

# Field Instructions and Standards

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Geological Survey of Denmark and Greenland  
Danish Ministry of Climate, Energy and Utilities

**2025**



**GEUS**

# Colophon

Based on a concept by Asger Berthelsen in the early 1960s this booklet has been revised and extended yearly by the staff of first GGU, and later GEUS, especially by Johan 'Didom' Friderichsen and in the late 2000s by Julie Hollis.

In 2010 the booklet was thoroughly revised by Michele Citterio, Thomas Find Kokfelt and Marianne Vestergaard (editors) with contributions from Uffe Larsen, Frands Schjøth, Denis Martin Schlatter, Agnete Steenfelt, Bo Møller Stensgaard and Leif Thorning.

Following a user survey after the 2011 field season it was decided that economic geology chapters be omitted to make the field guide relevant to all participants in GEUS fieldwork.

In the later years (2016–2017) the booklet has undergone several important changes. Special attention should be drawn to a new GEUS set-up for medical screening and to a new emergency health care back-up.

The editors has received valuable help and advice from a handful of field experienced colleagues and professional collaborators.

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## Introduction

Ensuring safety during fieldwork is crucial. Based on nearly 70 years of experience of carrying out fieldwork in Greenland GEUS has established guidelines and basic requirements to ensure safety, which all field participants must follow. Fieldwork carried out by GEUS can take many forms whether on land, on ice, or at sea, which is reflected in the precautions and preparations of the field activities.

*Fieldwork from patrol vessel Lauge Koch, Baffin Bay 2019. Joint Arctic Command is one of several collaboration partners in Greenland. Scientists can make use of their services at military stations and patrol vessels as long as they don't interfere with military tasks.*

**Fig. 1**



## Key points

### Planning and risk assessment

Project Managers must conduct detailed planning and risk assessments for all field activities and involve all field participants in the process.

### Training and certification

Participants must undergo relevant training and certification. Depending on the type of fieldwork participants must complete compulsory safety courses.

#### THESE INCLUDE:

- Arctic First Aid I & II
- Ordinary First Aid
- Rifle Training
- Glacier Safety Training
- Zodiac Training
- Security at Sea (STCW A VI/1-1)

### Health examination

Given the remote locations of most Greenland expeditions, access to regular medical care is limited. GEUS requires health and dental examinations in connection with participation in Arctic fieldwork.

### Field equipment

Suitable field-equipment is supplied by GEUS, except for personal gear and scientific equipment, see p. 22.



**Fig. 2**

*Shooting classes are mandatory for expedition members travelling to areas where dangerous wildlife can be encountered.*



### Learning from experience and near-miss

Evaluation of each field season and mandatory reporting of incidents and near-miss incidents aims to improve future fieldwork safety.

### Safety Instructions for Fieldwork

GEUS' Safety Instructions for Fieldwork is where field participants find rules, guidelines and formal requirements related to fieldwork. It is where all NEW information is gathered, e.g. new guidelines as a result of evaluations, or new rules from Danish or local authorities.

The Safety Instructions for Fieldwork should be read regularly and used as a reference point for all matters related to fieldwork.

### Rules and regulations

Fieldwork in Greenland must adhere to relevant rules and regulations and permits must be obtained where required. **Permits include:**

- Radio license permit (VHF radios and PLB's)
- Firearm permit
- Scientific expeditions permit
- Export permits (samples and equipment)
- Area allotment permit and more.

The list is not complete. Unless otherwise agreed the Project Manager is responsible for obtaining all necessary permits.



**Fig. 3**

*Glacier Safety Training for glaciologists who carry out fieldwork in Greenland, takes place on glaciers in Iceland in a 3 day long course. The techniques and procedures are repeated at a dry training course in Denmark in years where participants are not required to take the course in Iceland.*

## Logistics

Careful and detailed logistics planning is crucial for any Greenland field expedition. However, due to the unpredictable natural conditions in Greenland, planning must be flexible and dynamic.

### Typical logistical support options

#### BASE CAMPS

Large land-based expeditions typically operate from GEUS base camps with communication and emergency procedures, kitchen, and accommodation facilities. Base camps can be set up in connection to scientific or military stations, on ships, in settlements, or in the field.

#### LOCAL SUPPORT

Expeditions may receive logistical support from local contacts or partners in towns or settlements.

#### CRUISES AND SHIP-BASED EXPEDITIONS

The vessel with crew normally function as basecamp and local support at the same time.

#### HELICOPTER SUPPORT

Daily transportation for field teams is often provided by helicopters. Expeditions that operate from a base camp will typically have a helicopter chartered for the entire period of the fieldwork to move and support field teams with provisions, camp moves, and reconnaissance flights. Other types of fieldwork require ad hoc charters out of towns and settlements, e.g. visits to weather stations on the Inland Ice.



**Fig. 4**

*Transferring field equipment from the container to basecamp ship 'Tulu' before departure from Nuuk to Northeast Greenland in 2023.*

### Essential safety procedures before heading into the field

#### ALL EXPEDITION PARTICIPANTS MUST:

- Be briefed on safety and communication procedures before departure.
- Check that they have all relevant equipment (personal, safety, communication) and make sure it still works properly after transportation.
- Share concerns with the Project Manager and/or team before heading to the field.

## Agreement with GEUS

Field participants who are not permanently employed by GEUS must sign an agreement that outlines their rights and responsibilities.

### Types of agreements

- **Professional collaboration partners or consultants**  
External collaboration partners or consultants participating in GEUS expeditions must sign a contract and take out their own travel insurance.
- **Logistics Sharing**  
Sometimes, fieldwork participants cooperate with GEUS to share logistics without a formal contract. In these cases, GEUS does not hold responsibility for insurance coverage or other liabilities.

### Confidentiality

External field participants must sign GEUS's confidentiality agreement to ensure discretion and professional secrecy. The form is part of an agreement made between GEUS and the external participant's employer and is also an appendix to the Safety Instructions for Fieldwork.

## Insurance

### For GEUS employees

- Covered by Statens tjenesterejseforsikring, managed by Europæiske Rejseforsikring A/S.
- Participants must carry a travel insurance card, available from the accounting department.
- Optional additional insurance on a per field-day basis is offered to GEUS employees.

### For non-GEUS participants

- External participants and/or consultants must provide their own travel insurance for the duration of the fieldwork.

## Travel and settling of accounts

Field participants should coordinate travel through GEUS' project manager or logistics coordinator. Tickets from Copenhagen or Iceland to Greenland are usually booked by GEUS. Participants are encouraged to use public transport (e.g., airport buses) whenever possible.

After the field season ends, participants must submit original documentation (receipts, tickets, boarding passes) for all field-related expenses to the relevant GEUS secretary.

**Important:** Retain all tickets, boarding passes and receipts until accounts are settled.

## Emergency communication

Radio Medical provides 24-hour medical emergency services. Field participants should contact Radio Medical at +45 75 45 67 66 or [rmd@rsyd.dk](mailto:rmd@rsyd.dk) if medical advice is needed.

