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FACULTY OF SCIENCE

Safety Manual for Fieldwork in the Arctic

Faculty of Science, University of Copenhagen

March 2017

Safety Manual for Fieldwork in the Arctic

2nd edition, April 2017

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This safety manual is widely based upon information taken more or less directly from safety manuals produced by other institutions, i.e., University Centre in Svalbard (UNIS), Greenland Institute of Natural Resources, Aarhus University, the Geological Survey of Denmark and Greenland (GEUS) and The East Greenland Ice-core Project (EGRIP) UCPH. However, all information has been quality controlled by University of Copenhagen staff, and any errors that might occur in the manual are therefore the sole responsibility of the University of Copenhagen.

Front page picture: Morten Rasch

Publisher: Faculty of Science, University of Copenhagen

Preface

Safety is important for all types of arctic fieldwork. Fieldwork in remote arctic areas with extreme climate and extreme physical settings require close attention to safety.

This manual pertains to all arctic fieldwork associated with research projects and tasks commissioned or managed by the Faculty of Science at the University of Copenhagen (SCIENCE).

The manual consist of an introductory section including a more general introduction to safety considerations of relevance to all arctic fieldwork. More specific descriptions of procedures (e.g. handling of snow mobiles, crossing of rivers, use of different means of communication) are provided in the appendices.

It is mandatory for University of Copenhagen staff and students to have read and become familiarized with the rules found in the introductory section, as well as those in the relevant appendices of this manual, before leaving for arctic fieldwork (it is mandatory for all Project Leaders to indicate the relevant chapters and appendices).

Appendix V is the University of Copenhagen arctic fieldwork registration form. It is mandatory for all University of Copenhagen staff and students to complete the form prior to their departure for arctic fieldwork. The completed and signed form should be delivered to the fieldwork Project Leader before leaving for the field in the Arctic. The signed forms should be kept at the University of Copenhagen department in which the relevant field worker is employed, and it should be easily accessible in case it is needed. An exemption from the required use of the forms can be made if corresponding information is gathered and held by other means.

Exemptions from the rules described in this manual must be approved by the Dean, based upon the recommendation of the relevant department's occupational health and safety committee. Requests must also be processed via the occupational health and safety manager, Mette Høgsbro.

The manual is mainly based on information from the preexisting field manuals of other institutions and supplemented with information provided by a group of arctic specialists based at the University of Copenhagen. The material has been compiled by OHS manager Mette Høgsbro (SCIENCE) in cooperation with Chief Consultant Morten Rasch (Department of Geosciences and Natural Resource Management). We are grateful to the Geological Survey of Denmark and Greenland (GEUS), Aarhus University, The University Centre in Svalbard (UNIS) and the Greenland Institute of Natural Resources for providing excellent field manuals and for allowing us to use text from these manuals, directly or in edited form, in this manual.

In the manual, the arctic area is considered as the area being so northerly that trees are unable to grow (north of the tree-line). While much of the information provided in this manual could probably apply to Antarctica and alpine areas, i.e., areas above the tree-line altitude, the intention has been to make a manual for fieldwork in the Arctic with an emphasis on fieldwork in Greenland.

We urge everyone to contribute comments, feedback and ideas for the ongoing improvement of this safety manual. Comments should be submitted to Mette Høgsbro, mmh@science.ku.dk.

Dean John Renner Hansen

Faculty of SCIENCE
University of Copenhagen

Content:

INTRODUCTORY SECTION

1. Essential outdoor guidelines

These guidelines apply to all fieldwork:

- Never head into the wilderness alone.
- Always wear/bring warm and waterproof clothing.
- Always bring relevant means of navigation and communication – see chapter 10.
- Always inform people of where you intend to go and of when you intend to return.
- Always prepare thoroughly: check the weather forecast before leaving, select equipment that is appropriate for the activity to be conducted and listen to the advice of people with local or specialist knowledge.

2. Field Leader's responsibility in relation to safety

All fieldwork must have a Field Leader. The Field Leader has the ultimate responsibility to make sure that fieldwork follows the instructions as outlined in this manual. The Field Leader will be the person responsible for fieldwork safety as long as he or she is part of it. When this is not the case, the person responsible for the fieldwork must delegate this responsibility to a Fieldwork Supervisor. This might be the case if e.g., the group splits up to conduct field work in different parts of a study area.

Responsibility for security should always be assigned, clearly and unambiguously, so that the fieldwork group is always aware of who is the responsible party – whether the group consists of two or ten members and regardless of trip duration.

According to the Greenland Working Environment Act (as well as Danish legislation), an employer is responsible for the work environment and safety of its employees. This means that work should be of such a nature, that it can be completed in a secure and proper way, and that all necessary steps must be taken to comply fully with these conditions. The employer shall inform employees of any and all potential work related risks of accidents and diseases, he/she shall ensure the employees receive the necessary training and instruction to perform their work in such a way so as to avoid any possibility of injury. It is also the duty of the employer to ensure that there is effective supervision and that work is performed safely and without risk to employee health. The Department Head is responsible for delegating managerial roles, including the responsibility to ensure that all work is conducted in a safe manner.

Figure 1: organizational structure

From a legal perspective, a person is considered to be a manager when their terms of employment specify a managerial function. This could be via a description of the delegation that provides managerial powers within a specific area. It can also be after being named a manager, with either specialised responsibilities or more broadly, in an entire area. A manager will most likely have the power to provide instructions as well as delegate any subsequent responsibilities.

The Field Leader must be an experienced University of Copenhagen staff member who participates in the project. The Field Leader is appointed by the Project Leader of the relevant project and can be the Project Leader him-/herself. The Field Leader refers to the Project Leader. The leadership structure above the Project Leader follows the organizational structure of the relevant department, i.e., the *Field Leader* refers to the *Project Leader*, who refers to the *Leader of Section*, who refers to the H*ead of Department*, who refers to the *Dean*, who refers to the *Rector*. Figure 1 shows the organizational structure of relevance for a field work group.

Should any problems during the fieldwork require outside assistance, all levels up to the Head of Department must be informed. This is done by the Field Leader informing the Project Leader, who informs the Leader of Section, who informs the Head of Department. Should these problems involve injury to staff or students, all levels up to the Dean must be informed using the same system as described above.

You can find detailed information about the safety responsibilities of the Field Leader in Appendix A

3. Participant's responsibility in relation to safety


Photo: Kirsten Christoffersen

The Field Leader is required to instruct participants about the special risks that may occur during the fieldwork. And, participants are obliged to follow these instructions. The participants also have a duty to draw attention to anyone who does not follow the instructions. Safety regulations MUST be adhered to and participants may be sent home if not in compliance, possibly at their own expense.

<u>Actively seek information</u>

As a participant, you must make sure that you are informed. If you have not received sufficient information from the Field Leader or the Project Leader, you must seek the necessary information yourself, i.e., for issues such as insurance, vaccination, equipment, clothing, need for training, safety regulations, culture and conduct etc. If in doubt about anything at all, you should ask the Project Leader or the Field Leader – better safe than sorry!

<u>Ensure for proper and adequate personal gear</u>

As a fieldwork participant, be aware that one is often required to bring personal gear. You should know what to bring as well as what gear will be brought by the expedition/field work group. Your personal gear must be both adequate and in good condition.

Lists of different equipment can be found in Appendix D.

Alcohol and narcotics

Being under influence of alcohol or medicine may pose a greater threat/risk in the Arctic than elsewhere. Fieldwork participants may not be under the influence of alcohol or medicine causing drowsiness while conducting their work, regardless of whether the alcohol was consumed away from the workplace or outside of working hours. The consumption of alcohol may be acceptable, as long as the Field Leader finds that doing so does not pose any threat of safety. Narcotics are strictly forbidden and any use will be reported to the police.

4. Education and training

Fieldwork participants must be prepared to conduct work safely and be capable of dealing with accidents and other situations that may arise when something goes wrong.


Photo: Kent Pørksen

Naturally, the type of artic fieldwork education and training required by participants depends upon the types of activities to be conducted, the risks associated, whether these activities are being conducted during the summer or winter, if people with experience are mixed with those without, if the fieldwork is being conducted in wilderness areas, etc.

The Field Leader is responsible for defining the required competences for all participants and for ensuring that participants have received the necessary education, training and instructions. The Field Leader must assume responsibility for making this determination. Moreover, it may be considered negligent to not have adequately defined the necessary education, training and instructions of participants so as to ensure the safe conduct of work.

Education and training will typically involve:

- Lifesaving first-aid.
- Use of proper communication and navigation equipment (radio, map, GPS and compass), as well as emergency beacons and satellite telephones.
- Safe use of rifles and flare guns, to be used in self-defence against polar bears or other dangerous wildlife.
- Safe use of rubber boats/small boats with outboard engines, incl. safety equipment such as life-jackets and survival suits, and incl. capability to do small repairs in the field.
- Safe use of snowmobiles (as well as doing small repairs in the field).
- Safe establishment of a camp with respect to falling stones, snow and rain fall and attack from wildlife, especially polar bears.
- Knowledge of safe hiking techniques, especially when it comes to dangers associated with mountain climbing, glaciers and rivers.
- Handling of the potentially dangerous equipment to be used during the fieldwork.

In Appendix U you will find information about relevant courses offered by different research institutions.

5. Equipment

Thorough planning and preparation is a prerequisite for carrying out safe and successful fieldwork. Prepare a list of equipment needed for the fieldwork. Make sure you do not forget anything. Remember to plan how you are going to pack the equipment. You may want to try to pack your equipment well in advance. Pay attention to the packing: Consider the need for watertight/shockproof packaging. Also consider the need for carrying straps and the possible need of having to lift the equipment with a hook.

It is important to pay attention to both the volume and weight of the equipment. It is important that these variables agree with the means of transportation to be used. Coordinate your activities with other members of the group well in advance.

Equipment for fieldwork should aim at providing maximum security while working and camping in sparsely inhabited or completely isolated areas. Fieldwork in the Arctic requires extra materiel and equipment due to the harsh and variable climate.

The Field Leader must make sure that participants are properly outfitted and equipped before the start of the fieldwork. The Field Leader must also make sure that adequate safety and field equipment is brought along. This equipment must be inspected and checked to ensure that it is in good working condition. The Field Leader must be in clear and consistent communication with participants about what they should bring (personal gear) and what will be brought by the expedition. For fieldwork in remote parts of Greenland, different equipment is necessary in order to obtain a permit from the Greenland Government to enter the areas, i.e. different means of communications, a Personal Locator Beacon (to be used in case of Search and rescue being necessary) and different weapon types. Please ensure that you have the equipment and relevant permits and training to use the equipment. Notice that receiving a weapon permit for fieldwork in Greenland could take months and that the administrative issues relating to buying weapons, carrying weapons, taking weapons out of Denmark and bringing weapons into Greenland might include a lot of work. Therefore, start preparing well in advance. For projects that work for several years in Greenland, it is practical to avoid transport of weapons in and out of Greenland. It is possible to buy weapons and ammunition in grocery stores in Greenland, and keep them safely stored in Greenland.

The user is responsible for familiarising him-/herself with all equipment before use. In appendix D you can find a list for inspiration on relevant equipment for various types of activities/fieldwork.

If you need to rent equipment, you may try to do so through the Geological Survey of Denmark and Greenland (GEUS). More information about GEUS equipment rentals is available on www.isaaffik.dk.

6. Legal requirements associated with work in Greenland

Greenland is self-governing and thereby has its own legislation pertaining to the working environment, i.e., – The Greenland Working Environment Act no. 1048. Staff with work related stays in Greenland are required to familiarize themselves with this law prior to working in Greenland.

The Working Environment Act and its corollaries are applicable for all work conducted in Greenland, with the exception of work related to aviation or maritime activity. In these cases, Danish maritime legislation and the Danish Air Navigation Act preside.

The following legal requirements apply to fieldwork conducted in Greenland. Be aware that other legal requirements may apply for Svalbard and Arctic regions.

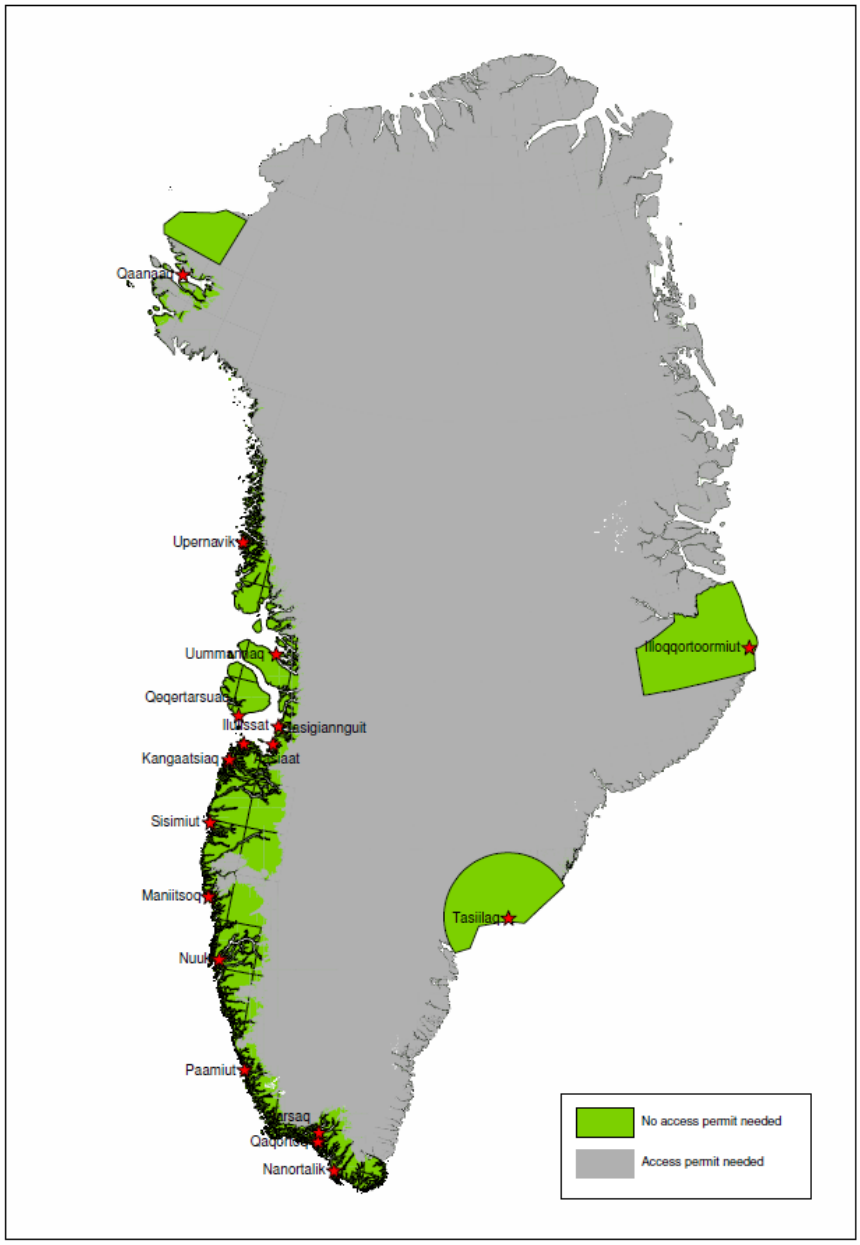
From February 2010, the Executive Order on Access to and Conditions for Travelling in Certain Parts of Greenland sets out the conditions valid for most travel activities going to the area of the National Park of North and Northeast Greenland, to the Greenland Ice Sheet and to certain other parts of Greenland, incl. the Melville Bugt. The rules are administered by the Expedition Office in Nuuk under the Ministry of Domestic Affairs, Nature and Environment.

Other permits that may be required are:

- Radio license permit
- Firearm permit (required for expeditions in the National Park, otherwise when applicable)
- Permit for non-nordic citizens: see appendix Y

Furthermore, locally applicable rules apply to various other work places and stations in Greenland including, but not limited to, the Greenland Institute of Natural Resources, Zackenberg Research Station, Villum Research Station, Station Nord and stations on the Greenland Ice Sheet. Naturally, these rules must be adhered to by University of Copenhagen staff, students and visitors.

7. Insurance



It is the responsibility of the project leader of the field work in the Arctic to ensure that all project participants are properly insured and that all relevant permits are acquired.

Questions regarding insurance can be addressed to legal adviser Susanne Tang, susta@science.ku.dk

Remote parts of Greenland
A permit to enter remote parts of Greenland (gray areas on the map) will not be issued by the Greenland Government unless a proper insurance or self-insurance is in order. You can find more information, including the pertinent application forms, for travels to remote parts of Greenland here.

