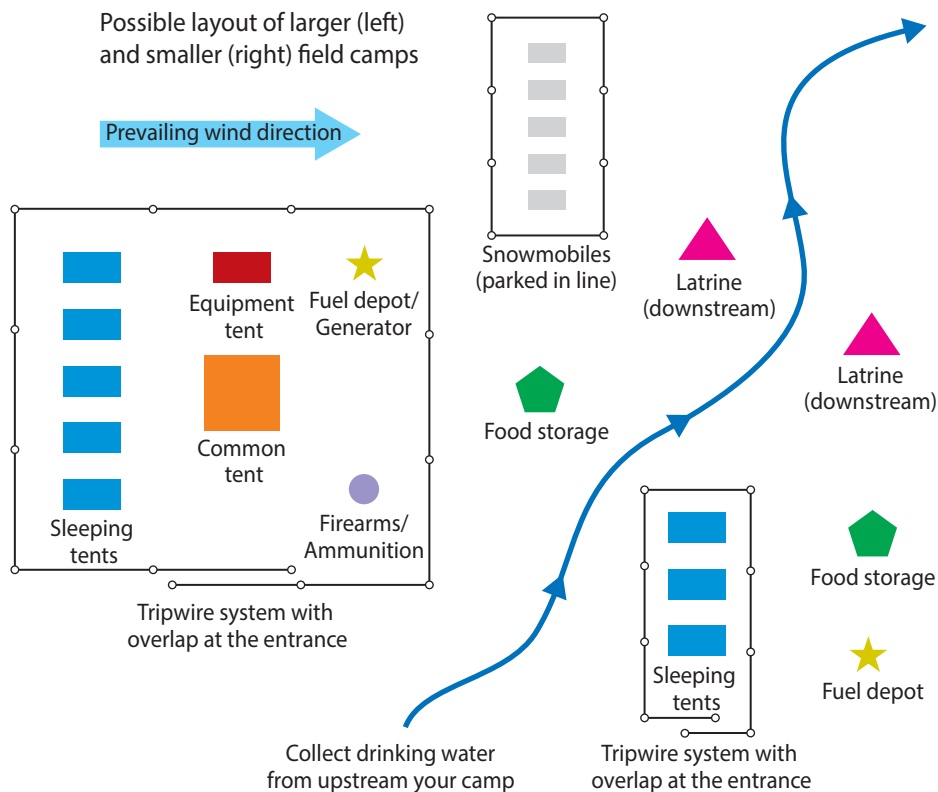
Risks:

- Fire.
- Flooding, rock falls, rock and snow avalanches, glacial lake outbursts and other floods, tsunamis created by iceberg calving.
- Strong winds and blizzards.
- Wildlife.

Keep the following in mind:

- Make sure you know how to set up your tent.
- Plan the camp layout and put up tents in daylight.
- Consider the terrain when choosing your campsite. Avoid areas prone to flooding, rock falls, avalanches, etc.
- Do not camp in areas commonly visited by animals. Check the area for any signs of wildlife (tracks and droppings are good indicators).
- Choose a site close to a source of running water and/or clean snow.
- Place tents a few metres apart to minimise the risk of fire.
- Flatten the ground under the tent, e.g. by compressing snow or removing rocks.
- Use a sturdy and waterproof ground sheet for insulation and keeping things dry.
- Place your tent with the entrance facing away from the predominant wind direction.
- Make sure your tent is securely anchored and often check guy-lines.
- Use stones, skis, hiking poles or similar objects to hold down your tent if you do not have tent pegs.

- If relevant, build a snow or rock wall around your tent for wind/snow protection.
- Place your latrine at least 100 m away from the camp and downstream of any fresh water sources.
- Pack all waste and take it back out of the field with you.



Standard camping equipment list:

- Tent(s) (including pegs and poles).
- Ground sheet.
- Mess tent (if relevant, including pegs and poles).
- Mattress(es).
- Sleeping bag(s).
- Cooking stove(s).
- Fuel bottle(s), filled with correct fuel blend.
- Pot(s) with lid(s).
- Plates/bowls, mugs, and cutlery.
- Knives.
- Water canister.
- Food and drinks.
- Matches/lighter in waterproof packing.
- Headlamp/torch.
- Shovel (for snow/latrine, where relevant).



Remote field camp (Morten Rasch).

Cooking

You will likely be cooking your food on some kind of gas or liquid fuel stove.

Risks:

- Fire (most outdoor clothing and tents can easily burn).
- Carbon monoxide (CO) poisoning in poorly ventilated enclosed spaces.
- Stove problems/failures.

Safety tips:

- Test the stove and know how to use it before heading out.
- Make sure you have the correct fuel blend (e.g. propane-butane mix in cold temperatures).
- Only refill a liquid-fuel canister outside with a designated pair of gloves.
- Pack and store stoves and fuel away from food.
- Check your stove and fuel canisters for damages or leaks before use.
- Always cook in ventilated places. Avoid cooking inside small tents, except in emergencies.
- Bring a spare stove and a repair kit.

Drinking water

In the field, you might get fresh water from a stream, river, lake, or by melting snow or ice. Depending on where you are, you may need to treat your drinking water.

Risks:

- Contamination from waterborne bacteria, viruses, or parasites (e.g. *Echinococcus multilocularis*).
- Contamination from toxins.



Drinking water purification (Gas burner: Andrea Schneider;
Others: www.cleverhiker.com/best-backpacking-water-filters).