- **Personal Locator Beacon (PLB)**  
Mandatory for all field participants in remote areas. Activating the PLB will trigger a Search and Rescue (SAR) operation.
- **Satellite telephone and Garmin InReach**  
Frequently, emergency communication is best made by means of satellite telephone or a Garmin InReach device. The latter has the advantage of sending the position (coordinates) of the communication.
- **Emergency Response Procedure (ERP)**  
GEUS' ERP outlines roles and responsibilities in case of emergency situations, see Emergency Response Procedure (Appendix D) pp. 100–109.

### GEUS emergency contact

Duty Officer: Available 24/7 during the field season at +45 91 33 36 36.

## Accidents and near-misses

All participants are responsible for taking appropriate action if an accident occurs. This may involve administering first aid, making emergency calls, notifying the police.

### Reporting process

Accidents must be reported to GEUS' management via the Duty Officer when the timing is right (Appendix D).

**Important:** Serious incidents must be reported to the HSE Manager at +45 91 33 34 53.

Expedition leaders must submit a report detailing the incident, including the location, individuals involved, and any action taken.

### Near-miss reporting

To improve safety measures, GEUS encourages all participants to report near-miss incidents. These reports can be submitted at GEUS' website: [www.eng.geus.dk/about/fieldwork/near-miss-incident-notification](http://www.eng.geus.dk/about/fieldwork/near-miss-incident-notification)



## 1. Equipment

Equipment for fieldwork varies greatly depending on the type of activity. GEUS fieldwork may take place in remote areas on land with access to no other infrastructure than a provisional basecamp and a helicopter, or the work may be carried out on the Inland Ice, mostly with a helicopter close by, or it may be on board a ship in which case the work may take place in an office or laboratory or include operating equipment/machinery outside.

Below a distinction is made between personal equipment, field equipment, and safety equipment addressing requirements for specific environments and/or tasks.



**Fig. 1.1**

*Geologists in the field should always wear brightly-coloured garments to maximize visibility.*

1.1 Personal equipment

Personal gear such as clothes, boots etc. is most often purchased by the individual field participants. However, fieldwork on the Inland Ice or at sea sometimes requires extra heavy, specialized gear (insulated, floatable, technical) that may be available from a department stock of equipment, or as part of a vessel’s equipment. Personal gear also includes items such as toiletries, hats, glasses, etc. Find a list of recommended personal equipment below.

**FOOTWEAR AND RAIN GEAR**

**Water- and windproof jacket**  
Gore Tex or alternative membrane/coating.  
Brightly coloured: Orange, Yellow, Red.

**Water- and windproof outer-trousers**  
Gore Tex or alternative membrane/coating.  
Brightly coloured: Orange, Yellow, Red.

**Durable leather boots with solid sole**  
Extra boot laces and wax.

**Spare pair of boots**  
Optional for long seasons.

**Rubber boots**  
Optional. Useful if working with dinghies.

**Sneakers/footwear for indoor use**  
Nice to have dry shoes to use in the camp or onboard a vessel.



| CLOTHING                                                              |                                                                                              |
|-----------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| Long underwear<br>Shirts and tights – preferably woollen inner layer. | Down or fibre jacket<br>Off-season or high altitude, brightly coloured: orange, red, yellow. |
| T-shirts, long sleeves                                                | Light socks                                                                                  |
| Underpants – short                                                    | Hiking socks, thick woollen                                                                  |
| Underpants – long                                                     | Pyjamas or t-shirt for sleeping                                                              |
| Working trousers<br>Durable outer layer                               | Fleece or Powerstretch<br>Light but warm middle layer                                        |
| Durable working shirts                                                | Hiking gaiters                                                                               |
| Belt                                                                  | Sweaters, at least one woollen                                                               |

| MISCELLANEOUS                    |                                        |
|----------------------------------|----------------------------------------|
| Toiletries<br>Including lip balm | Warm cap or sun hat<br>With broad brim |
| Sunscreen                        | Field hat                              |
| 2 towels                         | 1 pair of camp trousers                |
| Knife/multitool                  | Extra glasses                          |
| Sewing kit<br>Needle and thread  | Warm gloves                            |
| Sunglasses                       | Alarm clock                            |
| Camera with extra batteries      | Whistle                                |
| Passport                         | Literature                             |

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Additional personal equipment for fieldwork at sea

The safety equipment necessary on a cruise should reflect the work to be conducted, which can vary greatly (e.g. deck, lab, office).

| TYPICAL ITEMS USED DURING FIELDWORK AT SEA                                      |                                                                                  |
|---------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| Safety helmet                                                                   | Floatation suit                                                                  |
| Safety shoes<br>Shoes, Boots, Rubber Boots                                      | Safety gloves<br>Regular pair, waterproof/resistant                              |
| Rain gear<br>For offshore use standard Gore-Tex hiking clothes, not sufficient. | Safety glasses<br>Use GEUS purchase order if personal lens strength is required. |
| Inflatable life jacket                                                          | Overall                                                                          |
| Safety harness                                                                  | Ear protection                                                                   |



**Fig. 1.2**  
*Marine fieldwork in Arctic climate has many potential risks. Safety equipment in use here are hard hats (to protect against swinging and falling gear), float suit to stay warm on deck and if necessary in the water, safety harness to prevent falling overboard, self-inflatable life vest if this happens nevertheless, in addition to safety glasses, work gloves, and safety boots. Always check if your buddies have forgotten anything.*

Additional personal equipment for fieldwork on ice

In addition to warm clothes and waterproof personal equipment, persons participating in fieldwork on glaciers or on the Inland Ice also need personal equipment such as thick, insulated snow mobile suits, heavy boots (on ice/glaciers and when driving snow mobiles), sunglasses, warm beanies/hat(s), extra mittens and thick, insulated gloves. Sometimes hard hats are needed.

Further, to be able to move safely on the ice sheet a standard set for glacier safety is necessary.

| STANDARD SET FOR GLACIER SAFETY FOR 1 PERSON                                         |                                 |
|--------------------------------------------------------------------------------------|---------------------------------|
|  |                                 |
| 2x 1,5m of 6–7 mm accessory cord.                                                    | 2x 5m of 6–7 mm accessory cord. |
| 1x Petzl Micro Traction<br>Mechanical rope capture device                            | 6x Locking karabiners           |
| 1x Petzl Tblock                                                                      | 4x Non-locking karabiners       |
| 1x Small pulley                                                                      | 1x Rope per 2 persons           |
| 2x Ice screws 22 cm                                                                  | 1x Harness                      |
| 2x 120cm sling                                                                       | 1x Set of crampons              |
| 1x Ice-axe                                                                           |                                 |

## 1.2 Field equipment

When camping in remote areas on land GEUS will usually supply all equipment needed for fieldwork. Fieldwork activities that include several field teams and a base camp will often make use of a standard field camp (example below) from GEUS' equipment section, supplemented by special equipment.

Defective/damaged equipment should always be clearly marked upon return from fieldwork to avoid it being redistributed without repair.

Any losses of equipment during fieldwork should be reported to GEUS' equipment section upon return.

Smaller fieldwork activities will often use bespoke camp setups designed in collaboration with GEUS' equipment section. Normally the project manager or a field leader will request field equipment from the equipment section.