Please note that many insurance companies issue a worldwide travel insurance that also covers remote parts of Greenland. However, this kind of insurance is not accepted as valid by the Greenland Government for travel to remote parts of Greenland. For such travels you are required to have both travel insurance (to cover medical evacuations) and Search and Rescue insurance (to cover search and rescue). Other rules might be relevant in other parts of the World, and if you are travelling to other parts of the Arctic, you have to check carefully what insurances are needed before leaving.

The Search and Rescue insurance (SAR) relevant for travels in remote parts of Greenland is very expensive, but not having a valid insurance policy could result in extreme expenses.

The Greenland Government accepts self-insurance for Search and Rescue for Danish public institutions. Use the self-insurance form provided by the Greenland Government and have your Head of Department sign the form before submitting it. External foreign and private sector fieldwork participants must take out a Search and Rescue insurance policy. Such insurance can be obtained from numerous insurance companies, among them, Kallaalit Forsikring in Nuuk.

Visits to populated areas of Greenland do not require Search and Rescue insurance and regular travel insurance should suffice. Students and guests should familiarize themselves with their insurance policy for stays in Greenland prior to departure.

Employee or PhD student employed at UCPH

As an employee or PhD student employed at UCPH, you are covered by the University's self-insurance travel insurance and workers' compensation insurance policies.

If you are injured on your trip

If you as an employee or a PhD student employed at University of Copenhagen are injured on your trip, the conditions set out in the travel insurance policy for Danish government employees apply. You must remember to bring the University insurance card with you on your trip. The Danish government has an agreement with the travel insurance provider, Europæiske Rejseforsikring, and you can contact them for help if needed (the insurance card indicates where enquiries may be made). It is important that you follow their instructions for the treatment of the injury, as the University of Copenhagen is only authorized to pay compensation in respect of claims approved by Europæiske Rejseforsikring. The insurance provides coverage regardless of the duration of the trip. However, you should be aware that this insurance does not provide coverage during any holidays. So if you have planned holidays during the course of your fieldwork, you are required to inform your project leader and must take out a travel insurance policy that covers you for the duration of your holiday.

Accident insurance

The University of Copenhagen has not taken out an accident insurance policy, but should the University of Copenhagen act negligently, the University of Copenhagen will pay compensation for any resulting injury or damage.

It is always recommended that you as an employee take out private leisure accident insurance. Most public employees' pension schemes include accident insurance. You should investigate this before taking out an accident insurance.

Health insurance

When travelling to Svalbard (Norway) and elsewhere in Europe, beyond Denmark and Greenland, you must remember to bring the blue health insurance card. The blue health insurance card provides coverage in EU/EEA countries and gives you the right to the same treatment as the citizens of the country where you are visiting. However you must pay attention and make sure that you are not going to any areas where extra insurance is needed.

Students and externally employed PhD student

The University does not take out insurance for students and externally employed PhD students, which means that you must take out the necessary insurance yourself.

The Faculty of Science has decided that externally employed PhD students who travel to or conduct fieldwork beyond Danish borders should


Photo: Kirsten Christoffersen

either be hired as employees or covered by their own insurance policies (can be paid for by the externally employed PhD's employer).

You must have:

- Full-time accident Insurance
- Third-party liability insurance
- Travel Insurance
- The blue health insurance card when travelling in EU/EEA countries.

If you are going to conduct fieldwork in remote parts of Greenland, as either a student or an externally employed PhD student, you should speak with the Project Leader well in advance to discuss insurance issues. The insurance policy needed (Search and Rescue) for travels in remote parts of Greenland is extremely expensive, but even more extreme expenses may occur if a Search and Rescue operation is initiated without insurance!

Researchers and Students/guests from outside University of Copenhagen

The University of Copenhagen does not provide insurance coverage for expedition guests. Guests must provide a signed statement (appendix V2) in which they guarantee that they are adequately covered by their own insurance policies. The form should be delivered to the project leader before leaving for the field in the Arctic.

8. Researchers and students from other institutions


Photo: Kent Pørksen

Although the University of Copenhagen does not require researchers and students from other institutions to comply with University of Copenhagen standards, it is recommended that fieldwork participants from outside the University of Copenhagen have completed the same courses as University of Copenhagen staff and students prior to participation in any fieldwork arranged by the University of Copenhagen.

In connection with fieldwork conducted under the auspices of University of Copenhagen, researchers and students from other institutions must follow the rules stipulated by University of Copenhagen. It is the responsibility of University of Copenhagen (i.e. the relevant University of Copenhagen Project Leader) to make sure that they are informed of all current rules and regulations.

The University of Copenhagen is NOT responsible for researchers and students from other institutions that participate in programs that are administrated by their home organizations. These institutions must ensure for their own expeditions' consents.

Researchers and students from other institutions must sign the form in appendix V2.

9. Responsibility for equipment on loan


Photo: Morten Rasch

The project leader is responsible for all safety equipment used during fieldwork and is responsible for making sure that the equipment is inspected and fully functional before being loaned out.

The project leader is thereby responsible for making sure that everything on an equipment list is in good shape and fully functional.

With equipment such as life vests etc. that are loaned from a field station, the person using the equipment is obliged to check that it is in good shape. Equipment may become damaged during an expedition and the person using the equipment is in the best position to notice problems or shortcomings.

Equipment that does not function properly may not be brought on expeditions.

10. Means of communication

Photo: Morten Rasch

<u>Relevant means of communication are:</u>

- Cell phone – in areas with cell phone coverage. Generally there is no cell phone coverage c. 5-10 km outside towns. However, in some areas, e.g. Disko Bugt, there is an extensive relay system allowing for cell phone communication also outside the towns and at sea. Therefore check carefully with locals the cell phone coverage before depending on a cell phone as your only mean of communication.
- VHF-radio for local communication within line of sight – never applicable for distances of more than 20 km – often less in areas with mountains or other obstacles. It is allowed to use normal marine VHF-radios on land in Greenland within special certificate. However, avoid the use of Channel 16 to secure that you are not disturbing communication between ships, distress calls etc. Further, notice that marine VHF is mainly meant for communication between ships. Therefore, if crew on ships asks you to leave the channel you are communicating on, please do so and find an alternative channel for your communication.
- Satellite telephones for communication in remote areas. There are two different systems. INMARSAT is applicable up to c. 74^{o} N. Iridium is applicable World Wide. Inmarsat is generally a bit more reliable than Iridium.
- HF-radio for long distance communication. Not in use very much any longer – due to the much better performance of satellite telephones.
- PLB (Personal Locator Beacon) – only allows for a one way communication saying “I am in trouble and this is my position” (and only to be used when you are in real trouble). Activating a PLB will ini-

tiate a Search and Rescue operation which might be very costly. The PLB is mandatory for all expeditions to remote parts of Greenland according to Greenland Government regulations. In uninhabited areas outside The Remote Parts of Greenland, a SPOT device might be sufficient.

- Personal locator devices, such as SPOT3 are really compact, versatile and rugged and are recommended to carry when working outside cell phone range. The devices can be programmed to send an "all o.k." or another short text string and a GPS position at fixed time intervals. This allows for family and friends and fieldwork responsibles to locate field teams and their progress on the SPOT webpage. The device also has an emergency button in which case the device acts as a type of "Personal Locator Beacon" (PLB) sending out a distress call and a position. To the knowledge of the authors, SPOT devices are still not certified to fulfill the requirement of PLBs for expeditions in remote areas of Greenland, so be sure to carry a certified PLB as well.

For your own safety, make sure that you ALWAYS carry a relevant means of communication (and if relevant, a list of telephone numbers) with you in the field. A telephone allows you to call for help and to keep people informed of changes to your plans. A relevant means of communication is probably the most important safety equipment to bring along in the field.

In areas with cell phone coverage, a normal cell phone will suffice for all external communications. VHF-radios can be relevant for communication between expedition participants for safety calls and for more time consuming communications, e.g. in relation to surveys.


Photo: Morten Rasch

In areas beyond cell phone coverage it is mandatory that expeditions bring a satellite telephone (Iridium is recommended) for external communications and VHF-radios for communications between expedition participants.

Both Iridium telephones and Inmarsat telephones can be connected to a computer to transfer *e-mail text messages*. Due to the low baud-rate of both systems, it is normally not possible to use a browser or to send more than text messages.

If you travel in *remote parts of Greenland* it is mandatory to bring a PLB. You will be advised in relation to this, when applying the Greenland Government for permission to enter remote parts of Greenland.

NOTE: Always try and test that all means of communication work before heading into the field and make sure that the mobile phones or other devices are fully charged before leaving camp. Also remember to bring chargers and extra batteries. In case you want to send and receive e-mails via a satellite telephone connected to a laptop, it is essential that relevant software is installed prior to your departure into the field, and that the e-mail program is tested well in advance.

When fieldwork implies operating from a base camp, communication procedures shall be established for both the normal daily communication and communication in case of emergency.

In appendix R you will find a list of important telephone numbers of relevance for fieldwork in the Arctic.

11. In case of an accident

If an accident occurs, all persons involved are responsible for taking action. Depending on the situation, this may initially involve first aid, emergency calls and notification to the police and/or other relevant authorities. Carefully study the relevant competences of different University of Copenhagen staff for emergency situations in Figure 2. Serious injury to any participant in University of Copenhagen fieldwork must be reported to the relevant Head of Department as soon as possible.

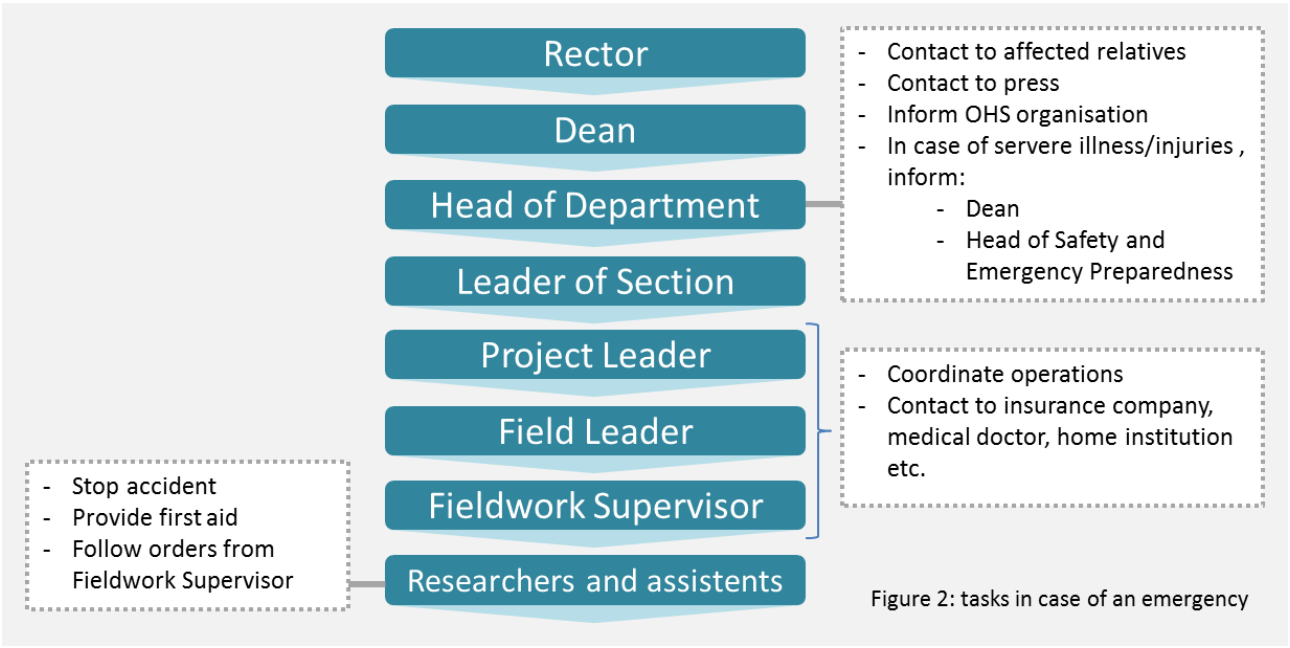


Figure 2: tasks in case of an emergency

See first aid emergency action principles in appendix B.

Prior to departure from Denmark, all fieldworkers should furnish their section secretary with a list of people to be notified in the event of participant illness, injury or accident (Appendix V). Researchers and students from other institutions must also complete the form in appendix V.

It is the responsibility of the Field Leader or the Project Leader to report any accident. Use the normal University of Copenhagen forms at KUnet.

12. First aid and medicine

It is essential to be well acquainted with the main principles of first aid before heading into the field. One should know the contents of first aid kits and be familiar with the use of this equipment. *It is therefore mandatory for University of Copenhagen staff and students to attend a first aid course before leaving on arctic fieldwork*. The course should be relevant to arctic conditions and it is recommended that the course has been taken within the last two years. If staff or students are solely going to stay in a large camp where

other people are well acquainted with first aid, the project manager may make an exemption from this rule. A list of relevant courses is given in Appendix U.

When the need for first aid arises, it is important to act fast without forgetting the general rule of: 'OBSERVE - THINK – ACT'.

Do not initiate treatment before you have obtained an overview of the situation and before you have contemplated which treatment will be the most effective. If possible, consult with a medical doctor as soon as you can. The normal procedure is to call Europæiske Forsikring and ask them for medical assistance. They will then get you in contact with a medical doctor. To make the communication with Europæiske Forsikring run smoothly it is a good idea to have the insurance card of the person being injured or ill ready, when you call Europæiske Forsikring.

Order of Events for Life Saving First Aid:

- Provide for your own safety.
- Obtain an overview of the site of the accident (how many are injured/ill?)
- Check consciousness
- Free airways
- Check breathing
- Check the pulse
- Seek help (If this is possible within the time frame for the given situation)
- Start the required treatment

Participants must carry first aid supplies when away from populated areas. See appendix D.

Participants must disclose their medical status for certain types of fieldwork. Certain medical conditions preclude fieldwork participation in wilderness areas[1]. In remote parts of Greenland this is evaluated by the Greenland Government in cooperation with the Arctic Command based on an evaluation made by a medical doctor. This is done while applying for access to remote areas in Greenland. There exist no strict set of rules relating to the evaluation, so it is dependent on the person carrying out the evaluation for the Greenland Government/Arctic Command.

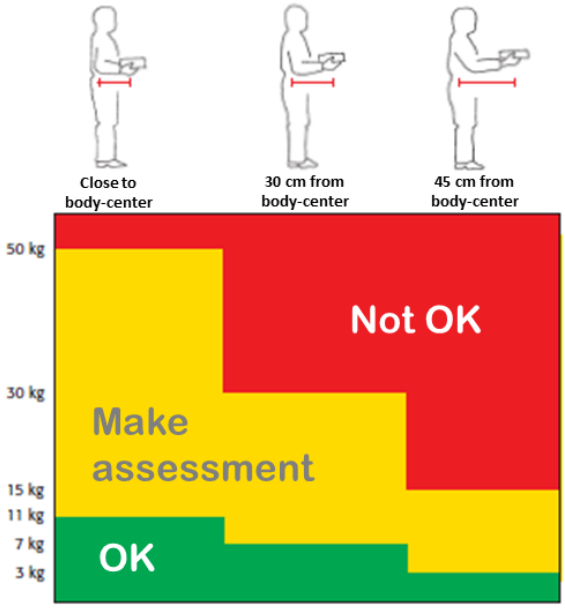
It is the responsibility of the Field Leader or the Project Leader to report any accident. Use the normal University of Copenhagen forms at KUnet.

Appendix B includes a list of potential injuries and treatments, and a list of first aid and medication considerations.

[1] There is a conflict between the Danish Act on Processing of Personal Data and the requirement to include medical records with an application for expedition consent. NBI has made a made a special agreement whereby NBI's own team of arctic doctors perform the medical evaluation based on a comprehensive test program. NBI guarantees that they have a copy of medical records to be forwarded to a hospital if necessary.

13. Ergonomics

Fieldwork can result in back trouble. Heavy goods must be handled carefully, preferably by two people, so as to avoid sudden back strain (spine and muscles). Be especially careful during awkward and stressed working situations, as for instance when loading a helicopter in a hurry. Try to avoid a cold back both during fieldwork as well as in the camp. Make sure you have adequate insulation under the sleeping bag at night. Bending/stretching exercises in the morning are useful.



In the worst case, muscles in the back may become tense, and the condition may lead to cramp and severe pain. Warmth and relaxation may help, but it may also be necessary to use pain killing drugs to relax the muscles.

When packing equipment and samples, due regard must be paid to the weight of the units. 0.05 m^3 of stone material packed in newspaper weighs about 50 kg. This is all that two persons may safely carry for short distances.

See the Danish Working Environment Authority guide for lifting, pulling and pushing - click here (only in Danish).