Safety tips:

- Snow and glacier water is depleted of minerals and salts. Make sure that you get these minerals and salts through your diet or by adding a pinch of salt to your water.
- Treat any water, unless you are sure it is clean. Treatment might include:
 - Boil the water for at least three minutes.
 - Use iodine/chlorine tablets or drops (30-120 minutes before they are fully effective).
 - Use water filters (different types exist).
- Remember that water purification may not necessarily remove any toxins. Therefore, be aware of any possible chemical contamination of drinking water.



Be careful with campfires and make sure to put it out completely
(Hans-Petter Frøhaug).

Fire

Many Arctic and northern Alpine environments have limited access to running water. In remote and dry locations, fires may have severe consequences.

Risks:

- Fires in field camps and at stations.

Safety tips at field camps:

- Make sure there is a proper distance between tents.
- Avoid cooking inside small tents.
- Exercise care when making campfires and make sure that fires cannot spread (e.g. pour enough water on it after use).

Safety tips at stations:

- Be extra careful if you are working in the kitchen or use flammable substances in laboratories.
- Never leave charging devices unattended. If differences in voltage occur, use adapters.
- Know the location of emergency exits and fire extinguishers.
- Only smoke outdoors and never throw cigarette butts on the ground.
- When making campfires, keep a good distance from buildings and tents.



Flare gun, rifle, and ammunition used as a deterrent and for polar bear protection (Katrine Raundrup).

Firearms

In areas with bears, muskoxen, wolves, or foxes, you need to carry a weapon and/or pyrotechnics (such as a flare gun/signal pistol, firecrackers, and/or handheld flares). You will very likely need to complete specific training before you are allowed to handle these.

Risks:

- Accidents with firearms.
- Jamming of firearms.

Proper handling of weapons:

- Understand what important terms mean:
 - Signal pistol/flare gun = handgun used for firing flares. Used as a deterrent to scare off bears, muskoxen, wolves, and foxes.
 - Firearm (in this context) = rifle suited for polar bear protection.
 - Half-loaded = the magazine is filled with ammunition while the chamber is kept empty. Visually inspect and feel inside the chamber and magazine with your fingers to make sure there is no bullet.
 - Loaded = ammunition is in the chamber.
 - Emptying the firearm = remove ammunition from the magazine and ensure the chamber is kept empty. Visually inspect and feel inside the chamber and magazine with your fingers to make sure there is no bullet.
- Never point a firearm at someone.

- Always keep the firearm aimed upwards and with the bolt open or removed near people or buildings.
- Always check that the firearm is empty when you receive or give it to someone.
- Check the firearm for any damage and ensure that the sights are present and centred.
- As a rule, firearms should be carried and transported empty. Ammunition should be stored easily accessible.

Safety tips:

- Be aware of any rules/laws/regulations regarding transport, storage, and use of firearms and ammunition.
- Practice with the firearm that you will be using.
- Ensure dust- and waterproof packing of firearms during transport. In the field, it is a good idea to cover the barrel opening with tape to avoid dirt from entering the barrel.
- Store firearms outside when it is very cold to avoid condensation and freezing of moving parts.

Getting lost

People regularly get lost in remote areas but this should and can be avoided. Remember that getting lost puts you, your team, and Search and Rescue personnel in unnecessary danger.

How not to get lost:

- Always have appropriate navigation and communication equipment with you.
- Follow known GPS tracks if available.
- Have coordinates of relevant sites, e.g. the research station, your field sites and/or field camp, potential shelters, and nearest towns/villages or houses.
- Always bring both a GPS and relevant maps. A GPS might stop working for different reasons.
- Regularly check your map and/or GPS to know where you are. Use terrain features for orientation.

- If in doubt, stop and consult your map and/or GPS.
- Use of an InReach/SPOT is strongly recommended. It allows you to navigate properly and to inform people about your status and your exact position. Furthermore, it includes a Personal Locator Beacon (PLB) function in case you need immediate help.

What to do if you get lost:

- Stay where you are, especially if the weather is deteriorating.
- Communicate with the field station or a relevant contact person to inform them about your problem and last known position. Discuss how the situation can be resolved before initiating a Search and Rescue operation.
- Put up an emergency shelter to protect you from wind and precipitation.
- Adhere to the guidelines and orders given by the personnel helping you.
- Wait for rescue.



A camp in white-out conditions in Janssundalen, Svalbard (Andrea Schneider).

Shelters

If the weather deteriorates severely or you get lost, it may be necessary to stay where you are and make or find shelter.

General guidelines:

- Move out of the wind. You can find shelter behind big rocks/vegetation, below ridges, etc.
- Take shelter in a windproof and lightweight emergency bivouac bag, if available.
- Build an emergency shelter from whatever natural material is available, e.g. stones, snow, etc.
- Be aware of your surroundings. Avoid staying in terrain prone to avalanches and rock falls.



Emergency bivouac bags do not fill much in a backpack but can accommodate 2-4 people in an emergency (Andrea Schneider).



Build a snow (or stone) wall for wind protection (K. Terwoelbeck).

Health precautions

Fieldwork in the Arctic often includes long days with hard work and you are living under conditions different from what you are used to. Therefore you need to pay extra attention to your health.

- Maintain a healthy and varied diet with an increased amount of calories (especially carbohydrates and protein).
- Carry enough provisions and snacks for day trips.
- If you are staying in a remote field camp, have provisions to cover your higher need for energy, and extra provisions for possible delays (of several days).
- Many Arctic towns/villages have a limited assortment of fruit, vegetables, and special food items. If you have special food requirements or allergies, check beforehand what you can buy locally.
- Remember to drink enough. Keep in mind that water from Arctic freshwater sources often is depleted of minerals and salts.
- It may be a good idea to take dietary supplements with vitamins and minerals with you.
- If you are staying in the Arctic for longer periods during winter, consider using Vitamin D tablets and/or a daylight lamp.
- Remember to rest enough.
- Consult a medical doctor in case you experience significant changes in your health and/or mood.