### STANDARD TWO-PERSON FIELD CAMP

|                                                   |                                                      |
|---------------------------------------------------|------------------------------------------------------|
| 2 tents<br>(sleeping tents)                       | 1 Heavy geologist hammer<br>(Turtolan)               |
| 1 Spacious tent<br>("Kitchen tent")               | 2 Chisels                                            |
| 2 "Sleeping machines"<br>Contents specified p. 27 | 1 Tripwire bear alarm<br>(in regions where relevant) |
| 2 Backpacks                                       | 1 Fire extinguisher                                  |

### STANDARD TWO-PERSON FIELD CAMP

|                                                                      |                                               |
|----------------------------------------------------------------------|-----------------------------------------------|
| 1 Iridium satellite phone                                            | 2 Thermo Hunter insulated bothy bags          |
| 2 Personal Locator Beacons (PLBs)                                    | 2 Working gloves                              |
| 2 Garmin InReach<br>(handheld GPS device with text-communication)    | 2 Sets of AAA-batteries<br>(2*4 batteries)    |
| Energy Supply<br>Contents specified pp. 24–25                        | 2 Sets of AA-batteries<br>(2*4 batteries)     |
| 2 VHF handheld radios                                                | 10 Rice bags for rock samples                 |
| 1 Tarpaulin<br>(lightweight, plastic)                                | 10 Newspapers for wrapping rock samples       |
| 1 Water can (10 litres)<br>Can be supplemented by a plastic bucket   | 100 Plastic sample bags<br>200*400 mm         |
| 1-2 Fuel can(s)<br>(each 5 litres of kerosene/Jet-A1 for camp stove) | 100 Plastic sample bags<br>300*600 mm         |
| 2 Lightweight camping chairs                                         | Labels for rice bags, incl. fastening strips  |
| 1 Kitchen box<br>Contents specified p. 28                            | 1 Set of binoculars<br>(8x30 or 7x50)         |
| 1 Office box<br>Contents specified p. 26                             | Parachute cord                                |
| 1 Spade (short)                                                      | 1 Medical box<br>Contents specified pp. 34–35 |
| 2 Estwing hammers                                                    |                                               |

## Energy Supply

Energy supply can be delivered as a kit in a hardcase (weight: c. 14 kg) consisting of one or more solar panels, a power station plus, a powerbank, cables and more. The kit is NOT classified as dangerous goods.

Fig. 1.3



### THE KIT INCLUDES:

#### Solar Panels

- Nomad 50 Goal Zero rain-resistant solar panel with a maximum output of 50 W.
- Nomad 20 Goal Zero rain-resistant solar panel with a maximum output of 20 W, able to charge powerbank or directly to a device via a 12 V or USB outlet.

#### Powerbank

- For charging devices.

#### Power Station Yeti 150 from Goal Zero

- Including a sealed AGM lead acid battery of 168 W (12 V–14 Ah), with outlets 2 x USB, 12 V jack, 1 x car type plug, 230 V inverter.

#### Extra

- Extension cable, 230 V charger, manuals etc.

### NOTE:

- The solar panels can be connected in a series with the power station for maximum output.
- Maximum output 160 W, with 80 W continuous output.
- Charging time with solar panel "in full sun" is 17–34 hours.
- USB-A and C-cables are provided.
- Powerbank may also be charged using a standard 230 V AC-outlet.
- Field telephone for data collection with a separate powerbank.

## Generator

A generator may sometimes be required if a field camp has many energy-consuming items. Generators run on petrol that is classified as dangerous goods and requires special packaging.

### THE GENERATOR-KIT INCLUDES:

Fig. 1.4





## OFFICE BOX

|                                             |                                       |
|---------------------------------------------|---------------------------------------|
| 2 Rite'n rain notebooks                     | 1 Repair kit for inflatable mattress  |
| A4-size millimeter-paper block              | 2 Geologists compasses                |
| A5-size paper block                         | 2 Notebooks                           |
| 20 Rubber bands                             | 1 Roll of leuko-tape                  |
| 2 Carpenters ruler<br>2m, folding           | 1 Roll of duct tape<br>38mm x 2,75m.  |
| 2 Sets of safety goggles                    | 1 Roll of marking tape, orange        |
| 1 Roll of twine                             | 1m <sup>2</sup> signal cloth          |
| 4 Blocks of sample number sheets            | 1 Pad (A5-size) adhesive marking foil |
| 2 Pencil cases<br>Contents specified below. |                                       |

## Pencil cases

|                            |                             |
|----------------------------|-----------------------------|
| 1 Magnifying glass (x10)   | 1 Pencil, 8040, red         |
| 2 Felt-tip pens, permanent | 1 Pencil sharpener          |
| 2 Ball pens                | 1 Eraser                    |
| 2 Felt-tip pens 0,1mm      | 1 Pencil, replaceable leads |
| 2 Felt-tip pens 0,3mm      | 1 Set of leads              |
| 2 Pencils HB               | 2 Set of earplugs           |
| 2 Pencils H                | 15 Crayons, various colours |
| 2 Pencils B                |                             |

## "SLEEPING MACHINE"



|                                                                           |                                                                                                |
|---------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| <b>1 Drybag</b><br>For keeping sleeping gear in.                          | <b>1 Emergency First Aid Kit</b><br>EFAK contents specified p. 32.                             |
| <b>1 Sleeping bag</b>                                                     | <b>1 Insect repellent (spray)</b>                                                              |
| <b>1 Self-inflating mattress</b>                                          | <b>Bothy bag (lightweight)</b>                                                                 |
| <b>1 Camping foam mattress</b>                                            | <b>1 Mosquito net</b>                                                                          |
| <b>1 Fleece inner sheet for sleeping bag</b>                              | <b>2 Cotton inner sheets for sleeping bag</b>                                                  |
| <b>1 Water can</b><br>1 liter "Nalgene" wide-opening, hot-water tolerant. | <b>1 Set of dishes + cutlery</b><br>Flat plate, deep plate, mug, knife, fork, spoon, teaspoon. |
| <b>1 Pillow (small)</b>                                                   | <b>1 Safety vest (brightly coloured)</b>                                                       |
| <b>1 Woolen rug (heavy)</b>                                               |                                                                                                |

| KITCHEN BOX                                                          |                                                                                   |
|----------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| 2 Camp stoves (Optimus HIKER+)                                       | Small plastic bags                                                                |
| 1 Set of spareparts for camp stoves                                  | Large garbage bags                                                                |
| 1 Set of priming utensils for camp stove<br>Contents specified p. 29 | Alcohol (0,5 l) for preheating camp stove<br>Dangerous goods, supplied separately |
| 1 Roll of paper towels                                               | 1 Set of dishtowels/dishcloths                                                    |
| Matches                                                              | 1 Set of metal and plastic scrubbers                                              |
| Set cooking pots and a skillet                                       | 1 Brush for dishing                                                               |
| 1 "French press" coffee brewer                                       | 1 Wash basin                                                                      |
| Coffee percolator No. 4                                              | Detergent for dishes (500 ml)                                                     |
| 50 Filters No. 4 for percolator                                      | 20 Clothes pegs                                                                   |
| 2 Dewar bottles (thermos)                                            | Detergent (250 g)                                                                 |
| 1 Set of kitchen tools/utensils                                      | Small broom                                                                       |
| 2 Cutting boards (small and large)                                   | Water bag for showering                                                           |
| 1 Roll of aluminum foil                                              | 6 Candles (Tealights)                                                             |

The kitchen box is part of a standard two person field camp. The contents of such boxes can be customized, e.g. for shorter field trips.