Appendices

Appendix A: Field Leader's/Project Leader's responsibility in relation to safety

Regarding safety, the Field Leader / Project Leader is responsible for:

1. Conducting a risk assessment and preparing a contingency plan. Greater risks demand more thorough and comprehensive evaluations.
2. Ensuring a thorough instruction of all participants in all relevant safety-related aspects of fieldwork, if possible before departure.
3. Ensuring that participants have completed all relevant courses/training.
4. Making sure that fieldwork is carried out in a sound manner in terms of health and safety.
5. Changing plans if circumstances dictate that the fieldwork cannot be carried out in a safe manner under the conditions given.
6. Being aware of insurance-related issues.
7. Collecting the registration forms (app. V1 and V2) from all participants. The forms must be submitted to department personnel, such as a department or section secretary together with the other requested information relating to the fieldwork (app. V3). A copy must also be provided to the expedition.
8. If any exceptions to the rules as describe d in this manual are to be made, the Project Leader must ensure that they are discussed in the department's local health and safety committee (IAMU) The IAMU will deliver a subsequent recommendation via work and safety manager Mette Høgsbro mmh@science.ku.dk for the deanery to sanction.
9. Assigning responsibility for security – clearly and unambiguously – so that the field work group is always aware of who is responsible, whether the group consists of two or ten members, regardless of the trip duration
10. Communicating with relevant people outside the fieldwork group in case of an emergency. Relevant persons outside the field work group include insurance companies, authorities taking care of medical evacuation or Search and Rescue, medical advisors etc. In case of severe illness/injuries or death of fieldworkers, it is the responsibility of the relevant Head of Department to make sure that relatives are informed. The Field Leader/Project Leader then informs the Head of Department who informs the relatives. In case the press becomes interested in an emergency situation, all communication with the press shall go through the Head of Department. The Field Leader/Project Leader informs the Head of Department, who informs the press.
11. Having equipment available, as well as procedures for equipment maintenance.
12. Reporting work related injuries to University of Copenhagen. The Head of Department or responsible manager must be notified about the accident. An incident report form can be found here.

On the next page you'll find a checklist developed by UNIS (University Centre in Svalbard) of items to be discussed by field party participants prior to fieldwork. Ideas for fieldwork participant instruction can be found in the list. Use it as inspiration.

The following issues have been discussed and agreed upon with the field party:

✓	**Health issues**	✓	**Environmental issues**
	Self-declaration on health condition filled out by everyone		Disturbance of wildlife special to the area and time period.
	Appropriate clothing and personal equipment		Waste disposal
	Nutrition, food and drinks		Protected areas
	List of "next of kin"		Cultural heritages
	Alcohol / medication		Location of camp sites
	Rabies		Flora
	Parasite: "Echinococcus multilocularis"		Need for special applications?
	Safety issues in general		**Field camp**
	The field party's route		Tents
	Weather forecast for the period		Small cabins
	How to handle bad weather situations		Fire protection
	Travelling over / movement on sea ice		CO poisoning
	Travelling over/ movement on glaciers		Polar bear protection
	Travelling on/ movement on mountain sides		
	Travelling in/ moving in areas exposed to ava-lanches		**Organisation and responsibilities**
	Encounters with dangerous animals		Leadership and responsibilities
	Routines regarding fire arms and pyrotechnics		When to report back to SCIENCE – and what to report back to SCIENCE
			Reports on accidents or near accidents
	Travelling / movement on melted Tundra		Report when travelling to and from destination
	Crossing rivers		Emergency equipment
	Means of communication		Preparing equipment before fieldwork
	Communication routines		Restore / cleaning equipment after fieldwork
	Distribution of safety equipment in the field party		
			Special operations
	Transportation		Diving
	Snow scooters		Handling heavy equipment
	Small boats		Handling heavy or dangerous machinery
	Large vessels		Use of winch or similar
	Helicopter		Handling chemicals
	Car		Use of toxic materials
	On foot /ski		Need for special safety analyses

Appendix B: First aid and medicine list

First aid:
Below is a list of treatments for different injuries. You can use these treatments as first aid, but always contact a medical doctor when someone is injured/ill.

Injury	Treatment
Abdominal cavity injuries	• The patient should lie in a supine position – nothing to drink. • Contact a medical doctor.
Acid burns	• Remove the injured person from the corrosive area. • Flush with water.
Avalanches and landslides	• Dig out the buried individual. • Begin with artificial respiration as soon as the head is free. • Contact a medical doctor.
Bleeding	• Elevate the bleeding area. • Have the injured person lie down. • If blood is spurting from the wound, see "Bleeding, arterial" • Contact a medical doctor.
Bleeding, arterial	• Immediately press your thumbs directly on the wound. Lay down the injured person. • Contact a medical doctor.
Bleeding, venous	• Elevate the bleeding area. • Lay down the injured person.
Broken bones	• Use a sling for arms. • For legs, have the injured person lie down and support the fractured area with pillows or blankets. • Contact a medical doctor.
Burns	• Immediately flush with cold (not icy) water directly from a tap or a river. • Keep on flushing for at least a half an hour.
Dog bites	• Wash the wound and dress it with a sterile bandage. • Contact a medical doctor. ○ Has the dog been vaccinated against rabies?

Drowning	• Save the drowning person without exposing yourself to danger.
	• Apply first aid as soon as you have pulled the drowning person out of the water.
	  • Victims with a body temperature below 30°C appear dead, but may be revived by warming them in a bathtub with water at 34°C for 5-10 minutes, then raise the water temperature to 40-45°C. If a bathtub or warm water are not available, remove the wet clothes and wrap blankets or dry clothes around the victim including his/her head, preferably with a layer of plastic innermost.
	  • Conscious victims should drink warm, sugary liquids - NOT ALCOHOL!
	• Contact a medical doctor.

Electrical accidents	• Turn off the electricity. • Apply first aid to unconscious individuals.
Exposure	• Protect from further chilling by wrapping up the patient in a blanket.
Frostbite	• Use skin against skin to warm up parts of the body that are frostbitten.

Injury	Treatment

	• Never rub white (frostbitten) areas of skin – this only worsens the injury.
	There are two degrees of frostbite, first and second degree. The degree depends on the depth and size of the injury:
	• *First-degree* frostbite is only superficial.
	  ○ After the skin thaws, it becomes red and the area may have changed slightly. The symptoms will disappear completely when it is treated.
	• *Second-degree* frostbite is deep.
	  ○ The skin becomes white and hard, and it is extremely painful when it thaws. In cases of second-degree frostbite, the best solution is to submerge the limb in water that is 42-44 °C. However, this treatment can be so painful that it is necessary to seek professional medical attention before starting.

Gunshot wound to the lungs	• Immediately cover the wound – but not airtight. • Dress the wound, allowing for air inflow. • Place in a lateral position on the side that has been hit. • Contact a medical doctor.
Gunshot wound to the stomach	• Lay the injured person down on their back to relieve any pressure. • Cover the wound(s) with sterile bandages. Do not give anything to eat or drink. • Contact a medical doctor.
Gunshot wounds to arms/legs	• Expect bone lesions, support as you would a broken bone. • Use sterile compresses. • Contact a medical doctor.
Heimlich maneuver, removing objects from airways	*Only to be used in extreme cases* as it may cause damage to internal organs. If Heimlich is used, a medical doctor must be consulted afterwards! • For a conscious person who is sitting or standing, position yourself behind the person and reach your arms around his or her waist. • Place your fist, thumb side in, just above the person's navel (belly button) and grab the fist tightly with your other hand. • Pull your fist abruptly upward and inward to increase airway pressure behind the obstructing object and force it from the windpipe. • If the person is conscious and lying on his or her back, straddle the person facing the head. Push your grasped fist upward and inward in a maneuver similar to the one above.
Hypothermia	Hypothermia is a medical condition in which the body loses heat faster than it can produce; it is characterized by an abnormally low body temperature. The *main symptoms* are trembling, apathy, withdrawing from the group, incessant complaining followed by mental confusion and irrational behavior. Individuals suffering from hypothermia must be treated with care – and possibly for physical shock. If someone is suffering from hypothermia: • Remove all wet clothing. • Place the individual in dry – but not heated – clothing / blankets / sleeping bags. ○ Remember that the arms must be outside the first layer of wrapping.

Injury	Treatment
	• Place a hot water bottle over the heart region and give the person hot drinks, preferably with high sugar content. ○ You may also serve the patient easily digestible hot food. The idea is to get the body to start producing its own heat. • Make sure that the individual does not move around too much.
Intracranial hemorrhage	• This happens when a person with a concussion later loses consciousness. • Apply first aid
Rib cage injuries	• Immediately cover the wounded area – but not airtight – with your hands. • Dress with a bandage. • Place the patient in a lateral position on the wounded side. • Contact a medical doctor.
Scalding	• Immediately flush with cold (not icy) water directly from a tap or a river. • Keep on flushing for at least a half an hour.
Sprained or dislocated joints	• Support the twisted joint using a sling for arms. • For leg injuries, lay the injured person down and support the joint. • Contact a medical doctor.
Throat, foreign object	• Remove the foreign object. • Give the patient five slaps on the back. • If that doesn't help, perform the Heimlich maneuver (see above).

First aid emergency action principles

EMERGENCY PROCEDURES

Principal Procedures for Life Support – ACCIDENT

	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? • Examine the capillary response • Assess the skin colour and temperature • Check for haemorrhage • Re-assess ABC • Contact Project Leader/Field Leader
D	**Disability**	• Assess the level of consciousness • Examine pupil reaction to light (close and re-open eyelid) • Assess if treatment can continue on the site of injury
E	**Expose**	• 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 seconds

Medicine

No medicine should be used without a being ordinated by a medical doctor. If the fieldwork takes place in the inhabited parts of Greenland, you should therefore contact the local hospital for prescription of the medicine. This is not possible for field work taking place in remote parts of Greenland. The group should therefore bring an assortment of medicine for use in case of illness. The list below suggests what to bring. However, special needs of the field workers might demand special medicine to be added to the list. The medicine brought into the field is only to be used after consultation with a medical doctor. Therefore, if somebody gets ill or injured, you should immediately contact a doctor (through the relevant insurance company), tell about the symptoms/injury, inform what medicine you have and then ordinate medicine in accordance with the advice of the medical doctor.

It is possible to have normal doctors ordinating the medicine to be used during an expedition. Please remember the prescription if you transport the medicine across borders. Please also ask your medical doctor to write a short note saying what the medicine is meant for to avoid being prosecuted for taking drugs across borders.

The list below was developed for GEUS by Ole Bisgaard-Frantzen, military doctor for the Sirius patrol and GEUS' medical consultant. The contents of a field team's medical box consist of two small first aid booklets and the following drugs and dressings:

Drug	Purpose	Dosage	Comments
PAINKILLERS (LISTED BY INCREASING STRENGTH)			
PamolR 500 mg tablets ***Paracetamol***	Ordinary painkiller	1-2 tablets for weak to moderate pain. May be repeated after 2-3 hours.	
TemgesicR * 0.2 mg tablets ***Buprenorphin*** *	For severe (unbearable) Pain	1 tablet dissolved under the tongue. May be repeated after 3-4 hours.	* Morphine — requires medical prescription **Δ** Induces drowsiness. **Δ** May induce nausea and vomiting. Included in the emergency pack.
ANTIBIOTICS			
Ciprofloxacin HexalR 500 mg tablets ***Ciprofloxacin***	To treat serious infection, e.g. pneumonia, appendicitis, diarrhoea (coli)	1 tablet a day for at least 5 days, even if symptoms have subsided.	Requires medical prescription Can be taken even if allergic to penicillin.
SKIN OINTMENT			
DiprodermR 0.05 % cream ***Bethamethasondipropionat***	To treat irritated red skin or rash (eczema) or allergy to mosquito bites	Apply a thin layer twice a day	NOT to be used as a precaution, only as a treatment.
FlamazineR cream 1 %. ***Silver sulfadiazine***	To treat burns	Apply a thin layer	For severe burns, e.g. of the hands, apply and cover with a plastic bag.
Rescue creme *bl.a. Klorhexidin*	For disinfection and cleaning of smaller wounds		

Drug	Purpose	Dosage	Comments
STOMACH PAINS			
ImodiumR 2 mg tablets ***Lobromid***	Astringent, to treat diarrhoea	2 tablets immediately, 1 tablet per defecation	
DulcolaxR 5 mg tablets ***Bisacodyl***	Laxative, purging	1 tablet in the evening. Works next morning.	
KuracidR 200 mg tablets ***Ranitidin***	To treat acid stomach, symptoms of stomach ulcer.	1 tablet, up to twice daily	
EYE, EAR AND NOSE TREATMENT			
OxyprocainR 0.4 % Eye ointment.	To treat snow blindness or a foreign body in the eye	Apply inside the lower eyelid if you feel pain	Local anaesthetic. The eye must be protected against dust etc.
FucithalmicR 1 % Eye ointment	To treat infection of the eye	Apply inside the lower eyelid two times a day	Also for local infection, e.g. in the external ear
MISCELLANEOUS			
BuranaR 600 mg tablets ***Ibuprofen***	To treat swollen joints	1 tablet 3 times a day for minimum 4 days, even if symptoms subside	May give stomach pains – if so, stop the treatment and consider contacting a doctor.
Δ TavegylR 1 mg tablets ***Clemastin***	To treat allergic reactions, heavy fever etc.	1-2 tablets as required	**Δ** Induces drowsiness **Δ**
EpiPenR 0,3 mg autoinjector	To treat severe allergic reactions (anaphylactic shock)	Intramuscular injection into the lateral thigh	May be repeated as required
DRESSING AND INSTRUMENTS			
Instruments 2 sets of medical gloves 1 Surgical scissor 1 Splinter tweezer 1 Thermometer		**Dressings** 1 packet compression bandages 1 packet adhesive bandages (20 pieces) 1 roll Elastic tape 1,25 cm x 5 m 1 roll gauze bandage 8 cm x 4 m 1 roll elastic bandage 8 cm x 5 m Safety pins (big) 2 finger bandages	
PERSONAL FIRST AID KITS			
Adhesive bandages (individually wrapped) 1 Elastic bandage 1 HMAK 15 X 15 cm compression bandage **TemgesicR** * 0.2 mg tablets For severe (unbearable) pain. ***Buprenorphin**** Aluminium blanket		* Morphine — requires medical prescription 1 tablet dissolved under the tongue. May be repeated after 3-4 hours. **Δ** Induces drowsiness. **Δ** May induce nausea and vomiting.	

** Any use of or irregularity in connection with this drug must be reported to GEUS. It is the expedition leader or project leader's responsibility to inform about this in the evaluation report after fieldwork.*

*Text in **bold** and **italics** = active substances* **Δ** WARNING

Appendix C: Vaccinations

Dependent on where the field work takes place each individual fieldworker must be vaccinated to prevent dangerous diseases such tuberculosis, diphtheria and tetanus. The bacteria that causes tetanus is not present in Greenland, but vaccination is required, to avoid a tetanus outbreak while at work there.

If you expect to be working with dogs or foxes, you must be vaccinated against rabies. If you have not been vaccinated against rabies and happen to be bitten by a dog or a fox, seek professional help as quickly as possible. Rabies bites must be treated within 48 hours. If you are infected, and do not receive treatment, rabies is deadly.

Appendix D: Equipment

This appendix contains checklists used by other institutions. They should serve as checklist guidelines for specific projects. The checklists are grouped according to activities. The following checklists are available:

- First aid kits
- Small boats / rubber boats
- Snowmobile
- Basic equipment (for a two person team)
- Glaciers
- Emergency equipment
- Personal equipment

FIRST AID KITS (Greenland Institute of Natural Resources)	
On a field trip, the first aid kit should be stored in one of the field cases or kept by the field leader. A complete first aid kit should contain the following:	
For minor injuries	**For more serious injuries**
□ Antiseptic swabs □ Adhesive bandages □ Elastic bandages □ Adhesive tape □ Fingertip adhesive bandages □ Small compression bandages □ Elastic gauze bandages (to hold compresses on wounds or as a temporary support bandage) □ Medicine (from list in Appendix B)	□ Sling □ Gauze compression bandages □ Large compression bandages □ Scissors □ Tweezers □ Disposable latex gloves □ Heat-reflective survival blanket (to protect the injured person from cold, rain and wind) □ Medicine (from list in Appendix B)

SMALL BOATS/ DINGHIES/RUBBER BOATS (UNIS)

The following **safety equipment** shall always be brought along when using small boats/ dinghies / rubber boats:

- □ Survival suits for everyone on board (must be used)
- □ Emergency tool kit (see below for the content of this tool kit) that should be attached to the boat using a rope
- □ First aid kit
- □ If conditions require it (e.g. you are sailing in remote areas), an auxiliary motor must be brought along.
- □ Rifle (Stored unloaded, onboard the boat) for self-defence against polar bears.
- □ Signal gun or signal pen with corresponding cartridges
- □ Communications equipment
- □ Map and compass

- □ Fuel (petrol, paraffin, methylated spirit, engine oil)
- □ Depth finder (echo sounder)
- □ GPS

Spare parts and tools

The box containing the spare parts and tools for the boat shall be attached to the boat using a rope.