5 Weather, terrain, and wildlife



Training

Most people doing fieldwork in the Arctic are less familiar with the environmental conditions there compared to conditions back home. It is therefore essential to prepare properly. Many universities provide training for staff going to the Arctic. If possible, follow such training before heading out.

Weather

The weather in the Arctic and Alpine regions can change surprisingly rapidly. You need to be prepared for strong winds, cold and wet weather, and limited visibility at any time.

Risks:

- Getting lost due to limited visibility.
- Cold-related injuries.

Safety tips:

- Obtain the latest weather forecast whenever possible.
- Ask about local weather conditions, such as areas particularly vulnerable to strong winds or tell-tale signs of weather change, etc.
- Pack enough clothing, food, and water, even if good weather is predicted.
- Stop your fieldwork and return to the field camp, station, or any other appropriate shelter if weather severely deteriorates.
- Inform your contact person if you need to stay out longer than planned due to bad weather – see [Non-scheduled calls \(p. 11\)](#).
- Remember that both wind speed and humidity have a strong effect on the temperature felt. Bring a thermometer and an anemometer to calculate wind chill factors.

Cold Index			
0 to -20 °C 32 to -4 °F	-20 to -40 °C -4 to -40 °F	-40 to -60 °C -40 to -76 °F	below -60 °C below -76 °F
Minimal risk, but false sense of security at prolonged stay	Increased risk level, lighter frostbites of exposed skin	Danger, frostbite of exposed skin within a short time	Grave danger, immediate frostbite of exposed skin

Wind		Celcius Temperature										
m/s	knots	°C										
0	0	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40
2	4	9	3	-2	-8	-14	-20	-26	-32	-37	-43	-49
4	8	8	2	-4	-10	-17	-23	-29	-35	-41	-47	-53
6	12	7	1	-5	-12	-18	-25	-31	-37	-44	-50	-56
8	16	7	0	-6	-13	-19	-26	-32	-39	-45	-52	-58
10	19	6	0	-7	-14	-20	-27	-34	-40	-47	-53	-60
12	23	6	-1	-8	-14	-21	-28	-35	-41	-48	-55	-61
14	27	5	-1	-8	-15	-22	-29	-35	-42	-49	-56	-63
16	31	5	-2	-9	-16	-22	-29	-36	-43	-50	-57	-64
18	35	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65
20	39	5	-2	-9	-16	-23	-31	-38	-45	-52	-59	-66
22	43	4	-3	-10	-17	-24	-31	-38	-45	-52	-59	-67
24	47	4	-3	-10	-17	-24	-32	-39	-46	-53	-60	-67
26	51	4	-3	-10	-18	-25	-32	-39	-46	-54	-61	-68
28	55	4	-3	-11	-18	-25	-32	-40	-47	-54	-61	-69
30	59	4	-4	-11	-18	-26	-33	-40	-47	-55	-62	-69
32	63	4	-4	-11	-19	-26	-33	-41	-48	-55	-63	-70

Wind		Fahrenheit Temperature										
m/s	knots	°F										
0	0	50	41	32	23	14	5	-4	-13	-22	-31	-40
2	4	48	37	28	18	7	-20	-15	-26	-35	-45	-56
4	8	46	36	25	14	1	-23	-20	-31	-42	-53	-63
6	12	45	34	23	10	0	-25	-24	-35	-47	-58	-69
8	16	45	32	21	9	-2	-26	-26	-38	-49	-62	-72
10	19	43	32	19	7	-4	-27	-29	-40	-53	-63	-76
12	23	43	30	18	7	-6	-28	-31	-42	-54	-67	-78
14	27	41	30	18	5	-8	-29	-31	-44	-56	-69	-81
16	31	41	28	16	3	-8	-29	-33	-45	-58	-71	-83
18	35	41	28	16	3	-9	-30	-35	-47	-60	-72	-85
20	39	39	28	16	3	-9	-31	-36	-49	-62	-74	-87
22	43	39	27	14	1	-11	-31	-36	-49	-62	-74	-89
24	47	39	27	14	1	-11	-32	-38	-51	-63	-76	-89
26	51	39	27	14	0	-13	-32	-38	-51	-65	-78	-90
28	55	39	27	12	0	-13	-32	-40	-53	-65	-78	-92
30	59	39	25	12	0	-15	-33	-40	-53	-67	-80	-92
32	63	39	25	12	-2	-15	-33	-42	-54	-67	-81	-94