Camp stove

Camp stoves are included (2 pcs.) in the kitchen box, and come with funnels for fueling, small plastic bottle for alcohol for pre-heating, spare parts, simple tools and a small packet of methaldehyde tablets ("dry alcohol") for pre-heating in case of lack of alcohol.

Fig. 1.5



### Provisions

For fieldwork operating with field camps supplied from a basecamp, GEUS will provide provisions. Each field team will from the outset be provided with one box of provisions designed to keep a two-person team fully supplied for five to seven days, plus a “start-box” that includes items that are not consumed in great quantity.

The provision boxes will be replenished from the base camp at the request of the individual teams, and supplies will usually be delivered in connection with camp moves or helicopter reconnaissance trips.

To safeguard access to food in case of prolonged bad weather, each team should aim at always keeping supplies for three to five days in store.



**Fig. 1.6**

*Fresh meat or fish is a rare luxury when camping in the field and only possible if there is a basecamp that is able to bring fresh supplies. Cooking meals outside the tent is attractive, also from a safety perspective, although weather doesn't always allow.*

### Non-standard field equipment

In addition to standard equipment listed above, special equipment, provided by GEUS, is required in certain areas and for certain tasks.

#### SUCH EQUIPMENT MAY INCLUDE:

##### Firearms

- Issued in areas where dangerous wildlife, principally polar bears, is a concern.
- Courses in the safe handling of firearms are mandatory, see additional details p. 6.

##### All Terrain Vehicles (ATVs)

- Can be used in basecamps and for some types of fieldwork.
- Crash helmets should always be worn when riding an ATV.

##### Snowmobiles

- Are designed for traversing snow-covered terrain.
- Riders must wear a crash helmet, an insulated one-piece snowmobile suit, snow goggles, boots, and gloves.
- Carrying extra fuel and a recovery bag is also recommended, see additional details pp. 74–75.

##### Rubber dinghies or other small boats

- May be used for certain types of fieldwork, see details p. 70.
- Life-vests, survival suits, outboards, etc. Dedicated courses are mandatory.

##### Mountaineering equipment

- Hard hats, etc.

##### “Reco-bag”

- A lightweight emergency camp, including provisions and cooking gear to be brought when doing day-long reconnaissance with helicopter drop-off, contents specified p. 33.

1.3 Safety equipment

In this section focus is placed on the safety equipment that is needed in emergency situations.

Safety equipment for emergencies onboard larger vessels is part of the inventory of the ship and managed by the crew, whereas expeditions working from small boats or rubber boats may need to bring the safety equipment mentioned below.

EMERGENCY FIRST AID KIT (EFAK)



|                                                       |                                                    |
|-------------------------------------------------------|----------------------------------------------------|
| 1 Flex Splint                                         | 1 Heliograph                                       |
| 1 Pair of scissors                                    | 1 Pack of plasters                                 |
| 1 Standard painkiller (Ibuprofen, 600 mg, 10 tablets) | 1 Strong painkiller (Temgesic, 0,2 mg, 10 tablets) |
| 1 Emergency blanket                                   | 2 Elastic bandages                                 |
| 1 SWAT Tourniquet                                     | 1 Syringe                                          |
| 1 Roll of sports tape                                 | 1 Hypodermic needle                                |
| 1 Roll of Tensoplast                                  | 1 Whistle                                          |

All field participants are required to bring a first aid kit (EFAK) to the field when working on land. Dry bag not mentioned in the list.

RECO BAG



|                                                                                |                                      |
|--------------------------------------------------------------------------------|--------------------------------------|
| 1 Drybag (95 L)<br>The reco-bag (not shown)                                    | 1 Water bag<br>Ortlieb 10 L          |
| 2 Bothy bags                                                                   | 1 Signal cloth                       |
| 1 MSR Advance Pro tent                                                         | Matches                              |
| 2 Sleeping mats                                                                | Toilet paper                         |
| 2 Sleeping bags                                                                | 6 Packets of drytech food            |
| 2 Sets of gear for eating, including cups                                      | 2 Packets Trek 'n Eat NRG-5 bisquits |
| 1 Trangia alcohol-fired camp stove                                             | Mixed nuts (1 kg)                    |
| 1 Trangia alcohol bottle<br>1 l, to be filled before the Reco-bag is deployed. | Chocolate drink powder (1 kg)        |

The reco bag is used for unforeseen prolonged stays in the field e.g. because of bad weather.

**MEDICAL BOX**

| Label | Medicine                                                              | No. | Use for                             |
|-------|-----------------------------------------------------------------------|-----|-------------------------------------|
| 2.2   | *Xylocain (Lidocain. Hydroclorid) gel, 2%, 30 gr                      | 1   | Local anaesthesia, itch relieving   |
| 3.1   | *Pamol (Paracetamol) tabl. 500 mg                                     | 20  | Pain relieving                      |
| 3.2   | *Burana (Ibuprofen) tabl. 400/600 mg                                  | 30  | Pain relieving                      |
| 3.3   | *Temgesic (Buprenorphinum) tabl. 0,2 mg                               | 10  | Pain relieving                      |
| 3.5   | *Tramadol (Tramadolhydroclorid) tabl. 50 mg                           | 10  | Pain relieving                      |
| 4.1   | *EpiPen 0,3 mg/dosis (Adrenalin) autoinjector                         | 1   | Anaphylactic shock                  |
| 4.2   | *Alnok (Cetirizinhydroclorid) tabl. 10 mg                             | 10  | Allergic reactions                  |
| 4.3   | *Prednisolon (Prednisolon) tabl. 5 mg                                 | 10  | Allergic reactions and inflammation |
| 4.4   | *Postafen (Meclozinhydrocloridum) tabl. 25 mg                         | 10  | Prevent seasickness                 |
| 6.3   | *Stesolid (Diazepam $\Delta$ ) tabl. 5 mg                             | 10  | Sedative and muscle-relaxant        |
| 6.3   | *Stesolid (Diazepam $\Delta$ ) Rectal liquid, 5 mg/ml                 | 1   | Sedative and muscle-relaxant        |
| 7.1   | *Penicillin (Phenoxymethylpenicillin) tabl. 660 mg                    | 20  | Bacterial infections                |
| 7.4   | *Abboticin (Erythromycin) tabl. 500 mg                                | 20  | Bacterial infections                |
| 7.8   | *Ciprofloxacin Krka/Actavis (Ciprofloxacin) tabl. 500 mg              | 10  | Bacterial infections                |
| 7.13  | *Sulfametizol Alternova (Sulfametizol) tabl. 500 mg                   | 12  | Urinary tract infection/ Pneumonia  |
| 9.1   | *Nitrolingual mouthspray (Glyceryl trinitrate) 0,4 mg/dose, 200 doses | 1   | Cardiac medicine                    |
| 9.3   | *Teva (Acetylsalicylic acid) tabl. 75 mg                              | 10  | Cardiac medicine                    |
|       | Hansaplast, wound healing ointment                                    | 1   | Burns                               |
| 10.7  | *Locoid 0,1% (Hydrocortisone buryrate) creme group II                 | 1   | Eczema, sunburns etc.               |
| 11.2  | Klorhexidin (ethanol) solution 0,2%, 25 ml                            | 1   | Disinfective                        |
| 12.6  | *Imolope (Loperamide) tabl. 2 mg                                      | 20  | Diarrhoea                           |
| 12.12 | *Motilium (Domperidom) tabl. 10 mg                                    | 10  | Nausea/vomiting                     |
| 13.2  | *Oxybuprocain 0,4% (Oxybuprocaine hydrochloride) eye drops            | 1   | Local anaesthesia                   |
| 13.8  | *Fucithalmic 1% (fucidic acid) gel                                    | 1   | Inflammation of the eye             |
| 15.5  | *Xylometazoline (Xylometazoline) nose spray 1 mg/ml (10 ml)           | 1   | Cold, sinusitis, otitis media       |