- □ Grapnel with 2 shackles and 20 m rope or chain.
- □ Sea anchor
- □ Repair kit (rubber boat):
  - metal stopper
  - manometer
  - valve washer
  - valve
  - aft valve
  - various patches
  - glue
  - whetstone
  - brush
  - sand paper
- □ Repair kit for the engine:
  - safety line
  - pins
  - 2 spark plugs
  - impeller
  - propeller
- □ Tools:
  - Hazet socket/drive set
  - knife
  - pair of tongs
  - a pair of nippers
  - screwdrivers: 1 large flat and 1 large Philips
  - spark plug key
- □ Funnel with filter
- □ Baler
- □ Pump (rubber boat)
- □ Rope

SNOWMOBILE (UNIS)

The following **safety equipment** shall always be brought along for any field operation where snowmobiles are involved:

- □ Emergency tool kit (See summary of contents in section 4.5)
- □ First aid equipment
- □ Communication equipment
- □ Rifle for self-defence against polar bears
- □ Signal pistol with ammunition.
- □ Map and compass
- □ Ice spike (if crossing over frozen water or sea)
- □ Bring along skiing equipment or snowshoes for at least one person in case of mechanical difficulties
- □ Glacier traverse kit (if crossing a glacier or sea ice).
- □ Glacier rescue kit

- □ Fuel
- □ Oil for the snowmobile

Numerous **spare parts** must always be brought along when taking longer trips. This includes a spare clutch drive belt, emergency strap, spark plugs for the scooter, pull bolt,

- □ A spare key for the snowmobile
- □ Spark plug key
- □ Combination screwdriver
- □ 5/16, 3/8, 7/16, ½, 9/16, 5/8, 11/16 and ¾", as well as two 17 mm wrenches.
- □ Combination pliers

The following is the **minimum clothing** recommended:

- □ Wool or silk underwear
- □ Layered clothing of wool or fleece. Cotton is not recommended.
- □ Snowmobile suit with hood and brim
- □ snowmobile glasses
- □ snowmobile gloves made out of leather
- □ hood and fur hat
- □ face mask
- □ snowmobile boots
- □ Scooter helmet

BASIC EQUIPMENT (for a two person team (GEUS)	
□ 2 lightweight tents □ 2 sleeping bags □ 2 sheet for sleeping bags □ 2 rucksacks □ 1 Iridum telephone with accessories (antenna, batteries) □ 2 lightweight insulation mattresses □ 1 tarpaulin (plastic) □ 1 water container or plastic bucket □ GPS and batteries for every team-member	□ 2 pieces of flourescent signal cloth □ Trip wires □ Fire extinguisher □ Smoke detector 1 medical box (see below) □ 10-15 l of kerosene/paraffin/JP-1, JP-8, JET-A1 or similar jet fuel* □ 1 kitchen box (see below) □ 1 office box (see below) □ 1 kitchen tent □ First aid kit
KITCHEN BOX	
□ Primus stoves Optimus 111 □ Set of cooking pot □ Frying pan □ Plates, mugs and cutlery □ Dish washing equipment	□ Small plastic bags □ 10 black plastic sacs □ 2 thermos flasks □ Various
OFFICE BOX	
□ Crayons, set □ Field notebooks □ Various paper pads □ Transparent paper pad □ Wulff stereo nets □ pencil cases (including commonly used colours)	□ 3 Sample docket books □ Spare battery pack (4x1.5 v. AA) □ 1 folding ruler (2 m) □ Duct tape (Danish: gaffatape) □ Araldite epoxy glue □ 2 heliographs □ Various

PERSONAL EQUIPMENT (GEUS)

FOOTWEAR AND RAIN GEAR

□ Durable leather boots with solid sole, extra boot laces and wax	1-2 pair(s)
□ Rubber boots (optional)	1 pair
□ Sneakers – nice to have dry shoes to use in the camp	1 pair
□ Water- and windproof outer-trousers (preferably Gore Tex or alternative membrane/ coating), brightly colored: orange, yellow, red	1 pair
□ Water- and windproof jacket (preferably Gore Tex or alternative membrane/coating), bright colors: orange, yellow, red	1

CLOTHING

□ Long underwear (shirts and tights – polyethylene or woollen inner layer)	2-3	□ Down or fibre jacket (off-season or high altitude, brightly coloured: orange, red, yellow)	1
□ T-shirts, long sleeves	3	□ Light socks	5 pairs
□ Underpants – short	5 pairs	□ Hiking socks, thick woollen	5 pairs
□ Underpants – long	1-2 pair(s)	□ Pyjamas or t-shirt for sleeping	1
□ Working trousers (durable outer layer)	2-3 pairs	□ Fleece or Powerstretch (light but warm middle layer)	2-3
□ Durable working shirts	3	□ Hiking gaiters	1
□ Belt	1	□ Sweaters, at least one woolen	2

MISCELLANEOUS

□ Toiletries including lip balm,	□ alarm clock,
□ suntan lotion,	□ literature, music etc.
□ towels,	□ Sleeping bag, -10 degC or lower
□ knife,	□ Fleece liner for sleeping bag
□ sewing kit (needle and thread),	□ Ear gear, fleece or rubber
□ dark sunglasses,	□ Face mask, (for snowmobile)
□ passport,	□ Personal medicine
□ 1 pair of camp trousers,	□ Solid hiking boots
□ field hat,	□ Polar boots, including extra liners, preferably 2 pairs
□ warm cap or sun hat with broad brim,	□ camera with extra batteries,
□ extra glasses,	
□ warm gloves,	
□ thin inner-gloves	

GLACIERS and MOUNTAINS (UNIS)

- □ Crampons
- □ Ice axe
- □ Rope
- □ Avalanche beacon
- □ Ski/boots/poles and proper clothing

"Glacier rescue kit" - UNIS:

The "Glacier rescue kit" is split in two separate boxes and should be carried in the front and at the back of the snow scooter column.

- □ 1 Rope, 9mm, 100m, static.
- □ 1 Rope, 11mm, 50m, static.
- □ 1 Rope, 6mm, 6m, static.
  - Search probes (240cm)
- □ 2 Rope clamp / grab, Jumar
- □ 1 Rope clamp / grab, croll
- □ 1 Descender, figure 8.
- □ 1 Descender, sticht
- □ 6 Locking gate carabiner
- □ 5 Carabiner
- □ 6 Sling, 120cm.
- □ 1 Harness.
- □ 1 Chest harness.
- □ 1 Rope for connecting harness.
- □ 1 Rescue harness, triangle.
- □ 1 Ice axe
- □ 2 Helmet
- □ 2 Headlamp with spare battery
- □ 6 Ice screw.
- □ 2 Swing side pulley
- □ 1 Swing side double pulley

Emergency tool kits

Emergency tool kits should always accompany field trips involving snowmobiles, small boats or helicopters. The kits are sealed and should only be deployed in emergency situations.

Familiarize yourself with the contents of emergency tool kits before the start of the fieldwork/excursions, especially for the tent, stove and the trip wires.

Always carry the "glacier rescue kit" on snowmobile field trips that cross glaciers or sea ice.

Emergency tool kit, winter, large: (5 people to survive 3 days) (UNIS)
□ 1 Tent
□ 3 Tyin 200 sleeping bags
□ 2 Sleeping pad
□ 1 Maglite flash light with 2 batteries
□ 1 Snow shovel
□ 1 First aid kit
□ 1 Gasoline stove (Will burn about 18-20 hours)
□ 1 Primus casserole
□ 1 Primus frying pan
□ 4 Boxes of matches in watertight container
□ 1 Wind safe matches
□ 2 Plastic cups
□ 1 Trip wire kit with 4 flares
□ 2 Wind tight bag
□ 6 Packs of 24 hours emergency rations.
□ 1 Box, drinking powder.
□ 2 Avalanche search poles

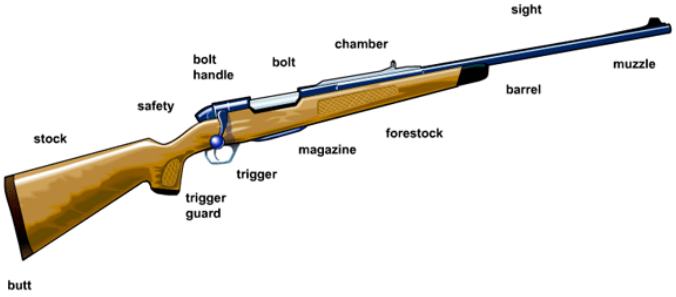
Emergency tool kit, winter, small: (3 people to survive 2 days) (UNIS)
□ 1 Tent
□ 1 Wind tight bag.
□ 1 Sleeping bag
□ 2 Sleeping pad
□ 1 Gasoline stove type.
□ 1 Litre fuel
□ 1 Casserole
□ 2 Plastic cups
□ 1 Box of matches
□ 2 Packs of 24 hour emergency rations.
□ 1 Trip wire kit with 4 flares
□ 1 First aid equipment
□ 1 Snow shovel
□ 1 Avalanche search pole
□ 1 Box, drinking powder.

Emergency tool kits, summer: (2 people to survive 2 days) (UNIS)
□ 1 *Fjellduken*, isolated wind tight bag
□ 4 Sitting pads
□ 1 First aid kit
□ 2 Boxes of matches/wind safe matches in watertight container
□ 1 Trip wire with 4 flares
□ 4 Packs of 24 hours emergency rations
□ 2 Plastic cups

UNIS has developed this form, which can be used as an emergency equipment checklist

✓	**Equipment**	**Number**	**Remarks**
	Strong rifle, cal. .30-06 or similar (never bring different riffles with different ammunition types/calibers – risk of confusion might be fatal.		Front and back of the group
	Ammunition cal. .30-06 or similar appropriate for riffle		
	Signal pistol		Front and back of the group
	Signal ammunition		
	Satellite telephone		Carried by the excursion leader
	Emergency beacon		Carried on the body by the excursion leader
	VHF radio		Front and back of the group
	Spare battery pack for radio		
	Battery charger for VHF radio		
	Avalanche search beacon		Everyone
	Glacier rescue set		Front and back of the group
	Emergency box 3 pax (winter)		Front and back of the group
	Emergency box 5 pax (winter)		Front and back of the group
	Emergency backpack 2 pax. (Summer)		
	Scooter rep set		At the back of the group
	Ice rescue spike		Everyone
	Survival suite		Everyone
	Map		
	Compass		
	GPS and spare batteries		

Appendix E: Use of weapons



A weapon is required for all fieldwork in any part the Arctic where dangerous animals are present. These mainly include polar bears and muskoxen, but might also include foxes, wolves and walruses. Polar bears are generally found throughout Greenland, but they are most common along the coasts of East Greenland, North Greenland and the southern reaches of West Greenland. Polar bears are also very common on Svalbard. Muskoxen inhabit North and Northeast Greenland as well as the area between Kangerlussuaq and Ivittuut, on Greenland's west coast.

Any carrier of a weapon *must have completed a firearms training course before leaving for the field.* Those not carrying a weapon need not. *It is recommeded that the training course has been taken within the last year, and people holding hunting licenses or having military training may not be exempted from the course*.

Riffles should always be used with the correct type of ammunition. It can be deadly dangerous to use wrong ammunition. It is therefore strongly recommended to have only one type of riffles to be used with only one type of riffle ammunition. The University Center on Svalbard has for a long time been using stainless steel riffles (either Ruger M77 Hawkeye 30-06 SPRG or Ruger M77 Hawkeye ark II 30-06 SPRG) with 30-06 ammunition. This riffle has been tested under different extreme conditions, and all students who have attended courses on Svalbard have received training in handling and use of this type of riffle. It is therefore strongly recommended to use this type of riffle. As for ammunition, it is recommended to use expanding 30-06 hunting ammunition. The bullet should have a weight of at least 11.5 gram, and the impact should be at least 2,700 Joule on a 100 meter distance. There are many different brands of ammunition, but a well-assorted weapon manufacturer can help purchasing the correct type of 30-06 ammunition.

Rifles and signal pistols are recommended for self-defence. Never use shotguns or pistols/revolvers unless for very specific purposes. Shotguns are not as efficient as rifles and much more dangerous if handled incorrectly. Rifles/pistols/revolvers/signal pistols are very dangerous in the hands of an inexperienced user.

The use of any weapon demands tremendous care and responsibility. A hunting rifle is a dangerous weapon and should always be regarded as if it was loaded.

The Field Leader is responsible for ensuring that the weapon is fully functional at all times. A defective firearm can cause fatal injuries.

When a rifle or shotgun is stored (either at a field station or at a university) it must be kept in a locked gun safe! The bolt of the rifle must be separated from the rifle. Remember to mark the bolt with the correct rifle number (found on the barrel) to ensure the right bolt goes with the rifle.

General rules

- Never point a weapon at other people.
- Always keep the muzzle pointed in a safe direction.
- You should treat all weapons as if they were loaded!
- Firearms must be unloaded when not actually in use.
- During fieldwork the rifle should either be ‘half-loaded’, i.e. with cartridges in the magazine but not in the chamber, or not loaded, i.e. you carry all cartridges outside the rifle (in a pocket, your bag or anywhere else where you can find them).
- When you enter inhabited areas you should carry the rifle with an open chamber, i.e. with the bolt pulled back.
- Do not rely on your gun’s "safety" mechanism.
- Only rely on the checks that you have done personally.
- When you are handed a rifle, immediately check if the chamber is free of cartridges (open the chamber, check that all cartridges are in the magazine; look through the barrel to ensure that there are no cartridges in the barrel; press down the upper cartridge in the magazine and close the magazine without the upper cartridge entering the barrel; point the rifle vertically upward and pull the trigger.
- Never bring a loaded or half-loaded weapon into a car, boat, house or cabin.
- Always carry a rifle with a strap over the shoulder and the barrel pointing upwards.
- Never use the safety lock of the rifle. It is not relevant if you just make sure that the rifle is either half-loaded or not loaded.
- Weapons and ammunition should always be stored in separate places. When you come back from the field, the first thing to do is to bring the rifle back to where you took it from. Remove all cartridges from the rifle, take the bolt out and store rifle and bolt separately.
- Avoid damaging the rifle.
- It doesn't take much to dent the barrel of a shotgun or budge the rifle's scope, thus throwing off the adjustment. Avoid hitting or banging into the weapon as much as possible, as this can also trigger an accidental shot if the weapon is loaded.

Appendix F: Animals

Encounters with wildlife are common when working in Greenland. In general, if you ignore them they will ignore you. Most animals are very rarely aggressive if unprovoked. In North and East Greenland and in the southern part of West Greenland, rifles are relevant for self-defence. The same goes for the entirety of Svalbard or parts of Canada, Alaska and Russia. In the field, weapons should be carried so that they are easily accessible, and they should be stored in sleeping tents at night. If a muskox, polar bear, walrus etc. is killed in self-defence, the nearest police station and the public authorities must be notified as soon as possible.

Safety in areas with dogs and foxes

Be aware that dogs who are untethered are normally more "inoffensive" than dogs who are tied up. Pay special attention to dogs who behave in an uncharacteristic manner. In Greenlandic towns it is mandatory to tie up dogs older than a half a year. However, it might happen that dogs break their chains.

If there are many foxes in the area, you should be on the watch for foxes with abnormal behaviour.

Follow these rules:

- Bring along a good solid walking stick of the right length that can be used to persuade attacking dogs that they would be better off finding other quarry.
- Try to ignore the dog. Do not look it in the eyes as this is a sign of dominance and the dog will try to defend itself.
- Avoid smiling at the dog, because baring your teeth will be perceived as a threat by the dog.
- Avoid showing fear, as this will be perceived as a sign of weakness and a reason to attack.
- If you are attacked by a fox, you should try to kill it. It is probable that it carries rabies.
- Do not leave your boots outside to dry at night where foxes are known to be around. You may not have a boot in the morning

If bitten: If you are bitten by a dog or a fox, seek professional help as quickly as possible. Rabies bites must be treated within 48 hours. If you are infected and do not receive treatment, rabies is deadly.

Safety in areas with muskoxen

Muskoxen are particularly common in the area around Kangerlussuaq (Søndre Strømfjord) in West Greenland, close to Ivittuut in West Greenland, and in entire North and East Greenland.