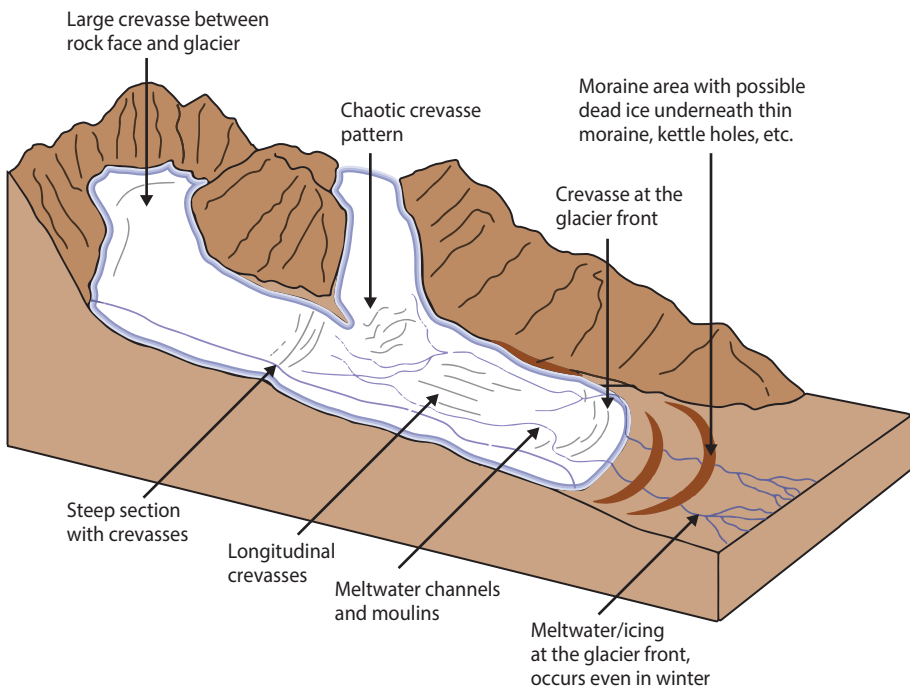
Wind chill chart (Modified from Danish Meteorological Institute).

Glaciers

Glaciers are high-risk working environments. Do not work on glaciers or in their surroundings without proper training.

Risks:

- Crevasses.
- Melt water channels and holes.
- Snow bridges.
- Calving of tidewater glacier fronts and resulting tsunamis.
- Unstable moraine areas.
- Glacial lake outbursts.



Schematic view of a glacier with areas that require special attention
(Image modified from climatica.org.uk).



Glacier travel and fieldwork requires proper training, experience and equipment (Andrea Schneider).

Safety tips:

- Never go on to a glacier alone.
- Never go on to a glacier in bad weather (e.g. poor visibility, storms, heavy snowfall).
- Always rope up when travelling on glaciers.
- Even on warm days keep your hands, arms, and legs covered.
- Follow known routes and GPS tracks (if available).
- Even if there are tracks from other teams, do not assume that you are safe. Snow and ice conditions may have changed.
- If you are unsure about ice or snow bridge stability, stop and probe the area around you with an avalanche probe.
- Avoid areas with visible crevasses, irregular surfaces, and steep sections. This is where most crevasses occur.
- Be aware of meltwater channels.
- Keep a good distance from tidewater glacier fronts.
- Move carefully in moraine areas as these may be unstable.

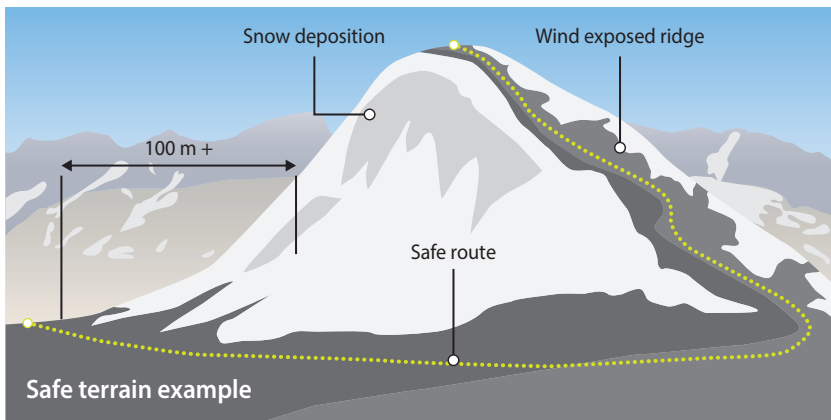
Equipment list:

- Ice axe.
- Crampons.
- Harness.
- Rope.
- Helmet.
- Gloves.
- Avalanche probe.
- Crevasse rescue kit (this may vary depending on the rescue technique you are familiar with).

Avalanches and cornice falls

Risks:

- Steep snowy terrain ($>30^\circ$).
- Wind-loaded and convex slopes.
- Terrain traps (e.g. flat areas or topographic depressions below steep slopes/cliffs).
- Narrow ravines.
- Cornice build-up on lee sides of crests and ridges.



Signs to look out for in avalanche terrain (Source: Scottish Avalanche Information Services).

Signs to watch out for:

- Evidence of avalanches in the area (e.g. previous avalanches and ravaged trees).
- “Whoompfing” sounds.
- Cracks in the snow that propagate sideways from below your feet or skis.

Safety tips:

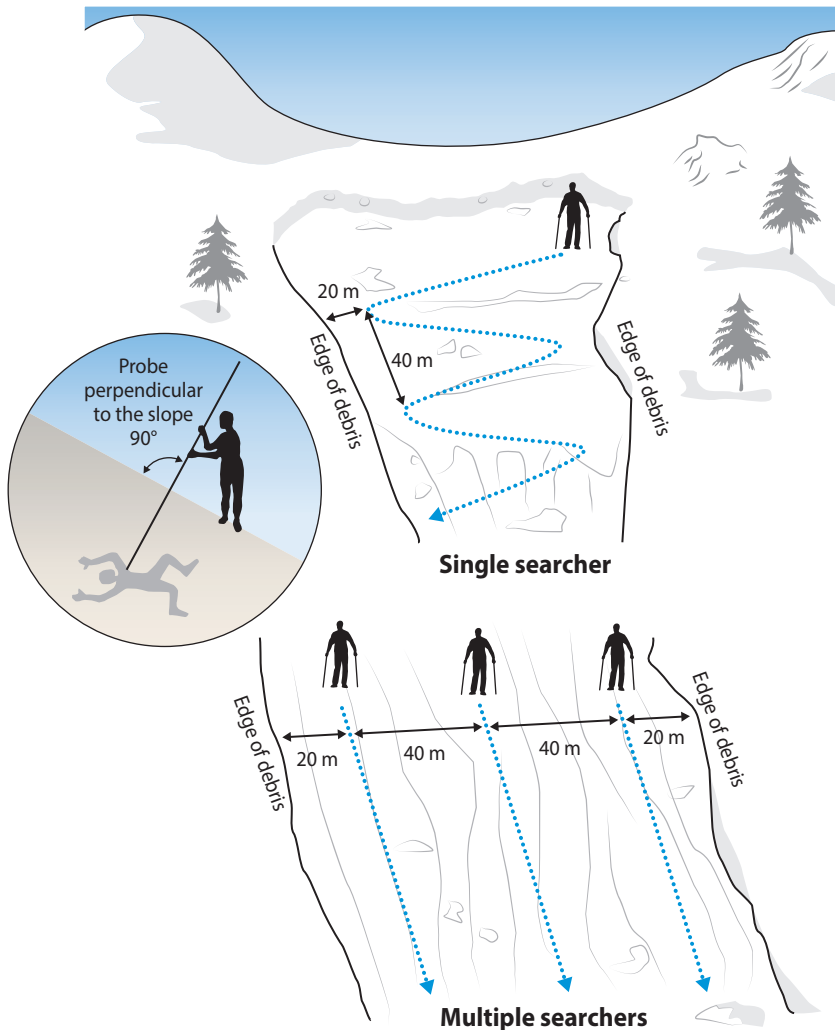
- Avoid all avalanche-prone terrain (slopes steeper than 30°, convex and wind-loaded slopes, narrow ravines, terrain traps, terrain below steep slopes with lee-side snowdrifts hanging near the top).
- Ask local people about the current conditions.
- Stop to estimate slope steepness if in doubt.
- Stay a good distance away from any run-out areas, i.e. below dangerous slopes or cornices.

Should someone get caught in a snow avalanche:

- Make sure there is no risk for new avalanches to occur in the same area.
- Start searching for the victim(s) immediately.
- Search in the area where you expect them to be, i.e. where you last saw them or any of their equipment.
- If you are several people: One person makes an emergency call, while all others search for the victim(s).
- Once you have located the victim(s), dig them out as quickly as possible.
- Move the victim as little as possible. They may have suffered internal injuries that are not visible.
- Keep the victim(s) warm.
- If necessary, free airways and start CPR.

Safety equipment:

- Avalanche transceiver, worn on the body and switched on.
- Avalanche probe.
- Snow shovel (metal).
- Avalanche airbag.



Searching for avalanche victims. Time is crucial, initiate fast but only if area is safe from avalanches. Turn transceiver into search mode and search debris area where person was last seen or where there are signs (items) in the snow (both downhill and uphill searches are fine – whatever is fastest). If signal is received, use probe to exactly locate the buried person and dig downhill from the persons position

(Modified from Tremper, B. 2013: Staying Alive In Avalanche Terrain. Mountaineers Books. USA).

Steep terrain

Risks:

- Rock falls and rock avalanches.
- Mud slides and mud flows.
- Snow avalanches.

Safety tips in steep terrain:

- Avoid areas under cliffs and steep slopes.
- Take care not to destabilise or start rock falls in steep terrain with loose rocks, especially when there are people below you.
- Never walk directly above or below another person on steep slopes.
- If you do cause a rock to fall, shout out a predetermined warning, e.g. "Rock!"
- Wear helmets and use a rope if necessary.
- Ensure that your gear does not fall.
- Consider using hiking poles.

Safety tips in avalanche areas:

- See *Avalanches and cornice falls* (p. 38).

A researcher secured with a harness and rope while working on a steep cliff
(Kim Holmén).



Sea-, lake, and river ice

Travelling or working on sea-ice and frozen lakes or rivers is potentially dangerous. Do not attempt to do this without the proper safety training.

Risks:

- Falling through the ice.
- Cold-related injuries.
- Drowning.

Safety tips:

- Consult ice reports or locals about the current ice conditions.
- Ice is considered safe if it is:
 - 12 cm thick and you are travelling by foot or with skis.
 - 30 cm thick and you are travelling on a snowmobile.
 - 30 cm thick at -15°C or more than 50 cm thick at -2°C and you are travelling in a vehicle of 3 tonnes or more.
 - Lake ice should have a thickness of at least 10 cm before it can be considered safe to walk on.
- Pay attention to the colour of the ice and snow. Colour changes may indicate changes in thickness and/or the presence of slush.
- Avoid areas with slush, open water, and areas around icebergs.
- Measure the ice thickness regularly along your route.
- Keep in mind that currents below the ice can cause it to thin, especially near the coast. Weather changes can also quickly break up the ice.
- Do not travel across ice in strong winds, poor visibility, or when temperatures are rapidly rising.
- Note that even distant storms can result in swell that can break up sea-ice.
- Be extra careful in the late winter season.

Safety equipment:

- Ice-spikes (always worn around your neck).
- Probe or drill to test ice thickness.
- Rope.



Ice spikes with attached neck loop and whistle (Andrea Schneider).

River crossing

- Keep in mind that glacial rivers often flow more strongly in the late afternoon than in the morning. Plan your trip accordingly.
- Cross rivers where they are broad and shallow rather than where they are narrow and deep.
- Always wear shoes or sandals when crossing a river.
- Cross one person at a time.
- Use hiking poles to keep your balance.
- Loosen your backpack straps for easy removal in case you fall.
- Never use waders without wearing a life jacket.