$\Delta$  Sedative medicine.

\*Consult Radio Medical: Tel: +45 75 45 67 66 or e-mail: [rmd@rsyd.dk](mailto:rmd@rsyd.dk) See Danish Maritime Authority's "Inventory, Control Document and user Instructions of Medicine, Category A"

**MEDICAL BOX**

| Label | Medical equipment                                         | No. |
|-------|-----------------------------------------------------------|-----|
| A.10  | Blanket for treatment of hypothermia                      | 1   |
| B.1   | Sterile gauze compress, approx. 5 x 5cm, 8 layers         | 4   |
| B.3   | Sterile absorb. bandage, non-adhesive, 20 x 30cm          | 2   |
| B.4   | Sterile compress bandage, 8cm                             | 2   |
| B.8   | Tube shaped gauze for finger bandaging                    | 2   |
| B.9   | Elastic gauze bandage, 4cm x 4m                           | 1   |
| B.10  | Adhesive tape with compress, various sizes, pocket pack   | 1   |
| B.11  | Adhesive tape with compress, 6cm x 1m                     | 1   |
| C.1   | Disposable gloves, latex, non-sterile, X-large (10 sets.) | 10  |
| D.1   | Steristrips                                               | 10  |
| D.2   | Adhesive suture, Dermabond, 1 ampul                       | 1   |
| D.7   | Surgical scissors w/ straight point                       | 1   |
| D.11  | Forceps tweezers, Splinter                                | 1   |
| D.15  | Haemostatic absorbable gelatine sponge, 1 x 1 x 1cm       | 4   |
| F.1   | Blood pressure measurer                                   | 1   |
| F.3   | Digital clinical thermometer                              | 1   |
| J.2   | Elastic bandage, approx. 6cm x 5m                         | 1   |
| J.4   | Triangular scarf                                          | 1   |
| J.5   | Safety pins                                               | 10  |
| J.10  | Adhesive tape, Tensoplast, approx. 2cm x 2m               | 1   |
|       | Tooth repair kit                                          | 1   |

Contents and labels follow the system used in the above mentioned Inventory. Read instructions for use carefully.

Please note, that the commercial name of the medicament in the medical box might differ from the name in the Inventory. Make sure that the active ingredient (mentioned in parenthesis) is the same. If in doubt, contact Radio Medical.



## 2. The Camp

Camping in the field is mostly related to activities in remote areas on land. On rare occasions camping takes place on glaciers or on the Inland Ice where some of the precautions and requirements mentioned below are different and case specific. However, in general GEUS's field camps mostly include two persons which are transported to new locations at intervals throughout the field season.

*Ship-based expeditions will sometimes make a simple basecamp onshore. Here Strindberg Land 2023, close to the airstrip.*

**Fig. 2.1**



## 2.1 The camp site

### DOs

- › Selection of campsites is done from the air on-site, but careful planning ahead, using maps, satellite images, orthophotos, oblique photos etc. is helpful.
- › Select a campsite near running water suitable for drinking (creek, river, etc.).
- › Place camp overlooking the landscape. A pro-tip is to camp on the north side of a valley so the sun is behind a mountain at night. Not dark but also not sunny.
- › Be aware of prevailing wind directions, try to find lee.
- › When camping on ice or glaciers, building snow-walls may be an option.

### DON'Ts

- › Avoid dry riverbeds and low-lying areas next to rivers no matter how level and attractive they may appear. Episodic emptying of ice-dammed lakes may lead to catastrophic flooding with fatal consequences.
- › Avoid depressions in the landscape, in particular such that are densely vegetated. They may seem comfortable campsites but turn into bogs in case of rain.
- › Avoid camping beneath tall cliffs prone to rock-falls and landslides – check talus-cones.
- › Avoid using lakes for drinking water.
- › Avoid camping on or close to wildlife migration routes. Such preferred paths can be identified from wear and the presence of manure.
- › Avoid camping on the beach (if possible) due to risk of polar bear encounters.



**Fig. 2.2**

*Geologist's camp in Northeast Greenland: The keen observer will note the steel-rods carrying the bear-alarm fence with the entrance just right of the centre of the photo. Also note that the snow-flaps of the tents as well as the tent-pegs are weighed down with big rocks as a precaution against heavy winds. This is important to do even if the weather is good – it may change rapidly.*

## 2.2 Camp layout

### DOs

- Place tents with the entrance facing away from prevailing wind direction.
- Place kitchen tent at a good distance from sleeping tents to prevent spreading of fire and to reduce the risk of polar bears being attracted to the sleeping tents.
- Place sleeping tents with a view towards the kitchen tent from the entrance.
- Place tents to allow an escape route for any intruding animal.
- Be sure to anchor tents thoroughly from the start, not after the storm has arrived. Use tent pegs, stabilized by putting rocks on top, and secure the rim/snow-flap of the tent by rocks, large ones, and many!
- When camping on hard ground, use boulders to anchor guy lines.
- Use trip-wire bear-fence in areas where polar bears may be encountered.
- Latrine areas should be placed away or downstream from where drinking water is collected.

### DON'Ts

- Avoid enclosed spaces, i.e. no "village square" between the tents.
- Do not throw or dump rocks on tent pegs and snow flaps when weighing down the tent for storm, place gently to avoid damage to guy lines and tent-fabric.