There is generally no reason to be afraid of muskoxen. Muskoxen are normally peaceful animals that remain unaffected by the presence of humans, but you should not ignore or underestimate the risks. Muskoxen can be provoked to exhibit threatening behavior or even to attack in self-defense, especially if people venture too close to them.

Always bring along a flare gun as a means of frightening off the animal, and perhaps a rifle for emergencies.

If you do end up shooting a muskox, you are obliged to provide proof that the shooting was in self-defense.

Follow these rules:

- Do not camp near trails used by muskoxen.
- Always maintain a respectable distance between you and the muskoxen (>200 m) and be aware of their behavior.
- Never walk through a herd of muskoxen, and never place yourself between calves and their mothers.
- Exhibit calm and relaxed behavior to avoid stressing the muskoxen.
- When a muskox begins to snort, scrape its horns against its forelegs, scrape against the soil with a foreleg or a horn or produce a grunting noise, you have come too close. Slowly retreat in a calm manner and leave the animal alone.
- *You cannot outrun a muskox*, neither uphill nor downhill. It is natural for muskoxen to seek higher ground if they feel threatened, so do not cut them off from this possibility.
- Use a flare gun if a muskox comes too close. If a muskox attacks you, you may have to kill it in self-defense, in which case, you should shoot at the animal's upper torso area – never at its head.

Safety in areas with polar bears

Polar bears can be found all over Greenland. In the central West Greenland you are less likely to encounter a polar bear than in other parts of the country. Nevertheless, the likelihood of such an encounter has increased in recent years. Polar bears are primarily endemic to the permanent pack ice along the coasts around the Arctic Ocean, as well as North and East Greenland. They live predominantly on the sea ice or in areas within a few kilometers of the coast.

In the autumn, winter and spring, polar bears hunt seals along the edge of the ice, in proximity to open water and in areas where sea ice has been piled up. They also hunt seals in areas where the sea ice is thin or cracked, for instance, where there are high tidal cracks, or at the foot of glaciers. During the summer, polar bears can be forced to go on land when the sea ice melts. During such periods, they feed on birds, eggs and small mammals found along the coasts, beaches and nearby islands. They also feed on leftovers from other animals, including waste left by humans.

During the summer, polar bears can be seen wandering along the coast. With the reduced amount of permanent sea ice in the Arctic, an increasing number of polar bears have been observed on land during the summer (until ice once again covers the sea near the coast). Polar bears can also drift with the pack ice along the east coast of Greenland, around Kap Farvel, and up along the west coast – as high North as to Aasiat.

Precautionary behavior

- Never approach a polar bear. These animals defend their territory and may feel threatened by you.
- Do not hike alone if you are traveling in areas where there is a good chance of encountering a polar bear.
- Always move during daylight hours and be aware of your surroundings. Polar bears can be difficult to see.
- Make noise to convey your presence.
- Scan the horizon with binoculars at regular intervals.
- Avoid areas with limited visibility caused by jumbled sea ice, large boulders, driftwood or high vegetation.
- Keep your eyes open for tracks and bear scat.

Camping rules

- If you have a separate kitchen tent with provision, place it a distance of at least 100 m from the sleeping tents.
- Do not leave edible or strong-smelling things out in the open. Polar bears associate people with food as something interesting and potentially dangerous.
- Burn your rubbish in the morning. If a bear smells the smoke (often from many kilometers away), it will at least come to investigate during daytime hours. void camping on beaches or coastlines. Polar bears often travel along the coast.
- Never sleep outside a tent or hut.
- Use a tripwire around the camp. Remember that the alarm is not intended to frighten the bear, but to wake the people in camp.

If you encounter a polar bear

If you observe a polar bear that has not picked up on your scent, move away in a calm manner. Use a VHF radio or another mean of communication to warn your colleagues of the polar bear's presence and provide precise information on its location and direction of movement.

Polar bears are curious and often investigate foreign objects, smells or sounds. Always proceed with caution and evaluate the situation. It is important to use good judgment and common sense, and be familiar with the animals' behavior.

You may only shoot a polar bear in self-defense. You may not provoke a polar bear and "preventively" kill it. If you do end up shooting the animal, you are obliged to provide proof that the shooting was in self-defense.

You can encounter three different types of behavior: curious, hunting or defensive.

Curious polar bears

A curious polar bear is characterized by investigative behavior. The bear moves slowly and with frequent pauses, stands on its hind legs and sniffs in the air (bears that attack never stand on their hind legs). The bear holds its head up high, with its ears forward or to the side, moves its head from side to side, or attempts to catch your scent by moving crosswind and approaching you from a downwind position.

Give the bear a chance to detect you. Help the bear identify you as a human by speaking in a deep voice. You may want to slowly move upwind of the bear, so it can catch your scent. This is often sufficient to cause the bear to move away.

The bear must always have an escape route. If you can only come clear of the bear by moving in the same direction that it is headed, allow the bear to put distance between you. The best behavior to display when encountering a bear is to slowly move away from the animal while, at the same time, never losing sight of it. Remain visible for the bear and *never run from a bear*.

If the bear gets closer, demonstrate calm determination. This means that you remain standing and wave slowly up and down with your arms while you speak with a commanding voice. If there are a number of other people with you, move close together and create the largest possible visual object. If possible, seek safety indoors. Bears do not attack buildings. Instead, they investigate them, scratch at them and, in some cases, break into them if they can smell something edible – or out of pure curiosity. You have a good chance of chasing the bear away if you make a lot of noise.

If a bear gets too close, try to frighten it away with flares or a warning shot. But be careful not to shoot behind the bear or you may risk frightening it towards you. A rifle warning shot rarely has a deterrent effect. Furthermore, you should retain as many shots as possible, just in case you are forced to kill the bear. There will not necessarily be time to reload the rifle if the bear attacks.

If it becomes necessary to kill the bear, wait until you have a clear shot. *Aim for the upper torso* and try to avoid hitting the head. Remember that you are shooting in self-defense, so wait until the bear is close to you. *Keep on shooting* – even if you have hit the bear and it falls over.

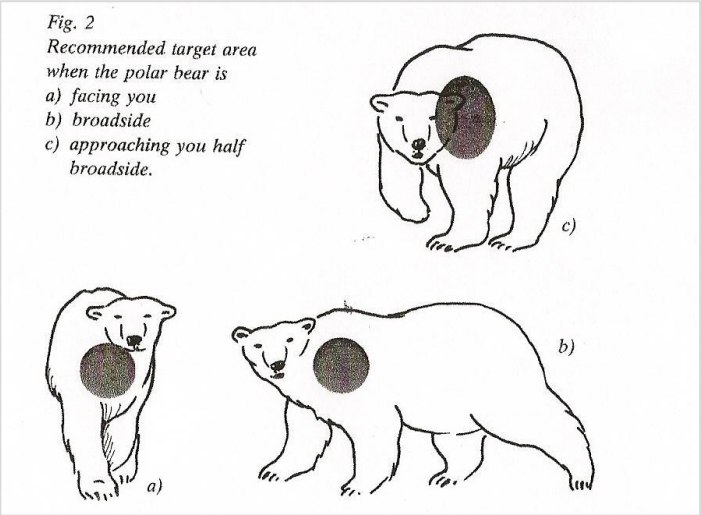


Fig. 2
Recommended target area when the polar bear is
a) facing you
b) broadside
c) approaching you half broadside.

Hunting polar bears

A hunting polar bear proceeds directly towards its "prey." It can follow you, or circle you or return after being scared away. It may do a mock attack, but that does not mean that it is bluffing. It may show signs of being wounded, old or thin. The above-mentioned rules generally apply here as well. Show calm determination. Do not try to run away from the bear. Move together in a tight group and try to frighten the bear away with noise. Use whatever you can find e.g. bang pots and pans together. Be prepared to use flares or warning shots to frighten away the bear and, if necessary, to shoot it.

Defensive polar bears

A defensive bear feels threatened because it has been surprised, its escape route is limited or it is a mother with cubs. It approaches directly, intense and undaunted, often with an open mouth and snarling noises. If you surprise a bear at close range that shows signs of being upset or threatened (makes panting, hissing, or growling noises, snaps with its jaws, stamps with its feet, stares directly at you or lowers its head with its ears pointed backward), do not run away. Slowly move away. Do not shout or make any sudden movements. Avoid direct eye contact. React in a non-threatening manner. Be prepared to use flares or warning shots to frighten away the bear and ultimately to shoot it.

Bears with cubs

Avoid getting between a mother and her cubs. If you find yourself in the vicinity of a bear with cubs, do not run. Gather everyone in the group and leave the area immediately. Be prepared to defend yourself if the bear attacks.

Fleeing and fighting a bear

If you are fleeing from a bear, you can try to drop gear and pieces of clothing. This will rarely stop a bear, but it can perhaps allow you to win a little time. It is not recommended to play dead. If you cannot escape from the bear, and it ends in a direct confrontation, kick it, hit it with your arms or use any available objects as a weapon – such as a firearm, stone, chunk of ice, knife, ski or ski pole – and try to hit on the head.

Appendix G: Crossing rivers

Crossing rivers by foot can entail big risks for a number of reasons. The water is cold and there may be strong currents and deep holes, which are not visible from the riverbank. At least two people must be present when crossing a river.

- Never cross a river if you are uncertain whether it can be done!
- Never go barefoot. You can lose all feeling in your feet and it can become difficult to maneuver where there are stones on the riverbed.
- Never attempt to cross a river during snow melt, because the river banks may be covered with water filled snow and you risk sinking through the snow.

Bring along a pole that can be used to work your way forward and give you support. Use either neoprene socks or gaiters over your boots. Waders may be used in special cases but only in combination with a life jacket.

It is recommended not to cross rivers or streams that are more than 1 metre deep and has a velocity of flow of more than 0.5m/s (throw an object into the water and check the velocity). Do not cross in bends and do not cross merging rivers where the river bottom consists of sand and silt only (risk of quicksand). A river bed of stones and gravel is to be preferred, but be aware of large stones close by where ones feet can be caught and become wedged. In delta areas it is recommended to cross the river or stream close to where it runs out into a sea or lake where it is less deep. Cross a river as early in the morning as possible. During spring and summer the water level tends to be lower earlier in the day due to lower snow melt.

For large rivers, you can use a rope (length: minimum 3 times the width of the river) tied around your waist during the crossing.

Before crossing rushing streams, remember to loosen the straps of your backpack so that it can be quickly jettisoned if you fall.

Appendix H: Crossing ice

It takes considerable experience to assess ice's capacity to bear weight when crossing a layer of ice over deep water. Thin sea-ice and fresh water ice react very differently, i.e., thin sea-ice is normally elastic, while fresh water ice is brittle.

Always use a survival suit when crossing ice presumed to be less than 20 cm thick.

Always use a rope if you are crossing ice as a group.

Always listen to the weather forecast and avoid attempting to cross long stretches of ice-covered water if there are predictions for strong winds or heavy snowfall, which can reduce visibility.

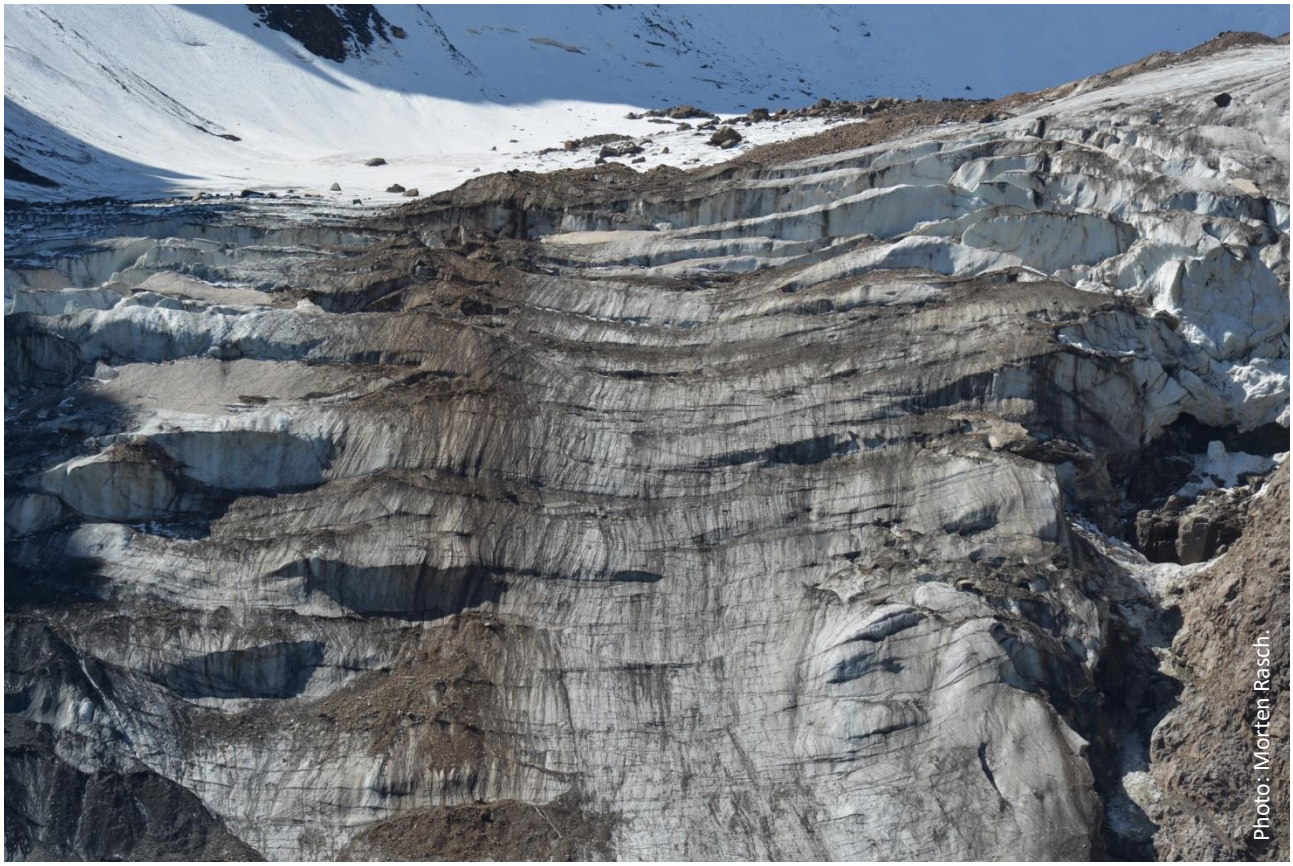
You may experience large temperature fluctuations in Greenland. Thus, it is important to be aware that it is not just the thermometer that tells you how cold it is. You should always check the weather forecast and calculate the wind chill factor using the chart in Appendix S.

Appendix I: Safety on glaciers

If the fieldwork involves working on glaciers or crossing glaciers, fieldworkers *must complete a course in glacier skills before work commences*. The crossing of glaciers may be done without having completed a course. In this case, the group should be led by an experienced mountaineer with the relevant certification for guiding groups upon glaciers. Necessary equipment must be obtained, including rope, crampons and ice axes.

You are only allowed to set foot on a glacier if you are secured with climbing ropes and bring along the appropriate emergency equipment.

Field workers who only work in the interior of the Greenland ice sheet (on the central Greenland plateau) are exempt from courses in glacier skills.



Appendix J: Climbing

Working on bird cliffs and climbing in general is a particularly dangerous activity. *Before climbing, the field worker must receive proper training*. Climbers must wear helmets and other necessary safety equipment (e.g. ropes and anchors).

Photo: Morten Rasch.

Appendix K: Helicopters

It is important to develop good helicopter habits. The pilots know far too many stories of those who did not. So follow the instructions from the pilot, as well as the instructions on the figure below. The pilot is responsible for you, but you could still cause an accident.