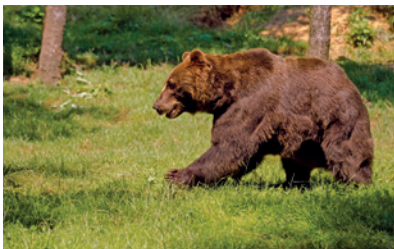
Crossing a river on Svalbard (University Centre Svalbard).

Wildlife

There are many magnificent animals in the Arctic and Alpine regions. Some of them can be dangerous.

Risks:

- Infections from bites and scratches.
- Diseases, such as rabies.
- Parasites, such as *Echinococcus multilocularis*.
- Serious injury from any animal attacks.



Potentially dangerous wildlife you may encounter at INTERACT stations.
(Arctic fox: William Callaghan; Others: Colourbox).

Encounters with wildlife:

- Do not travel alone, especially if there is a good chance of encountering large mammals.
- Be aware of your surroundings and keep your eyes open for animal tracks and droppings.
- Keep at least 100-200 m away from all animals, including marine mammals. Remember that animals are unpredictable and may act unexpectedly. Large species can inflict significant damage even if just curious.
- Always observe behaviour and move away if animals show signs of distress. Familiarise yourself with aggressive behaviour of the dangerous species you may encounter during your fieldwork.
- Never get between a mother and her young, no matter the species.
- Never approach wildlife that are feeding, in particular predators, as they will defend their food.
- Never feed any animal, no matter the size.
- Do not leave food, cooking equipment, backpacks, boots, or anything else outside that may attract animals.

How to behave during close encounters:

- If an animal is acting aggressively, group together to look as large as possible.
- If the animal gets too close, make as much noise as you can.
- Do not run. You cannot outrun most animals.
- Always back away slowly in a calm way with your eyes averted and do not show your teeth.

Avoiding parasite infections:

- Do not touch carcasses.
- Always wear gloves when handling wild animals, particularly birds.
- Treat your drinking water appropriately – see [Drinking water \(p. 25\)](#).

Encounters with potentially rabies-infected animals:

- If you are bitten by a fox or reindeer (on Svalbard, Norway), seek medical attention immediately. You will need to get a rabies vaccination within 48 hours.

Safety equipment:

- Airtight canisters or containers for food and garbage storage.
- Deterrents, e.g. noisemakers, flare gun, pepper spray (where allowed, in regions with brown/black bears), and firearms and ammunition.
- Mosquito protection (e.g. repellents, bug shirts, bug nets, and gloves).

Polar bears

Polar bears are beautiful animals but potentially extremely dangerous predators. Encounters can have very serious consequences.

Risks:

- Serious injury or death from an attack.

Working in polar bear country:

- Consult locals about any recent polar bear sightings.
- Always stay alert and aware of your surroundings.
- Establish a bear watch during stationary fieldwork.
- Travel in daylight and avoid areas with limited visibility.
- Trained dogs can help to detect and avert polar bears.
- Carry deterrents and firearms. Know when and how to use them, and practice beforehand.
- Remember that a rifle should be your last resort of self-defence and should only be used when all other deterrents fail.
- Never approach a polar bear for any reason; in particular bears that are feeding or mothers with cubs.
- Report all polar bear sightings to your local contacts as soon as possible.

Precautions at field camps and cabins in polar bear country:

- Bring firearms and ammunition.
- Camp on higher ground where you have a clear view of the surrounding area.
- Never camp on beaches.
- Establish a bear watch, especially at night.
- Consider putting a tripwire system around your camp.
- Night vision binoculars may be helpful to identify bears at night.
- Use airtight bags or bear-proof containers to store food and garbage. Store them at least 100 m away from your camp.
- Do not assume that cabins are “bear-proof”.
- Be careful when exiting cabins, tents, etc. by looking around for bears.

Safety equipment:

- Binoculars.
- Polar bear deterrents: Flare gun/signal pistol, pyrotechnics, noisemakers.
- Weapons for self-defence: Rifle and ammunition.
- Tripwire systems.

If you encounter a polar bear:

- Stay calm and watch the bear’s behaviour.
- If the bear does not realise you are there quietly back away while keeping an eye on it.
- If a bear does get closer, try to make yourself look as big as possible. Make loud noises with whatever is available to you (e.g. pots, whistles, etc.).

Polar bear behaviour:

- Signs of curiosity: Moving slowly with frequent stops, standing on hind legs, sniffing the air, moving its head from side to side.
- Signs of polar bears being agitated or feeling threatened: Growling or jaw-snapping, stamping its feet, staring directly at you, lowering its head with its ears laid back.

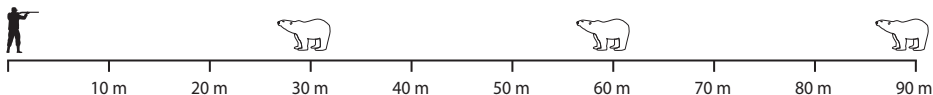
- Signs of stalking or hunting: Following or circling you, approaching directly and in an unafraid manner, returning after being scared away.