## GEUS TRIP WIRE SYSTEM

### Set-up suggestion

One perimeter of almost invisible trip wire

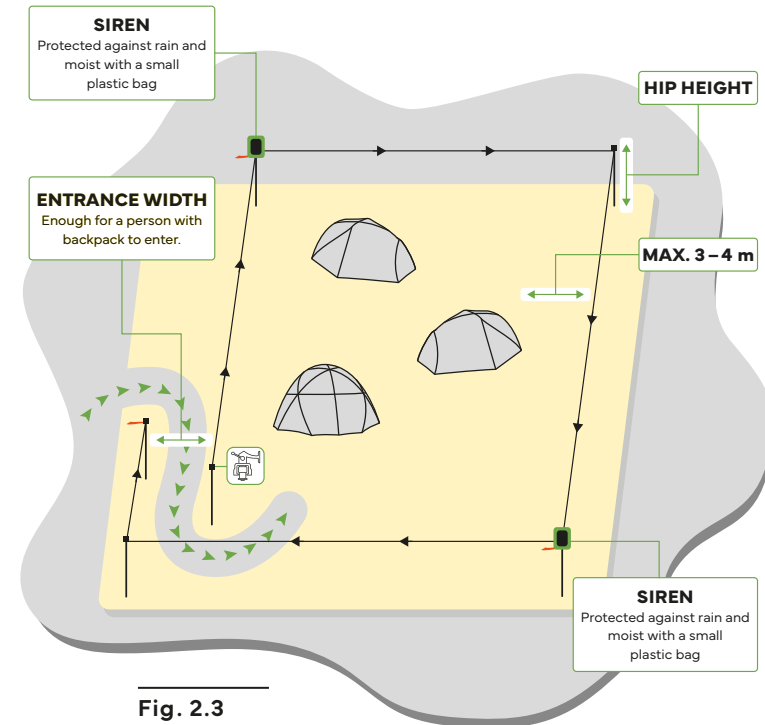


Fig. 2.3

### STEP BY STEP

1. Place the poles forming a perimeter around the camp – remember an entrance.
2. Attach the reel to an end-pole.
3. Attach sirens to strategically selected poles (e.g. diagonally).
4. Loosen the rear brake on reel.
5. Pull the trip wire from the reel, through the snap hooks and attach the wire on the far end-pole using the snap lock.
6. Tighten the rear brake on the reel.
7. Turn the handle and tighten the trip wire as much as possible – until close to triggering the alarm.



## 2.3 Running the camp

### DOs

- › Keep the camp tidy, “leave nothing but your footprints”.
- › Keep food in the kitchen tent or in a separate stash away from the camp but within visibility – and nowhere else.
- › Sort garbage according to instructions from basecamp (where applicable).
- › Send garbage back to basecamp whenever possible or otherwise dispose of properly.
- › Bury leftover food distant from camp, but preferable within sight to be able to spot if wildlife is being attracted.
- › Be aware of fire-hazards, particularly in the kitchen tent.
- › Place camp-stoves on level, stable, heat- and fireproof substrate, e.g. on top of an aluminum box or inside the lid of an open empty, lying aluminum box, allowing a fire to be extinguished by “closing the box over the lid”.
- › Be sure to pump and prime camp-stoves thoroughly before igniting.
- › Ensure proper ventilation to avoid carbon monoxide poisoning.

### DON'Ts

- › Don't do littering.
- › Do not fill the fuel tank of camp stoves to more than 80%.
- › Do not leave camp stoves pressurized when not burning. Vent pressure when turning camp stoves off to avoid fuel leakage.
- › Avoid food, including candy in the sleeping tents.



**Fig. 2.4**

*If you have to cook inside a tent, make sure that the tent is well-ventilated; keep a door open and don't go to sleep when the camp stove is lit. Also be sure you how to light the stove, and place it on a level, stable, heat- and fireproof substrate. Be prepared to extinguish the stove in case of high flames.*

## 2.4 Camp move – end of season

### DOs

- › Clean out dirt, sand etc. from the tents floors before packing down. Unless impossible due to bad weather, be sure to dry tents and other equipment thoroughly before packing for shipment.
- › Be sure to note/label damaged or defective equipment clearly.
- › Empty all liquids from thermo-bottles, camp stoves, etc.

### DON'Ts

- › Never leave liquids of any kind (water, alcohol for priming, kerosene/JetA1 for camps stoves, etc.) with the camp gear when packing for shipment.
- › Never leave any food with the camp equipment.
- › Never leave firearms, ammunition, pyrotechnics of any kind whatsoever with the camp equipment.



**Fig. 2.5**

*Field camp packed down and ready to go into the helicopter and return to base camp or a new camp site. Note that no small/light items are on the ground for safety reasons, to avoid that they go into the rotor when the helicopter approaches the site. The white bags are heavy as they contain rock samples.*



## 3. Communication

Outside towns and hamlets in Greenland most communication takes place using satellite-based devices, or radio see p. 59. All means of communication including relevant software need to be installed and tested before fieldwork and apps and updates need to be applied before leaving Denmark. Means of communication should always be easy to reach and available to all teams and key personnel.

In emergency situations, all possible means of communication should be considered. Usually, the satellite phone will be the first choice, either calling base camp, another field team, GEUS Duty Officer (bagvagt), Radio Medical (available 24/7) or local authorities (Appendix D, p. 100).



**Fig. 3.1**

*Communicating in the field: List of phone numbers, satellite phone and Garmin InReach-device. In this set-up base camp will usually contact all teams at 8 a.m. and 8 p.m.*

### 3.1 Current communication systems

The means of communication mostly used for fieldwork in Greenland are shown below.



**Fig. 3.2**

*The satellite phone and the Garmin InReach devices come in a yellow hardcase for protection.*

#### Satellite Phone (Iridium)

- Satellite phones are used mostly for planned communication between field teams and base camp or other contacts and are essential for emergency communication in remote areas where conventional networks are unavailable.

GEUS satellite phones come with pre-digitized phone numbers for the three main emergency contacts:

1. GEUS Duty Officer
2. The police in Nuuk
3. Radio Medical

- Batteries are easily depleted in cold climates.
- Be cautious of the battery life of the satellite phone. During very cold weather, consider keeping the satellite phone in a pocket close to your body.
- When connected to a computer with the relevant software, the satellite phone can be used for text-based communication with base camp, other field teams, and the world at large. Always ensure that the e-mail set up is tested before heading to the field.

#### NOTE:

That the band-width does not allow attachments such as photos etc.

### CALL CHARGES

Calling from an Iridium to an Iridium telephone is cheaper than calling from an Iridium to a landline telephone or mobile phone, and the ordinary Iridium telephone is cheaper than the PTT version (see call charges per minute below).

If family members or other trusted persons want to call a person in the field via his/her Iridium, they should call via Polarsat following these procedures:

- Call +45 9631 7910
- Press customer ID 10372
- Press PIN code (if required) 1475
- Press the last eight digits of the Iridium telephone no., e.g. if you want to call 00 8816 3144 9626 you only dial 3144 9626.

| Call charges                      | Iridium  | PTT      |
|-----------------------------------|----------|----------|
| Iridium to Iridium (voice)        | 1.10 USD | 0.91 USD |
| Iridium to landline, mobile, data | 1.10 USD | 1.84 USD |
| Iridium used to send e-mail       | 1.10 USD | 1.84 USD |
| Text message                      | 0.10 USD | 0.15 USD |

### Garmin InReach satellite communicators

- Garmin InReach Satellite communicators offer GPS navigation tools and tracking. The InReach system allows global two-way messaging via the Iridium satellite network.
- For improved messaging capabilities, download the relevant Garmin applications to your smartphone before fieldwork.
- For improved battery life, use the Expedition setting.