Safety guidelines for helicopters

- Keep calm when operating inside and in the vicinity of the helicopter. It is easy to get excited as the helicopter approaches. This may lead to uncoordinated and dangerous situations. There are small margins between success and failure.
- Remove all loose objects from the landing ground to make sure these objects are not whirled into the rotor or hit bystanders.
- The pilot should always be able to see you when manoeuvring near the ground.
- The pilot is in charge. He/she is the one that decides when you may enter and leave the helicopter. Thumbs up: come! Thumbs down: stop and wait! The pilot decides where the luggage should be stowed. He/she also decides what luggage may be brought along on the trip.
- Bend down when moving to and from the helicopter. The rotor may seem to move in a plane, but it may actually move quite some distance up and down. Do not move away from the helicopter until it has taken off when it lands in sloped terrain. Stay low and wait. When landing in sloped terrain it may be necessary for the pilot to land close to the passengers. Remain where you are and do not approach the helicopter until the pilot signals that it is safe to do so.
- Never move further back than the back door of the helicopter to prevent being hit by the tail rotor. Make a large detour around the tail end of the helicopter if it is absolutely necessary to move behind the aircraft.
- Never throw anything in the vicinity of the helicopter. This object may be sucked into the rotor creating a dangerous situation.
- Baggage and equipment that you are carrying must never extend higher than your head. Remember to carry long objects in a horizontal direction. Keep this rule in mind when you attach or detach exterior cargo.
- Be careful with the door. Do not leave a door half-open. The door should normally be closed during flight.
- Always use seat belts and ear protectors (preferably with intercoms) when onboard.
- Smoking and all sources of fire are not allowed onboard or in the vicinity of the helicopter.
- Use a ground cable when attaching exterior cargo.
- During an emergency landing:
    - Follow the instructions of the pilot.
    - Put on flotation aids if ordered by the pilot when flying over water.

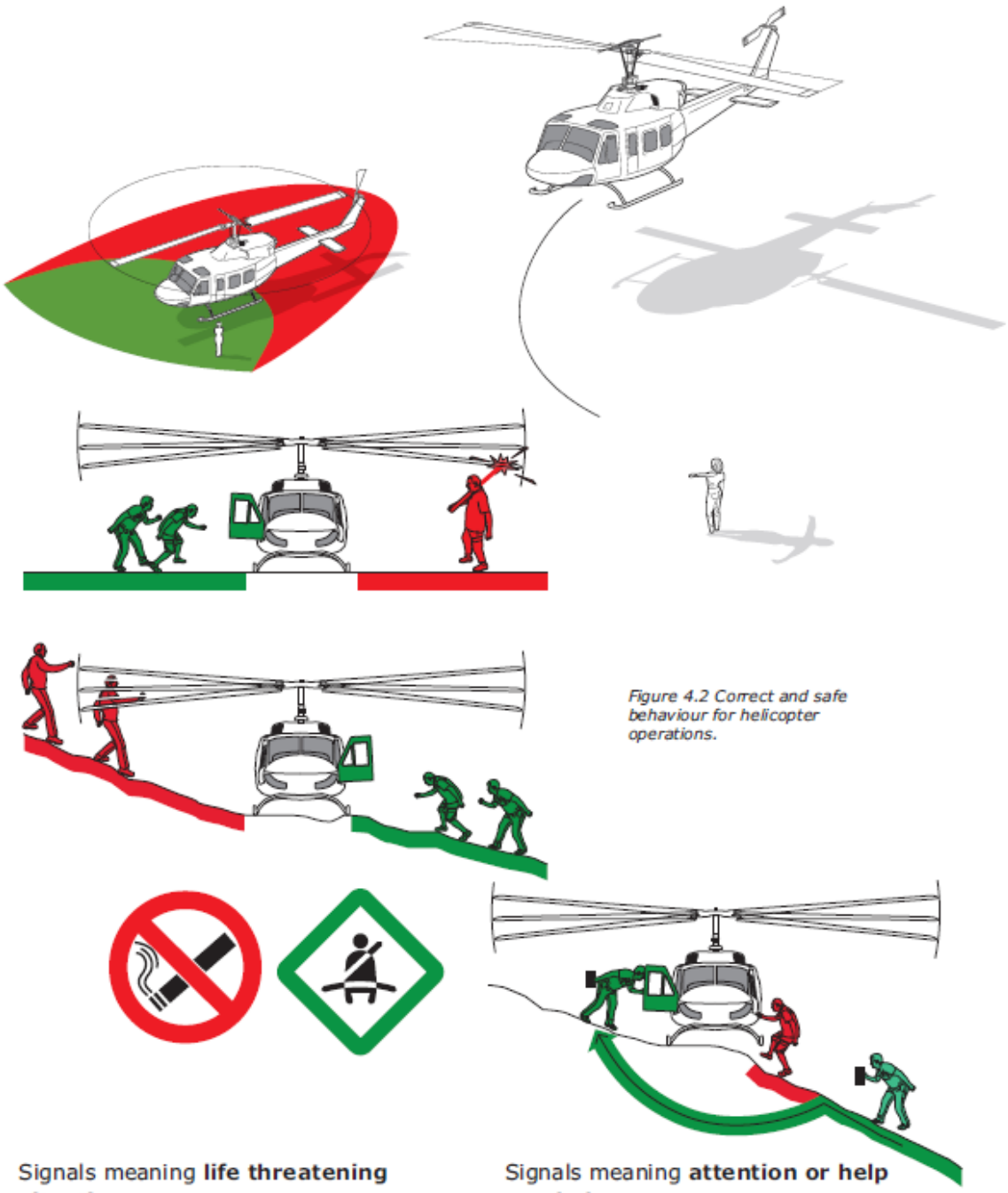


Figure 4.2 Correct and safe behaviour for helicopter operations.

Signals meaning **life threatening situation:**

- Red rockets/flares/light balls
- Mayday/SOS radio calls (at sea)
- Orange smoke

Signals meaning **attention or help needed:**

- Green rockets/flares/light balls
- Other radio calls
- Fire on the beach. In summer, smoke is more easily observable than flames.

Appendix L1: Using snowmobiles

Snowmobiles should be used with caution. They can be very fast, but the speed has to accord with the conditions, one's own driving experience and the any relevant traffic regulations. *The driver of a snowmobile must be well instructed.*

Follow these rules*:

- Personal use is not allowed
- Wear a crash helmet
  - You are legally required when driving a snowmobile in Greenland – even if you are a passenger.
- The dead man's switch must be connected to the driver.
- You may not open the engine compartment while the motor is running.
- For safety reasons, at least two persons should drive together on separate snowmobiles.
- Bring spare parts, tools and safety equipment.

*these general rules are different relating to use of snowmobiles in the interior of the Greenland icesheet, see appendix L2, the rest of the rules apply to all use of snowmobiles.

Equipment

In appendix D, you will find a list of relevant equipment for snow mobile use.

Before Starting the Snowmobile

Check the following:

- Remove snow in the air intake, engine room, and belt
- Full tank of fuel and oil (for two-stroke-engines)

- Accelerator moves freely in and out
- Ski and belt are not frozen to the ground. Lift the sled attachment of the scooter onto a petrol can and let the belt rotate freely a couple of times.
- Stand on the footplates and wiggle the snowmobile from side to side before starting. If the snowmobile still does not move, then lift the rear end of the snowmobile.
- Be aware if you will be driving a two-stroke or four-stroke snowmobile and use the right type of fuel.
- The engine should be sufficiently warm before driving. Let the engine run on idle sufficiently long such that the engine runs smoothly without requiring additional acceleration. When relevant (in case the engine is two-stroke) remember choke when the engine is cold.
- Never take the safety of existing trails across sea ice for granted. Obtain information about sea ice conditions.

Operating the Snowmobile

- Adjust your speed according to the driving conditions and your own skills. Keep an eye on other drivers in your team. Decide the order of who will be driving first and last.
- Lower your speed during low visibility (whiteouts or snowstorms). Stop the snowmobile under extremely difficult driving conditions. Wait and contemplate the situation. Return if possible. If this is not an option, set up an emergency camp.
- If you loose orientation: STOP and setup camp until you can orient yourself. NEVER keep driving!
- Follow existing scooter trails whenever possible.
- If the snowmobile rolls over, jump clear. Do not attempt to stabilize it by sticking your legs out. One of the most common injuries with snowmobile are broken feet or legs from a snow mobile that tilts to the side and traps a leg under the sharp side of the foot plate.

Exercise caution when venturing beyond the marked trails. This especially applies on glaciers, sea ice and in irregular terrain. The potential for avalanche is often high in lee sides, small river valleys and along steep overhangs.

- Remember to give the right away to pedestrians in towns and in the terrain. Do not disturb animals more than necessary.
- Driving under the influence of drugs or alcohol is strictly illegal and will be reported to the police.

Returning the Snowmobile

- Place the snowmobile on a pallet with a petrol can under the sled connection. Place in designated area. For long term storage, the rear end should be supported to take the weight off the track
- Remove snow, ice, and any other objects from the belt
- Inspect the body of the snowmobile and the belt drive systems (belt, guide wheels, shock absorbers, bolts, springs).
- Check the tightness of the drive belt.
- Control the clutch drive belt, attachment for the manifold, and the carburetor (for two-stroke-engines).
- Check the steering ski and the steering transmission system for damage.
- Make sure the fuel tank and any fuel cans are filled with fuel and that (two-stroke-engine) the oil tank is filled with oil or (four-stroke-engine) oil level of engine is correct..
- Cover the snowmobile with the snowmobile cover.

- Unload any sled that has been in use and bring all the field equipment to the right place.
- Tilt the any sled that has been used on its side and inspect it for damage (skis, attachments, shock absorbers, etc.)
- In case of damage, report to whom it may concern.

Loading of a sled

It is important that the load is stacked and secured correctly. This will minimise damage to the sled and load under transport, and prevent the load from moving around. The sled and not the snowmobile should carry the weight of the load. For sleds with pivot runners this is accomplished by placing the load above the shock absorbers on the sled.

- Always use heavy-duty lash-straps or ropes. Retighten periodically.
- Always place containers with fuel or other chemical fluids with the right side up. Be aware, that if the containers are not securely fastened on the sled, leaks in containers will form. Check for leaks regularly.

Appendix L2: Using snowmobiles in the interior of the Greenland icesheet

(on the Greenland plateau)

Follow these rules:

- Never drive a snowmobile before you have received a safety and operation briefing from trained users.
- Snowmobiles are only to be used for work - not for leisure.
- Never drive the snowmobile in second gear - only use first.
- Always park the snowmobile in neutral, and place it on the hotline by night.
- Never leave camp area without permission from the Field Leader.
- Always use the hook to attach a sled - never use rope.
- Never drive in "clean snow" zones designated by the field leader.
- Keep the safety string ("dead mans switch") attached to the snowmobile.
- Do not drive a snowmobile in the absence of surface contrast. You may not see obstacles or holes before too late.
- As all trips involve driving at slow speeds (<30 km/h) and the surface is flat and covered in deep snow, it is not a requirement to use a crash helmet. Focus instead on avoiding frostbite by wearing adequate head gear.

Appendix M: Safety on water


Photo: Morten Rasch

If working from a bigger ship, you will receive instructions from the crew. This appendix relates to smaller boats, dinghies, rubber boats and working from an ice-surface.

Smaller boats, dinghies, rubber boats or working from an ice-surface

Before the field work is initiated, the Project Leader or Field Leader must carry out a risk assessment, which takes into consideration factors such as the time of year when work is carried out, whether it is carried out at sea, on a large lake or a small lake, what the risk is that the ice will break or that somebody will fall into the water. Safety measures and preparedness are chosen on the basis of this risk assessment. When working from rubber boats, dinghies or from an ice-surface, it is the Project Leader or Field Leader's responsibility that field participants follow the rules for safe operations.

Operating a boat

If you are not familiar with operating the boat and the engine of relevance, you should be instructed in how to use it by an experienced operator. The driver of the boat should be thoroughly trained, preferably by the GEUS-course described in Appendix U. Familiarize yourself with the engine as well as the boat. One of the more serious risks is having engine failure. If you are totally unexperienced in relation to operating a boat, it is recommended that you attend a relevant course.

<u>The general rules to be followed are:</u>

- Never sail alone
- Always wear a life jacket. Life jackets are mandatory for University of Copenhagen staff and students when outside on both smaller and larger boats.
- With a few exceptions (see below), *wearing a survival suit is mandatory for University of Copenhagen staff and students when sailing in smaller boats, dinghies and rubber boats*.

- Use the dead-man button (the feature on the engine that automatically stops the engine, if you need to bring the boat to an immediate stop). It must be connected to the boat driver e.g. at the wrist.
- Always bring a satellite phone and a VHF radio. Mobile phones do not normally qualify as safety equipment for maritime activities in Greenland, but can be used in most of the inhabited parts of Greenland. Keep the satellite phone and/or the VHF radio in a water proof container, when not in use.
- Bring a first aid kit + signal flares (Appendix D).
- Bring along an emergency distress beacon – Personal Locator Beacon). The transmitter must be placed so it can be easily activated in the event of an accident.
- Bring the necessary equipment for an emergency camp (Appendix D)
- Bring the necessary equipment for the boat (Appendix D)
- The field workers must ensure that the motor and other equipment are working properly before they begin their trip.
- Nets, ropes and similar equipment must be kept in a plastic bag, box or other container to minimize the risk of field workers becoming entangled in them if the boat capsizes.
- The fuel tank may only be filled when the motor is turned off.
- It is strictly forbidden to smoke on board the boat while filling the fuel tank or switching fuel tanks.
- The outboard motor and the number of passengers must accord with the boat's size.
- The outboard motor must be secured with a chain or ropes.
- Bring sufficient fuel for the trip.
- Icebergs should be kept at a safe distance, as they are known to be unstable and capsize from time to time. Also keep at a safe distance from calving glaciers.
- A minimum of two people must be on board if work is to be done from the boat.
- You must always use a lifeline when traveling in remote areas.
- Control the air pressure of the rubber boat on a daily basis when out in the field.
- Inflatable boats must have a minimum of two air chambers.

Life-jackets and survival suits

The danger of falling into very cold water is easily underestimated. In 0-5°C cold water of you will be unconscious after 15-30 min and drown if not wearing a life-jacket and it is only possible to survive for 30-90 min before hypothermia causes death. A proper survival suit can significantly prolong the time spend in cold water before hypothermia kicks you of.


Photo: Kirsten Christoffersen

Life-jackets are mandatory in Greenland for participants working from zodiacs or small boats. The use of life-jackets cannot under any circumstances be deviated from. *Life-jackets are also mandatory when working from ice-surfaces.*

It is KU's official position that users of smaller boats, dinghies and rubber boats shall always wear survival suits. It is also mandatory to wear a survival suit during work on deck on larger ships. Survival suits should

ALWAYS be used correctly, i.e., fully zipped; falling into the water with an unzipped survival suits has the opposite effect of its purpose: It gets filled with water and you risk drowning.

There are three instances in which participants can decide to refrain from using survival suits, if they consider it to be safe to make such decision. In both cases, operations should take place at a low speed, in good weather and under optimal sea and sailing conditions. The two instances are:

1. Operations taking place so close to the coast that the employee would be able to bring themselves to land, if they should fall overboard. Survival suits should be onboard the zodiac/boat at all times and be ready for use.
2. Assisting in transportation operations between base ship and shore.
3. When working on small lakes in the summer if the field leader finds this acceptable on the basis of a risk assessment. When working on larger lakes it will often be relevant to follow the same safety measures as the ones applied at sea.

Man overboard

<u>The following rules are important in case of an accident:</u>

4. Avoid panic.
5. Move around as little as possible in cold water to minimize heat loss.
6. Turn the boat away from the wind (wind and sea coming in from the back).
7. If possible, assign a person to only keep track of the person overboard.
8. Turn the boat to face into the wind, reduce speed, and place the boat 1-2 meters down wind of the person.
9. Disengage the motor (idle). Help the person back on board. If practical, switch off the motor and use the propeller as a staircase.

<u>Once out of the water:</u>

- Victims with a body temperature below 30°C appear dead, but may be revived by warming them in a bathtub with water at 34°C for 5-10 minutes, then raise the water temperature to 40-45°C. If a bathtub and warm water are not available, remove the wet clothes and wrap blankets or dry clothes around the victim including his/her head, preferably with a layer of plastic innermost.
- Conscious victims should drink warm, sugary liquids - NOT ALCOHOL!

Outboard motors

- Only use the fuel type recommended for the motor.
  - Ensure that all fuel tank(s) contain this type of fuel.
- Before you fill the fuel tank of a two-stroke engine:
  - Know the correct type of oil to mix with gasoline.
  - Know the correct proportional mixture of gasoline and oil.
  - Make sure there are labels on the spare tank with information on whether the gasoline is mixed or unmixed.
- For longer boat trips, bring a full spare tank of gasoline.
- At least one person on board should be able to operate the motor in a competent manner and to perform simple troubleshooting and change the spark plugs.
  - Bring new spark plugs and a spark plug wrench for the outboard motor

Troubleshooting

Letters in list refer to table below.

A. Motor will not start.
B. Motor runs unevenly or stops.
C. Motor runs unevenly in neutral.
D. Motor will not go above a certain number of RPMs.
E. Motor becomes overheated.
F. RPMs are lower than normal.
G. No speed when the motor is put in gear.
H. The motor produces a great deal of smoke.