Aggressive encounters and self-defence:

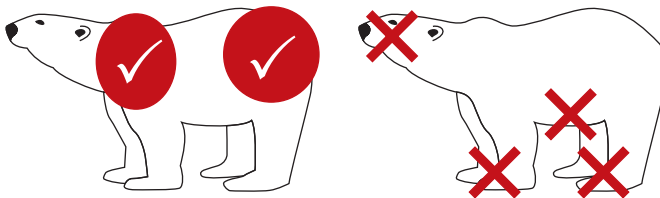
- Act in a non-threatening manner: Avoid direct eye contact. Back away slowly. Do not run.
- Prepare to use deterrents. Make loud noises with whatever is available to you.
- Make sure the bear has a clear and obvious escape route before firing deterrents.
- Make sure deterrents explode in the air or touch the ground between you and the bear.
- If the bear is more than 30 m away and approaching, prepare to shoot lethal rounds. Aim for large muscle groups such as the shoulder and the rump. Do not aim for its head, lower limbs, or belly.

Various deterrents – Make sure the bear has a clear and obvious escape route before firing deterrents

Lethal rounds



Distance ranges for deterrents and lethal rounds.



When shooting lethal rounds aim for large muscle groups such as the shoulder and the rump. Do not aim for the head, lower limbs, or belly

(Modified from: Ross, T., Medill, S., Hansen, B.: Bear Safety. Government of Nunavut).

6 Code of conduct



Natural environment and protected areas

Always plan and conduct fieldwork with minimal impact on the natural environment. Protected areas may be subject to various restrictions and regulations. Familiarise yourself with legislation of relevance for your type of research and the area you are working in.

Arctic plants and flowers (Morten Rasch).



General guidelines:

- Make sure you are aware of where protected areas are located and, if necessary, that you have the correct permit to enter them.
- Do not remove any plants, geological specimens, or historical artefacts unless you have a permit to do so.
- Avoid bringing in non-native species as they may be invasive and threaten local populations.
- Show respect to local communities and cultural heritage sites as they may still be in use.
- Do not build cairns or modify the environment in any way that is not a part of your fieldwork.

Cultural heritage sites (Karl Newyear, Nicolas Lecomte, Richard Fortier, and Sigrid Thranov).



Pollution and waste management

The Arctic and Alpine regions are fragile environments and it is essential to prevent any pollution and to minimise the amount of waste produced while out in the field.

General guidelines:

- Follow “Leave no Trace” ethics.
- Remove as much packaging as possible before going into the field.
- Never leave any litter in the field, including cigarette butts, plastic wrapping, toilet paper, female hygiene items, etc. Pick up any litter that you find.
- Never leave scientific instruments or camp equipment in the field unless this is planned.
- Store food and waste to avoid attracting wildlife.
- Pack out all waste and dispose what you can upon return from the field. This may include human waste.
- Use environmentally friendly toiletries (i.e. without micro-plastics or harsh chemicals).
- Use appropriate spill kits or containers when working with hazardous substances. Report any pollutant spills, regardless of the volume spilled.
- Consult your local contact about how to deal with hazardous waste.



*Leave no garbage behind.
It may take centuries or
millenia for it to disappear
and it may harm wildlife
(Alexandre Lavrov).*

Reducing use of energy and water

Small and simple measures can help reduce energy use and the amount of wastewater to be treated.

These measures include:

- Ensure that all equipment is as energy efficient as possible and used only when necessary.
- Switch off lights, equipment, and computers when not in use.
- Unplug chargers when not in use.
- Regulate the temperature in your bedroom and living space.
- Ensure that radiators/heaters are not blocked by clothing or furniture.
- Ensure that refrigerators and freezers are set to the right temperature – not too cold. Remember to open them for as short a period as possible.
- Take only brief showers.
- Do not leave taps running.
- Report any leaks in water systems immediately, no matter how small they may be.

Conflicts and harassment

An important aspect for any Arctic and Alpine fieldwork is that everyone is mentally prepared for high-pressure situations and that all team members are friendly and considerate. Ensure that you have discussed leadership roles, responsibilities, and expectations to minimise misunderstandings and confrontations.

Generally:

- Maintain a safe, secure, and open environment to discuss any issues.
- Consider having a scheduled time at regular intervals to raise and overcome any issues (for example at dinner) in an open and friendly way before they develop further.
- Approach your team members and fieldwork with a positive attitude.

Steps to take if a conflict should arise:

- Agree on a neutral person to lead the discussion process and ensure that the situation does not deteriorate.
- Gather information from all involved parties and assess the situation.
- Communicate any decisions to all involved.
- If necessary, inform your local contact or your home institution.
External experts may be asked for advice, particularly in the case of possible mental health problems.
- Following any conflict, it is vital that all involved parties undergo a debriefing.
- Restore a good living and working atmosphere.

Discrimination, harassment, and workplace violence:

Remember that any kind of discrimination, harassment, and workplace violence are not tolerated. Team leaders and team members must work together to ensure the field is a safe and welcoming environment for all.

7 Local/Traditional Knowledge



People have lived in Arctic and Alpine areas for centuries and even millennia. Many live in close relationship with nature giving them extensive knowledge and experience about issues of relevance to fieldwork, e.g. local weather conditions, local waters, ice conditions, glaciers and icebergs, dangerous terrain, wildlife, etc. We recommend that you tap into this knowledge during your fieldwork planning and accomplishment, either by involving locals in your project or by seeking advice from locals once in the field.

- Be sensitive about your engagement with local people. They are often very open and willing to share information but may also experience 'researcher fatigue'.
- Be sensitive to local culture and traditions. Respect local activities and avoid disturbing hunting/fishing activities and sites of local importance.
- Be sure to obtain consent from local people if you intend to use their information in publications and give your informant proper credit.
- Be prepared to pay for the services provided by locals (e.g. field assistants, guides, translation services, transport assistance, etc.).

Consult your local contact to find out what is the best way of engaging with the local community and how to establish contact.