### VHF radio

- VHF Radios are mainly used for maritime communication among vessels and between vessels and shore stations. In Greenland they are used on land for line-of-sight communication between team members and for coordinating with approaching helicopters.
- Works as a "Walkie-Talkie", however using different frequencies (VHF: 30–300 MHz).
- Channel 6 is often preferred as the working channel. Always agree on the preferred channel before departing from base camp or between field participants and teams.
- Be aware that the system in principle requires line-of-sight between transmitter and receiver.
- Use channel 16 for emergency calls.
- Most VHF-radios come with a dual function, allowing Channel 16 to be monitored constantly, while the radio is used for other communication using a different channel.

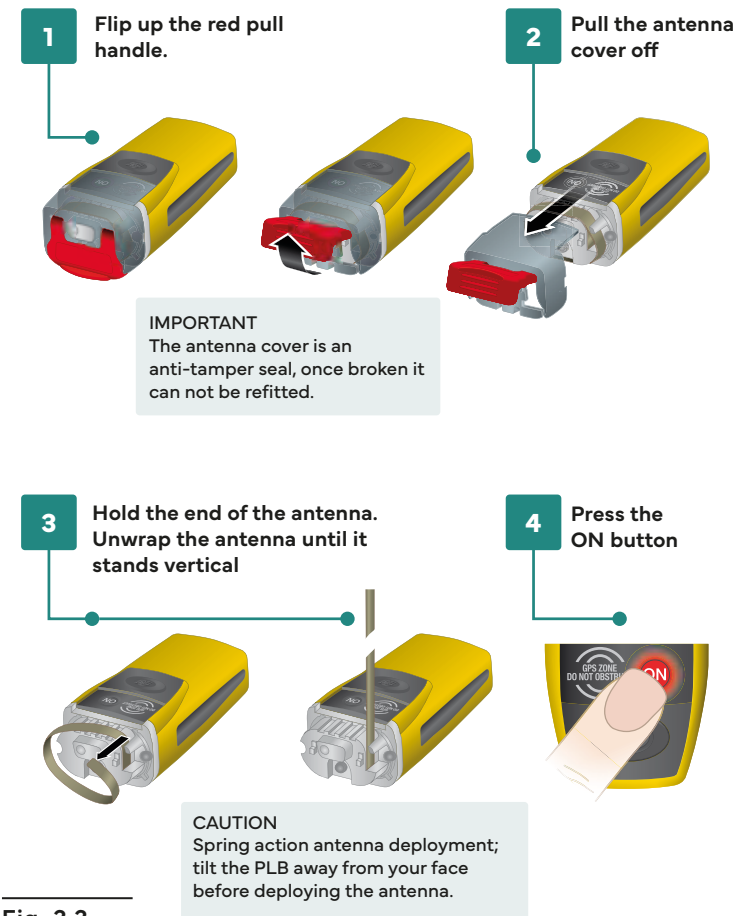
- Commercial ships are required to monitor Channel 16 constantly and 5 minutes of silence on the channel past every full and half hour should be maintained to allow weak emergency signals to get through.
- MAY-DAY procedure can be used if vessels or onshore stations are expected to be in the vicinity, see p. 69.

### Personal Locator Beacon (PLB)

- **Emergency use only!**
- PLBs should only be activated in severe emergency and imminent life-threatening danger, and only if other means of communication fail.
- The PLB is the last resort for emergency communication and rescue coordination.
- The PLB is **personal**, and each field participant is required to carry a PLB.
- The PLB should be carried in a pocket rather than in the backpack.

### ACTIVATING THE FAST FIND PLB

Only ever activate in situations of grave or imminent danger.



**Fig. 3.3**

Transmission of the first emergency alert message takes place 50 seconds after initial activation, in the event of an accidental or false activation this delay allows time for the user to turn off the Fast Find before the first alert is transmitted.



### 3.2 Fixed hours for making contact

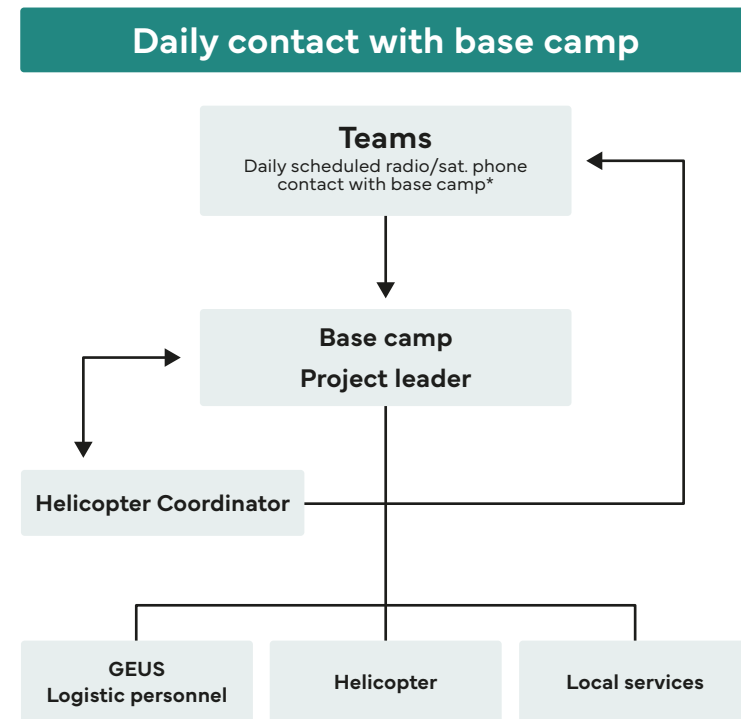
All types of fieldwork should establish fixed hours for regular contact to an outside party, to ensure appropriate action is taken in case of problems. If the fieldwork includes a basecamp and several field camps/teams in the field, base camp will establish daily contact with field teams at fixed times (usually 8 a.m. and 8 p.m.) using the following scheme p. 55.

Communication typically takes place using the push to talk (ptt) function of the satellite phone, which can include a predefined group of people.

Base camp will call field teams in numerical order and initiate the communication. Each team must be ready to report on weather conditions, planned activities, location or any specific needs (camp movement, reco trip etc.). During fixed contact hours a team can request the base camp to have communication with other teams after the radio hour.

Failure to establish contact through two consecutive planned contacts (c. 12 hours) triggers search and rescue procedures. However, in case a field team fails to report at fixed communication time, repeated attempts will be made, using additional means of communication, for a prolonged period of time, after which rescue operations may be initiated at an earlier stage.

#### Lines of communication



Always observe these lines of communication unless in an emergency.

If, for other reasons, you urgently need to change your plans and cannot reach the expedition leader/project leader, you may contact the helicopter coordinator to find out whether changes can be made without seriously affecting other teams.

**Fig. 3.4**

The diagram shows the set-up (normal setup) for expeditions with a base camp. For smaller expeditions GEUS recommends that the field participants establishes daily calls to either a local contact or to a trusted person at GEUS, and/or make sure that they can be contacted every day at a certain hour (e.g. 8 a.m. and 8 p.m.).