A	B	C	D	E	F	G	H	Possible cause
X	X							Fuel tank is empty.
X	X		X					Fuel line is incorrectly connected.
X	X	X	X		X			Fuel line is pinched or broken.
	X	X	X		X			Fuel filter is clogged.
X								There is a problem with the fuel pump
X	X				X			The fuel is contaminated or unusable
	X			X				Specified motor oil has not been used.
X	X	X	X		X			Spark plugs are fouled or malfunctioning
						X		Propeller and/or propeller cotter pin need(s) changing
							X	Too much oil in the gasoline mixture

Some of these problems can be fixed on the spot – others require assistance.

Changing spark plugs

- Take the hoods off the spark plugs.
- Unscrew the old spark plugs and install new ones.
- Put the spark plug hoods back on.

Starting a flooded motor

If a number of attempts are made to start an outboard motor (especially with an open choke), the motor can become flooded. Remove the surplus fuel from the motor by doing the following:

- Remove the spark plugs as described above.
- Dry the spark plugs.
- "Start" the motor a few times without the spark plugs installed.
- Install the spark plugs again.

Starting the motor with the emergency starting cord

The motor includes an emergency starting cord (roughly 1 meter long), which has a knot on one end.
If the cord used to start the outboard motor breaks or becomes defective in some way, you can start the motor with the emergency starting cord by doing the following:

- Remove all loose clothing and other objects a good distance from the motor.
- Remove the motor cover.
- Slip the knot on the emergency starting cord into the notch in the flywheel on top of the motor.
- Wind – never tie – the cord clockwise around the flywheel one or two times.
    - Motors with a starter engine may have a plate over the flywheel.
- Pull the cord to start the motor.
- Repeat if necessary.

Changing the propeller

Remember to bring a new propeller and cotter pin on boat trips.

Change the propeller if it is damaged, and change the cotter pin for the propeller/axle if it is broken.

It is best to change a propeller and cotter pin on land. If you have to change the propeller on the water, you should first remove the motor, so the propeller can be changed inside the boat.

On some propellers, there is an "inner" shear pin that sits firmly on the axle. It is important not to lose this inner pin, as the axle's rotation will then no longer drive the propeller. If the pin is broken, it will have to be replaced with a new one.

- Remove the locking cotter pin, which is held in place by a nut.
- Remove the nut that holds the propeller to the axle.
- Remove the propeller.
- If the shear pin is lost or broken: Slide the new onto the axle, screw on the nut and lock in place with the cotter pin.

Cleaning the fuel filter

The fuel filter is placed where the tube from the fuel tank enters the carburetor. Clean it by unscrewing it and removing any dirt that may have accumulated inside.

Cooling system

When the motor's cooling system is working properly, a stream of water shoots out at the rear of the motor. When starting a motor, and regularly during operation, you should check to ensure that this vital stream of water is there.

To remove water from the cooling system:

- Put the running motor in neutral.
- Pull the water intake above the waterline until all water has been pumped out of the cooling system. This is particularly important in freezing temperatures.

Appendix N: Diving and underwater work

When working under water, it is important to differentiate between snorkeling and actual diving: Snorkeling takes place on the surface using a snorkel. Diving normally refers to scuba diving, i.e. to dive with compressed air tanks.

- *All University of Copenhagen staff members, students or externals who are going to engage in diving must have a valid Nordic Professional Diving Certificate*.
- When diving with compressed air cylinders, Danish diving rules apply, i.e. there must be a trained line holder and resuscitation equipment, etc. Resuscitation equipment is rarely available in Greenland.
- Communication with the surface must be deployed during dives.
- Staff members may snorkel without approval from a certifying authority. When snorkeling, you should wear the necessary gear and in cold waters a suitable suit. Snorkeling may be dangerous, so a minimum of two people should snorkel together.

Appendix O: Using gasoline-powered high-voltage generators

The instructions below must be followed to avoid injuries, death and damage to property.

- A generator must be placed at least one meter away from buildings and similar structures. A generator may not be operated in enclosed spaces, because exhaust fumes contain carbon monoxide!
- A generator must be properly grounded to avoid getting a shock if it is hooked up to a defective machine or appliance. Connect a thick cable between the ground clamp and the ground connection on the generator (NB: Effective generator grounding can be difficult in Greenland)
- On the ice sheet, it is impossible to obtain ground connection. When no grounding is possible, make sure that ground and generator “zero” are connected at the generator. Then use leak current relays, that trip when a current flow between “zero” and ground. This modification should be made by qualified electricians.
- To avoid electric shock never touch a generator with wet hands, and do not use a generator outdoors in rain or snow, causing it to get wet. Protect the generator by placing it in a wooden box turned on its side.
- The gas tank may only be filled when the generator has stopped running.
- It is forbidden to smoke or use an open flame when filling the tank.
- When you start the generator, you should ensure that the alternating/direct current is turned off, and no devices are attached to it.
- The user must know how to quickly stop the generator, and not allow anyone to use it without proper instruction.
- Before starting the generator, read the manufacturer's user manual for the specific generator.
- Storing a generator:
    - Empty as much fuel as possible from the tank, remove the spark plug(s), clean it and reinstall it.
    - Pack the generator in a plastic tarp or, if possible, in a box (make sure beforehand that the box is completely dry).
- There should be at least two new spark plugs with the generator.
- Never connect more devices to the generator than it can power.

Appendix P: Portable propane/butane gas devices

Bottled butane gas is heavier than air and thus settles into low-lying areas. In spaces where you can smell gas, you must not use an open flame. You should open doors and windows to create air circulation, and close the valve on the gas bottle. In case of fire, remove all gas bottles if possible.

- All gas containers, including empty bottles, should be securely tied down when they are transported on roads or over rough terrain, and the valves should be properly closed and protected against damage.
- If you use butane gas in a tent camp for cooking, heating etc.:
  - Bottles of gas must be placed *outside* the tent.
  - Fire extinguishers must be within easy reach.
- You may only use bottled gas for producing heat and light in living containers and other spaces with a minimum size of 15 well-ventilated cubic meters.
- Appliances that use gas must be supplied with a thermoelectric ignition fuse.
- The appliances may only be connected to a gas bottle with a maximum size of 11 kg, and the arrangement may only include a gas cooker or a maximum of two gas appliances.
- Bottled gas should be treated with caution and due consideration should be given to the risk of fire and explosions caused by gas leaks.

Photo: Morten Rasch

Appendix Q: Operations of forklifts, tracked vehicles and snow blowers

RULES OF CONDUCT:

Tracked vehicles:

Tracked vehicles, such as Pistenbullys or Caterpillars, in operation are very dangerous. Several fatalities have been recorded. Therefore:

- Never walk behind a vehicle in operation - you never know when it reverses.
- When approaching a vehicle, make sure you get eye contact with the driver.
- Never step onto the vehicle tracks before the driver has indicated that the handbrake is on.
- As a passenger, never open the door before the driver has engaged the hand brake.
- Only trained personnel are permitted to operate tracked vehicles.

Forklifts:

- Never walk behind a forklift in operation.
- Never walk in front of a forklift carrying a load. The driver can not see you. Stay clear.
- Only approach a forklift after you have made contact with the driver.
- No passengers are allowed on forklifts.
- Forklifts may only be operated by personnel with government approved certificate.

Snow blowers:

- Several, very severe injuries have been recorded from accidents with snow blowers.
- Never walk above or in front of a snowblower in operation.
- Only trained personnel may operate snowblowers
- The manufacturers safety distance of the snow blower (in some cases up to 70 m) has to be maintained.

Photo: Morten Rasch.

Appendix R: Important telephone numbers

Relevant insurance companies	***Telephone/e-mail***
Europæiske Forsikring	+45 33 25 25 25 / info@env.dk
Kalaallit Forsikring:	[+299] 70 12 43 / kfa.erhverv@if.gl

Rescue coordination centres	***Telephone/e-mail***
The police authority in Greenland, Chief Constable Office	[+299] 32 14 48 / grpoliti@greennet.gl
Joint Arctic Command (Nuuk) Maritime Rescue Coordination Centre (MRCC)	[+299] 36 40 00 / mrcc-nuuk@mil.dk
Rescue Coordination Centre (RCC)	[+299] 84 12 01 / [+299] 84 11 35 / [+299] 84 10 34 / rcc@naviair.dk

Hospitals and Nursing Stations

Name		***Telephone no.***
Queen Ingrid's Hospital, Nuuk	National hospital	[+299] 34 40 00
Aasiaat Hospital		[+299] 89 22 11
Ilulissat Hospital		[+299] 94 32 11
Upernavik Health Care Center		[+299] 96 12 11
Kulusuk Nursing station		[+299] 98 69 11
Maniitsoq Health Care Center		[+299] 81 32 11
Qaqortoq Hospital		[+299] 64 22 11
Qaanaaq		[+299] 97 10 11
Qeqertarsuaq		[+299] 92 12 11
Sisimiut		[+299] 844211
Upernavik		[+299] 961211
Uummannaq		[+299] 951211
Ittoqqortoormiit (Scoresbysund)		[+299] 99 10 11
Tasiilaq Hospital		[+299] 98 12 11
Contact to all health care units		www.peqqik.gl/kontakt

University of Copenhagen	***Telephone/e-mail***
Dean John Renner Hansen	+45 35 33 20 01 / dekan@science.ku.dk
Fakultetsdirektør Henrik Zobbe	+45 30 59 03 16 / fak-direktor@science.ku.dk
Head of Section HR, Marianne Nielsen	+45 35 33 20 23 / mni@science.ku.dk
Head of Section, Education,Karen Rønnow	+45 28 75 42 58 / krw@science.dk
Legal adviser Susanne Tang	+45 51 70 01 30 /susta@science.ku.dk
OHS manager Mette Høgsbro	+45 28 78 38 27 / mmh@science.ku.dk

Head of Departement:	
BIO, Niels Kroer	+45 20 29 13 88 / nk@bio.ku.dk
NBI, Niels Obers (konst.)	+45 30 58 93 11 / obers@nbi.ku.dk
PLEN, Svend Christensen	+45 51 48 94 21 / svc@plen.ku.dk
SNM, Peter C. Kjærgaard	+45 93 56 53 33 / kjaergaard@snm.ku.dk
IGN, Claus Beier	+45 93 56 52 44 / cbe@ign.ku.dk

Authorities	*Telephone/e-mail*
Mineral Licence and Safety Authority (MLSA)	[+299] 34 68 00 / mlsa@nanoq.gl
Department of Housing, Nature, and Environment (Expedition office), Nuuk	[+299] 34 67 32 / ipan@nanoq.gl
The police authority in Greenland, Chief Constable Office	[+299] 32 14 48 / grpoliti@greennet.gl
Joint Arctic Command (Nuuk)	
Maritime Rescue Coordination Centre (MRCC)	[+299] 36 40 00 / mrcc-nuuk@mil.dk
Rescue Coordination Centre (RCC)	[+299] 84 12 01 / [+299] 84 11 35 / [+299] 84 10 34 / rcc@naviair.dk

Police Stations	*Telephone/e-mail*
Aasiaat	[+299] 89 42 22
Ilulissat	[+299] 94 32 22
Ittoqqortoormiit	[+299] 99 10 22
Kangerlussuaq	[+299] 84 12 22 / [+299] 52 12 22
Maniitsoq	[+299] 81 32 22
Narsarsuaq	[+299] 66 52 22/ [+299] 49 74 14
Nuuk	[+299] 32 14 48 / politi@politi.gl
Qaanaaq	[+299] 97 10 22
Qaqortoq	[+299] 64 22 22
Qeqertarsuaq	[+299] 92 12 22
Scoresbysund	[+299] 99 10 22
Sisimiut	[+299] 86 42 22
Tasiilaq	[+299] 98 14 48 / [+299] 59 81 48
Upernavik	[+299] 96 12 22
Uummannaq	[+299] 95 12 22

Airline companies	*Telephone/e-mail*
Air Greenland (Greenland)	[+299] 34 34 34 / [+299] 55 24 89 / info@airgreenland.gl
Norlandair (Iceland)	[+354] 414 6960 / [+354] 860 1208 / kibba@norlandair.is
Lufttransport (Norway)	[+47] 77211600 / post@lufttransport.no

Passenger ships	
Disko Line	[+299] 94 53 00
Arctic Umiaq Line	http://aul.gl/en/about-us/who-are-we.html

Airports	*Telephone/e-mail*
Mittafeqarfiit (Greenland Airports)	[+299] 98 69 88
Aasiaat Airport (JEG)	[+299] 89 17 99
Constable Point (CNP)	[+299] 99 38 54
Ilulissat Airport (JAV)	[+299] 94 41 40
Kangerlussuaq Airport (SFJ)	[+299] 84 13 00
Kulusuk Airport (KUS)	[+299] 98 69 88
Maniitsoq (JSU)	[+299] 81 25 66
Mestersvig, Tower (BGMV)	[+871] 762 215 337
Narsarsuaq (UAK)	[+299] 66 54 30
Nuuk Airport (GOH)	[+299] 32 60 05

Nuuk, AFIS operator	[+299] 32 71 19
Paamiut Airport (JFR)	[+299] 68 40 95
Qaanaq Airport (NAQ)	[+299] 97 13 35
Qaarsut (Uumamanaq) Airport (JQA)	[+299] 95 76 99
Qeqertarssuaq (GOH)	[+299] 38 27 20
Sisimiut Airport (JHS)	[+299] 86 54 99
Tasiilaq Airport (AGM)	[+299] 98 16 89
Thule Air Base (THU)	[+299] 97 65 85
Upernavik Airport JUV)	[+299] 96 11 99

Shipment of gear

Royal Arctic Line (RAL):	*Telephone/e-mail*
Head Quarter, Aalborg	[+45] 99 33 32 32
Nuuk Operations	[+299] 34 91 00

Travel agencies	*Telephone/e-mail*
Carlson Wagonlit	[+45] 33637878 / staten.dk@contactcwt.com
Greenland Travel, Copenhagen	[+45] 33 13 10 11 / info@grb.dk
Greenland Travel, Nuuk	[+299] 34 95 95 / nuuk@grb.gl
Greenland Travel, Ilulissat	[+299] 94 75 40 / ilulissat@grb.gl

Hotels and Hostels	*Telephone/e-mail*
Hotel Hvide Falk, Ilulissat	[+299] 94 33 43
Hotel Arctic, Ilulissat	[+299] 94 41 53
Hotel Icefiord, Ilulissat	[+299] 94 44 80
Hotel Disko, Qeqertarsuaq	[+299] 92 16 28
Sømandshjemmet, Aasiaat	+299 89 27 11
Hotel Kulusuk	[+299] 98 69 93
Kulusuk Youth Hostel	[+299] 98 68 88
Ammagssalik Hotel, Tasiilaq	[+299] 98 12 93 / arcwon@greennet.gl
Det Grønne Hus, Tasiilaq	[+299] 98 17 48
Hotel Nansen, Tasiilaq	[+299] 98 21 01
Hotel The Red House, Tasiilaq	[+299] 98 16 50
Roberts Hotellejligheder, Tasiilaq	[+299] 98 10 52
Hotel Narsarsuaq	[+299] 66 52 53
Hotel Hans Egede, Nuuk	[+299] 32 42 22
Sømandshjemmet, Nuuk	[+299] 32 10 29
Arctic Hostel, Kapisillit	[+299] 55 05 55 / 55 68 55 www.arctichostel.com

Radio and Weather Report Services	*Telephone/e-mail*
Aasiaat Radio, Aasiaat	[+299] 89 22 55
Ammassalik Radio, Tasiilaq	[+299] 98 12 55
Radio Administration, Qaqortoq	[+299] 64 31 22
Tele Greenland, Nuuk	[+299] 34 12 55
Søndre Strømfjord Weather	*Telephone/e-mail*
Report Services, Kangerlussuaq	[+299] 84 10 22
Danmarks Meteorologiske Institut, DMI	[+45] 39 15 75 00
Copenhagen	www.dmi.dk
Meteorologisk Institut/NRK	www.yr.no