8 Emergency preparedness



Handling risks

Emergencies can occur but being properly prepared can stop the situation from deteriorating and save lives. In case of an emergency, it is important to follow the agreed safety protocol.

Emergency procedures and communication– see inside of front cover and page 12.

Risk management

- Assess and plan to prevent/minimise risks before heading into the field.
- Identify mitigation measures and what to do in case an emergency should occur.

ALWAYS

- Be cautious and remember safety is your top priority.
- Have emergency contact details with you (use *Relevant contacts* (p. 60) for this purpose).
- Have appropriate communication equipment with you and know how to use it.
- Ensure you have all safety equipment and an adequate first aid kit with you.
- Have a pre-designated leader and co-leader that take charge in an emergency situation.

After an emergency situation:

- Report the emergency to all relevant bodies (e.g. police, insurance companies, home institution, station manager, and next-of-kin), including information about the date, location, summary of what happened, casualties, etc.
- Have one or more debriefing sessions to discuss the event, procedures carried out, and people's reactions.
- Post-emergency counselling may be necessary.
- If there is any contact with the press and/or social media, carefully consider what information is confidential.

Safety measures to minimise risks

The most important tool to keep yourself safe is your head – take your time to use it early enough.

Most accidents happen because of human error, bad decision making and fatigue.

1. Before heading out:

Identify possible risks and related mitigation measures, plan ahead to avoid problems, bring relevant safety equipment

Risks, mistakes or incidents occur during the activity

2. If a risk occurs in the field:

Follow mitigation measures in risk management plan to eliminate/reduce risk, use relevant safety equipment, re-assess risks

Incidents / mistakes lead to severe injury or emergency

3. If an injury or emergency occurs:

Minimise injury/damage, use emergency equipment, get help

Safety measures include:

- Thorough risk assessment and mitigation measures.
- Adequate safety gear and emergency equipment.
- Training and experience.

Modified from The University Centre in Svalbard (Elmer Topp-Jørgensen).

Relevant contacts

Use a pencil to fill in the relevant information below. This means you can erase the information at a later date and reuse the book for future field-work. Remember relevant country and area codes. Remember to note the reference coordinate system used for geographical positions (the norm for GPS's is WGS84).

This book belongs to:

Name:
Phone number:
E-mail:
Home institution:

Home institution contact person:

Name:
Phone number:
E-mail:

Emergency contact details:

Research station/Contact person, Name:
Phone number:
VHF frequency:

Police/Search and Rescue:

Phone number:
VHF frequency:

Nearest hospital/Medical doctor:

Phone number:

Insurance company:

Name:
Policy number:
Contact details (Phone number/E-mail):

Relevant geographic positions (reference coordinate system: WGS84):

Research station:
Field sites:
Field camp:
Potential shelters:
Nearest towns/villages or houses:

Routine communication with research station/contact person:

Make routine calls to research station/contact person every:
Research station, Phone number:
Research station, VHF communication frequency:
Other contact person, Phone number:
Other contact person, VHF communication frequency:

Routine communication within team members:

Make routine calls to team members every:

VHF communication frequency for internal communication with team members:

Team member 1, Name:

Phone number:

Team member 2, Name:

Phone number:

Team member 3, Name:

Phone number:

Team member 4, Name:

Phone number:

Team member 5, Name:

Phone number:

Next of kin information for team members:

Team member 1, Name:
Next of kin, Name:
Contact details (Phone number/E-mail):
Team member 2, Name:
Next of kin, Name:
Contact details (Phone number/E-mail):
Team member 3, Name:
Next of kin, Name:
Contact details (Phone number/E-mail):
Team member 4, Name:
Next of kin, Name:
Contact details (Phone number/E-mail):
Team member 5, Name:
Next of kin, Name:
Contact details (Phone number/E-mail):

Other contacts:

Authorities of relevance:
Travel agency:
Transport companies of relevance:
Shipping company:
Airline companies:
Airports of relevance:
Hotels or hostels of relevance:
Local weather service(s):

Outbound cargo:

Address to which cargo has been sent:
Shipping company:
Consignment number:
Number of packages in consignment:

Homebound cargo:

Address to which cargo has been sent:
Shipping company:
Consignment number:
Number of packages in consignment:

INTERACT

INTERACT is a circum-Arctic network with more than 85 terrestrial field stations in the Arctic and adjacent boreal and Alpine areas. INTERACT seeks to build capacity for research and monitoring in the Arctic and beyond, and offers access to numerous research stations that are part of the network.

APECS

The Association of Polar Early Career Scientists (APECS) is an international and interdisciplinary organisation for undergraduate and graduate students, postdoctoral researchers, early faculty members, educators and others with interests in the Polar and Alpine regions as well as the wider cryosphere.



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www.eu-interact.org

INTERACT Practical Field Guide

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www.eu-interact.org and from the APECS website: www.apecs.is



The *INTERACT Practical Field Guide* contains information on best practices and safety aspects in relation to fieldwork in the Arctic. It includes eight chapters, addressing General safety guidelines; Communication; Safety during transport; Safety in the field; Weather, terrain, and wildlife; Code of conduct; Local/traditional knowledge; Emergency preparedness; and Relevant contacts. It is meant as a handy guide that you can bring with you in the field.

The book has been made in a cooperation between INTERACT and APECS, and the managers of Arctic and northern alpine research stations, with funding provided by the European Union through the Horizon 2020 Research and Innovation Programme.

A more comprehensive book, the *INTERACT Fieldwork Planning Handbook*, describes in more detail all aspects of planning and conducting fieldwork in the Arctic. Both books are available for download at the INTERACT website.

Let's INTERACT!

www.eu-interact.org

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