Appendix S: Chill factor chart

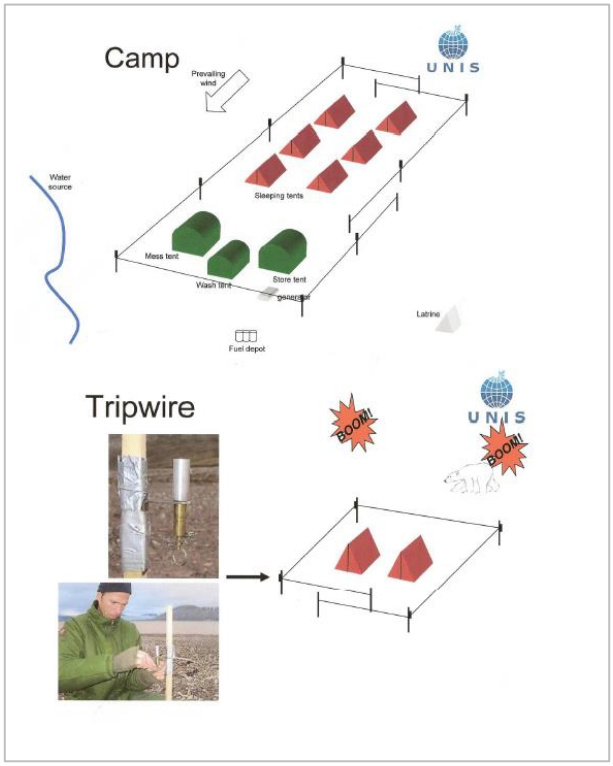
Wind-chill factor

Temp. in °C ->			25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50
Km/h	**m/s**	**knots**																
0	0	0	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50
7	2	4	25	20	15	9	5	-1	-6	-11	-16	-21	-26	-31	-36	-41	-46	-51
14	4	8	23	17	12	5	0	-6	-12	-18	-24	-30	-36	-42	-48	-54	-60	-66
22	6	12	23	16	10	3	-3	-10	-16	-23	-29	-36	-42	-49	-55	-62	-68	-75
29	8	16	22	15	8	1	-6	-13	-19	-26	-33	-40	-47	-54	-61	-68	-75	-82
36	10	19	21	14	7	0	-7	-15	-22	-29	-36	-43	-50	-58	-65	-72	-79	-86
43	12	23		14	6	-1	-9	-16	-23	-31	-38	-46	-53	-61	-68	-75	-83	-90
50	14	27		13	6	-2	-10	-17	-25	-32	-40	-47	-55	-63	-70	-78	-85	
58	16	31			5	-3	-10	-18	-26	-33	-41	-49	-57	-64	-72	-80	-87	
65	18	35					-11	-19	-26	-34	-42	-50	-58	-65	-73	-81	-89	
72	20	39							-27	-35	-43	-50	-59	-66	-74	-82	-90	

Cold index	Effect from prolonged exposure, correctly equipped
0°C to -20°C	Minimal risk, but false sense of security at prolonged stay
-20°C to -40°C	Increased risk level, lighter frostbites of exposed skin
-40°C to -60°C	Danger, frostbite of exposed skin within short time
under -60°C	**Great danger, immediate frost bite of exposed skin**

The wind-chill factor describes the virtual effect on exposed skin as a result of both air temperature and wind speed. E.g. for air temperature of -5°C and wind-speed of 6 m/s the actual effect of exposed skin will correspond to air at -16°C.
Source: DMI

Appendix T: Camp setup and operations



Deciding on a camp location is important. You may want to talk to locals and people that have camped in the area beforehand for suggestions.

Important factors to consider:

- Predominant local winds.
- Access to drinking water. Use a source of running water situated at a higher elevation than the camp.
- The terrain should be dry (stay away from moss, cotton grass or other vegetation indicating wet conditions), preferably at an incline for drainage.
- Communication conditions (boat, helicopter, snow-mobile and radio). Considering docking options for larger vessels, landing conditions for rubber boats and landing space for helicopters, radio communications.
- Watch out for areas commonly visited by polar bears (close to the ocean, drift ice). Unfamiliar objects in the terrain will attract polar bears. Be sure to establish your camp well away from the sea or sea ice.
- Keep a good distance between fuel and tents. Also keep a good distance between the tents because of potential fire hazards. Consider the need for a fire extinguisher.
- Consider the need for a tent dedicated for provision, for cooking food and eating. In addition to the social aspects of meals it is important to remember that polar bears are attracted to places where food is kept or where food has been cooked.
- Keep your food supplies stored well away from the tent camp and in line of sight from the tent opening.
- Latrine facilities should be established well away from the camp.

Fire

To minimize the risk of fire, tents must be kept at a distance of at least 15 meters from each another. Smoking is not allowed in tents. If at all possible, all cooking should be done outdoors, at a safe distance from tents.

Be careful with the use of open flames as dry air and strong winds can whip up large brushfires.

Appendix U: Courses of relevance

In the future **SCIENCE** Management Secretariat will make yearly inquiries to the head of departments of the PLEN, IGN, NBI, SNM and BIO about the need for safety courses. Deadline for replying will likely be February 1st. When relevant, the SCIENCE Management Secretariat will be arranging the causes. Look out for news on this homepage.

University of Copenhagen staff and students may register for **GEUS** or **AU** course offerings, if any vacant seats. Registration fees apply. Current courses can be viewed on the ISAAFFIK website.

GEUS contact person: Marianne Vestergaard, Cell: +45 31103038, E-mail: mve@geus.dk.

- First aid (basic course)
- Field Safety (first aid under Arctic conditions, as well as general information about fieldwork in cold climates)
- Firearms (theory and firing range training)
- Rubber boat/dinghy course
- Glacier course (if travelling across ice)
- Bear course (polar bears in particular)

Greenland Institute of Natural Resources provides Arctic safety courses in Nuuk, ECTS-credits are awarded to participants. **UNIS** (University Centre in Svalbard) also provides such courses, and they can also provide courses to externals on demand.

A common page on arctic safety courses is being developed via the "Hindsgavl-process". A link will be included here when the page is up and running.

.

Photo: Morten Rasch.

Appendix V1:

Registration form for employees

(when signed, the form should be delivered to the project leader before leaving for the field in the Arctic)
An electronic version of this form is available at KUnet.

- □ I, the undersigned, hereby confirm that I have received the "Safety Manual for Fieldwork". I acknowledge that I am required to familiarize myself with the relevant rules and follow them.
- □ I declare that I have participated in relevant courses and received relevant instruction regarding to safety.
- □ Furthermore, I declare that I shall follow the instructions provided by the Project Leader/Field Leader/Fieldwork Supervisor.
- □ I accept this declaration to be submitted to University of Copenhagen. The Project Leader leaves a copy in Denmark at the institute secretary.

Place / date: _____

Name (in block capitals):_____

Signature:_____

Expedition:

Name and destination: _____

Duration: _____

Expedition number (only for expeditions to remote parts of Greenland)**:** _____

Name of Field Leader: _____

Insurance:

My insurance card no:_____

Next of kin (please write legibly):

Relation: _____

Name: _____

Address: _____

Phone: _____

E-mail: _____

Appendix V2:

Registration form for persons not employed at University of Copenhagen

(when signed, the form should be delivered to the project leader before leaving for the field in the Arctic)
An electronic version of this form is available at KUnet.

- □ I, the undersigned, hereby confirm that I have received the "Safety Manual for Fieldwork". I acknowledge that I am required to familiarize myself with the rules and follow them.
- □ I also declare that I have a travel insurance covering my Field work, including Search and Rescue insurance if demanded for the area I am going to.
- □ Furthermore, I declare that I shall follow the instructions provided by the Project Leader / Field Leader / Fieldwork Supervisor.
- □ I am aware that a first-aid course might be requested.
- □ I accept this declaration to be submitted to University of Copenhagen. Project leader leaves a copy in Denmark at the institute.

Place / date: _____

Name (in block capitals): _____

Signature: _____

Expedition:

Name and destination: _____

Duration: _____

Expedition number (only for expeditions to remote parts of Greenland)**:** _____

Name of Field Leader: _____

Insurance:

Company (name and phone number)**:** _____

Police no: _____

Next of kin (please write legibly):

Relation: _____

Name: _____

Address: _____

Phone: _____

E-mail: _____

Appendix V3:

Declaration from Project Leader

(must be submitted to the department or section secretary with the participant's declarations)
An electronic version of this form is available at KUnet.

Expedition:

Name and destination: _____

Duration: _____

Expedition number (only for expedition to remote areas)**:** _____

Short description of the expedition:

_____

_____

_____

_____

Needed courses/instruction/training for the expedition participants:

_____

_____

_____

_____

_____

_____

- □ I, the undersigned, hereby confirm that all relevant courses/instruction/training, mentioned in this manual will be followed by the persons implied.
- □ I also declare that I have received Registration Form V1 or V2, whichever is applicable, from all participants in the Fieldwork in the Arctic, and that these forms have been delivered to the department secretary.

Place / date: _____

Name (in block capitals): _____

Signature: _____

Appendix X: Links

page	Link	Full link
5	The Greenland Working Environment Act no. 1048	http://at.gl/da/Regler/Love/Arbejdsmiljoeloven-UK.aspx
5	maritime legislation	http://www.dma.dk/Legislation/Sider/Mainpage.aspx
5	Danish Air Navigation Act	https://www.trafikstyrelsen.dk/EN/Civil-aviation/Air-law-and-Regulation.aspx
5	Ministry of Domestic Affairs, Nature and Environment	http://naalakkersuisut.gl/en/About-government-of-greenland/Travel-activities-in-remote-parts-of-Greenlandhttp:/naalakkersuisut.gl/en/About-government-of-greenland/travel-activitiesin-remote-parts-of-greenland
6	travels to remote parts of Greenland here	http://naalakkersuisut.gl/en/About-government-of-greenland/Travel-activities-in-remote-parts-of-Greenland
6	(gray areas on the map)	http://naalakkersuisut.gl/~/media/Nanoq/Files/Attached%20Files/Engelske-tekster/Logistic/The%20Map%20landkort.pdf
6	self-insurance form	http://naalakkersuisut.gl/~/media/Nanoq/Files/Attached%20Files/Engelske-tekster/Procedure/Required%20permits/INSURANCE_STATEMEN_for_research_projects%20in%20the%20National%20Park%20%20above%20latitude%2078%20%20N.doc
6	Kallaalit Forsikring	http://www.forsikring.gl/web/gl/kaalaallitdk.nsf/noframes/2BE763E4D55955B9C125717D0061603E
7	the blue health insurance card	http://huskdetblaa.dk/
10	normal University of Copenhagen forms at KUnet	https://intranet.ku.dk/medarbejderguide/hr/arbejdsmiljoe/arbejdsskader/Sider/arbejdsskader.aspx
10	SPOT3	http://www.findmespot.com/en/index.php?cid=100
11	normal University of Copenhagen forms at KUnet	https://intranet.ku.dk/medarbejderguide/hr/arbejdsmiljoe/arbejdsskader/Sider/arbejdsskader.aspx
12	click here (only in Danish).	http://arbejdstilsynet.dk/~/media/at/at/04-regler/05-at-vejledninger/d-3-1-loeft-traek-og-skub/d-3-1-loeft-traek-skub%20pdf.ashx
14	An incident report form can be found here	https://intranet.ku.dk/medarbejderguide/hr/arbejdsmiljoe/arbejdsskader/Sider/arbejdsskader.aspx
63	this homepage	https://intranet.ku.dk/science/dk/bygninger-service/plan-projekt/arbejdsmiljoe/Sider/SikkerhediArktis.aspx
63	ISAAFFIK website	http://www.isaaffik.org/tags/education
63	such courses	http://www.unis.no/course/as-101-arctic-survival-and-safety-course/
64	An electronic version of this form is available at KUnet	https://intranet.ku.dk/science/dk/bygninger-service/plan-projekt/arbejdsmiljoe/Documents/Appendix%20V1.docx
65	An electronic version of this form is available at KUnet	https://intranet.ku.dk/science/dk/bygninger-service/plan-projekt/arbejdsmiljoe/Documents/Appendix%20V2.docx
66	An electronic version of this form is available at KUnet.	https://intranet.ku.dk/science/dk/bygninger-service/plan-projekt/arbejdsmiljoe/Documents/Appendix%20V3.docx
70	visas to Greenland	https://www.nyidanmark.dk/en-us/coming_to_dk/visa/faroe_greenland/the_faroe_islands_and_greenland.htm
70	work in Greenland	https://www.nyidanmark.dk/en-us/coming_to_dk/greenland/work/work.htm

Appendix Y: Work Permit for non-Nordic citizens

The following information has been looked into by Aarhus University and verified by Gitte Rydal, adviser at the Danish Agency for International Recruitment and Integration (SIRI). Questions may be addressed to Gitte Rydal, gry@siri.dk / +45 7214 2314.

Rules of thumb:

- Work permits are required for all non-Nordic citizens if a work stay exceeds 90 days in a 180-day period.
- For research data collection to be processed outside of Greenland, a work permit for Greenland is *not* required, as long as the stay is less than 90 days within a 180-day period. Anyone from a country whose citizens require a visa/port of entry letter must obtain a visa.
- For work in Greenland that will result in output to be used in or benefit Greenland, non-Nordic citizens are required to obtain a work permit, even when the stay is less than 90 days within a 180-day period.

In practice, typical situations will include:

Situation	**Work Permit?**
A person needs to travel to Greenland to collect data through fieldwork affiliated with research stations. AU is involved in gaining access to the national park and has planned the logistics necessary to do so.	As long as data is not processed in Greenland, there is no need to obtain a work permit when the stay is less than 90 days. Citizens of countries that require a visa must obtain a visa/port of entry letter. For stays of 90 days or more, work permits* are required for non-Nordic citizens.
A person from AU, already employed in Denmark, travels to a research station to conduct fieldwork and collect data.	As long as data is not processed in Greenland, there is no need to obtain a work permit when the stay is less than 90 days. Citizens of countries that require a visa must obtain a visa/port of entry letter. For stays of 90 days or more, work permits* are required for non-Nordic citizens.
A skilled/unskilled worker is employed in Greenland to service research stations (ex. – logistics and service staff)	A work permit and authorization from the municipal authority are required for non-Nordic citizens regardless of the duration of stay. Authorization from the municipal authority is required for everyone except for Danish citizens.
Employment as a researcher or to conduct research work at the Greenlandic university or Greenland Institute of Natural Resources.	A work permit is required for all non-Nordic citizens regardless of the duration of stay.
A person's travel to Greenland is related to teaching or a similar activity, as a result of being invited.	There is no need to obtain a work permit when the stay is less than 90 days. Citizens of countries that require a visa must obtain a visa/port of entry letter. For stays of 90 days or more, work permits* are required for non-Nordic citizens.
A person is to visit Greenland to participate in meetings, conferences or similar events.	There is no need to obtain a work permit when the stay is less than 90 days.

Situation	Work Permit?
	Citizens of countries that require a visa must obtain a visa/port of entry letter. For stays of 90 days or more, work permits* are required for non-Nordic citizens.

* As the activity can be conducted without a work permit, "only" a residence permit is required. Applying for a work permit may be worth considering if the person wants to conduct activities considered as "work".

Visit www.nyidanmark.dk for additional work permit exemption possibilities:
https://www.nyidanmark.dk/en-us/coming_to_dk/greenland/work/work.htm#a

Port of Entry Letter (instead of a visa)

If a person requires a visa for Greenland while legally residing in Denmark or another Schengen country, they should request a port of entry letter from SIRI.

Port of entry letter requests should be sent to the Greenland/Faroe Islands post box at fo_gl@siri.dk .

The mail should include:

- arrival and departure dates to/from Greenland (attach plane ticket/reservation as documentation)
- attachment of a scanned copy of your residence permit (to ensure that the applicant has a residence permit that can be used upon their return)
- copy of passport (must be valid for at least 2 months after the period of travel)
- brief description of the purpose of travel (very brief – "going to xx-city/place for AU, to do zz").

Some port of entry letters are supplied by The Danish Immigration Service (DIS), not SIRI.

If UCPH receives a "guest" who requires a visa and who entered Denmark on a Schengen visa or has a residence permit in another Schengen country, the Danish Immigration Service (DIS) will supply the port of entry letter. Port of entry letter applications should be submitted to the DIS visa office.

If a UCPH employee has a permanent residence permit, or a residence permit based on family reunification, or as a refugee (i.e.- the permit was given by DIS), DIS should supply the port of entry letter.

SIRI will only provide for a single, limited period, but after an evaluation will supply port of entry letters for 90 days within a 180-day period. Thereafter, no further port of entry letters are required for the same "season".

Municipal Authority Permit

Municipal authority permits should be applied for by non-Greenlandic skilled and unskilled workers employed in Greenland. The permit should be applied for directly from the relevant municipal authority. SIRI is not involved. Typically, Greenlandic labour must be sought prior to filling a position. As such, expect the municipal permit processing to take some time.

Municipal permits usually need not be applied for in relation to technical and administrative staff or academic postings.

For employment in nature reserves, for example, where labour is far and hard to find, SIRI suggests that AU contact the Greenland Self-Government to discuss the possibility of dispensing with the requirement for municipal permits.

Miscellaneous:

- EU citizens should remember to carry a valid passport with them to Greenland (must be valid for 2 months beyond the stay)
- Unlawful stay and work in Greenland may lead to a fine and one-year entry ban.

Links:

visas to Greenland

work in Greenland