### 3.3 Good communication practices

Regular hours for contact should be arranged even when fieldwork does not include a basecamp with field teams and two daily hours of contact. Be sure to state where you plan to go or are already located, when you intend to leave, and when you expect to return.

Keep your satellite phone open and nearby during established regular hours for contact and for at least 15 minutes before and after regular contact hours.

**Important:** Always carry a list of important telephone numbers on you.

- › Use concise voice procedure techniques to simplify communication between the parties, see p. 57.
- › When on the “air” speak clearly and slowly and in a loud, articulated, and clear voice.
- › Only one person speaks at a time.

When possible, plan camp moves, reco-trips and ordering of equipment and food supplies well in advance by Garmin InReach or email.

If a team has an important communication to make outside of scheduled contact times, the first choice is via the satellite phone. If the team is close to the base camp, an attempt can be made by using the VHF on channel 16 or any pre-agreed channel.

#### VOICE PROCEDURE

|                                                  |                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Affirmative                                      | Yes                                                                                                                                                                                                                                                                                                                                 |
| Negative                                         | No                                                                                                                                                                                                                                                                                                                                  |
| Reading you five/everything and it is very clear | I fully understand what you say; I can understand loud and clear                                                                                                                                                                                                                                                                    |
| Reading you .., four, three, two, one            | I understand you ... varying degrees of understanding. (I can just hear you, but do not understand you)                                                                                                                                                                                                                             |
| Over                                             | I have finished talking and I am listening for your reply, short for 'over to you'.                                                                                                                                                                                                                                                 |
| Come in                                          | You may begin speaking now.                                                                                                                                                                                                                                                                                                         |
| Out                                              | I have finished talking to you and do not expect reply.                                                                                                                                                                                                                                                                             |
| Wait                                             | I do not have the answer or information to hand, I will attempt to source the answer or information requested shortly, until then I have finished, talking and do not expect a reply.                                                                                                                                               |
| Roger/Roger that                                 | I understand what you just said; ok; all right.                                                                                                                                                                                                                                                                                     |
| Copy                                             | I heard what you just said; ok; all right.                                                                                                                                                                                                                                                                                          |
| Go ahead or send your traffic                    | Send your transmission.                                                                                                                                                                                                                                                                                                             |
| Repeat/Say again                                 | Please repeat your last message.                                                                                                                                                                                                                                                                                                    |
| Standby                                          | Pause for next transmission. This does not usually entail staying off the air until the operator returns as they have used the word 'out' which indicates the transmission has ended. The net is now free for other traffic to flow but users should be aware that the previous C/S may re-initiate a Call as per their 'Wait out'. |
| Pan-pan                                          | Maritime/aviation urgency call. Repeated three times. Has priority over safety calls.                                                                                                                                                                                                                                               |
| Mayday                                           | Maritime/aviation urgency call. Repeated three times and at beginning of every following transmission relating to the current distress situation. Has priority over urgency and safety calls.                                                                                                                                       |

### Phonetic Alphabet

If urgent or if information is transmitted under poor conditions, and the phonetic alphabet can be used to spell out individual words.

| LETTER | PHONETIC | LETTER | PHONETIC |
|--------|----------|--------|----------|
| A      | Alpha    | P      | Papa     |
| B      | Bravo    | Q      | Quebec   |
| C      | Charlie  | R      | Romeo    |
| D      | Delta    | S      | Sierra   |
| E      | Echo     | T      | Tango    |
| F      | Foxtrot  | U      | Uniform  |
| G      | Golf     | V      | Victor   |
| H      | Hotel    | W      | Whisky   |
| I      | India    | X      | Xray     |
| J      | Juliet   | Y      | Yankee   |
| K      | Kilo     | Z      | Zulu     |
| L      | Lima     | Æ      | Ægir     |
| M      | Mike     | Ø      | Ødis     |
| N      | November | Å      | Åse      |
| O      | Oscar    |        |          |

### MAY DAY Procedure

In an emergency, stay calm, assess the situation, and use the following steps to call for help:

#### Sending a Distress Message

- 1 Select the correct frequency.
- 2 Speak clearly. Take your time.
- 3 Call "MAYDAY, MAYDAY, MAYDAY."
- 4 Listen for a reply.
- 5 When a reply is received.
  - Tell them who you are, where you are, and the nature of your emergency, and that you are trying to make contact with the closest permanent USAP station in your area.
  - Give any information which may assist the rescue.
- 6 If no reply is received:
  - Check your equipment.
  - Repeat your call at regular intervals -- allow listening periods between calls.

#### Action on Receipt of a Distress Message

- 1 Listen carefully. Write down the message(s) and time.
- 2 Listen for an acknowledgment from a major station.
- 3 Acknowledge the distress call
  - If another station does not acknowledge the distress call, acknowledge the distress call and retransmit the distress message to the closest permanent USAP station in your area, using the words: "MAYDAY Relay, MAYDAY Relay, MAYDAY Relay. This is..." (repeat your station call sign three times).
- 4 Give distress message as broadcast by station in distress.
- 5 Give assistance to station in distress if possible.
  - Advise your base station of what you are/are not doing.
- 6 Continue to listen in.

#### Cancellation of MAYDAY messages

If help is no longer required, don't forget to announce cancellation of your distress or urgency call!

**AVOID UNNECESSARY TRAFFIC AT ALL TIMES!**

## 4. Safety In The Field

The following guidelines emphasize the importance of proper training, caution, and adherence to safety protocols when handling firearms, explosives, and engaging in potentially hazardous activities in the field. Note that details and up-dates on safety requirements are found in GEUS' safety instructions for fieldwork.

- › Prioritize safety through common sense and proper equipment.
- › Wear bright or fluorescent clothing for visibility.
- › GEUS provides medical boxes, personal first aid kits, and emergency equipment as needed.



**Fig. 4.1**

*How not to do! In case of accident, this person will be impossible to locate. Always wear brightly coloured garments when working in the terrain. Also. stop and think. Is it really necessary to sample at this particular outcrop?*



## 4.1 Emergency equipment

GEUS supplies expeditions and camps with medical boxes containing instructions and medicines, see pp. 34–35.

Personal first aid kits include emergency blankets, flares, signal mirror, and fluorescent cloth, see pp. 18–19.

Communication devices play a crucial role in an emergency, see chapter 3 Communication, pp. 47–59.

Additional safety and emergency equipment such as firearms, polar bear fences, life vests, survival suits is provided by GEUS as needed.

## 4.2 Emergency situation

Use satellite telephone, VHF radios, Garmin Inreach, or, as a last resort, the Personal Locator Beacon (PLB), to call for help in case of accidents or serious medical conditions. Red emergency flares, heliographs, and fluorescent cloth can attract attention in the field.

### First aid emergency action principles

- › Survey the scene for safety and assess the victim's condition, see CABCADE Action Card (catastrophic hemorrhage, airways, breathing, circulation, disability, exposure/environment) Appendix G p. 117.
- › Call for help using any means of communication, see Emergency lines of communication p. 57.
- › Perform a secondary survey and provide first aid accordingly.
- › Follow the Emergency Response Procedure outlined in Appendix D pp. 100–109.
- › If applicable, use the VHF Radio and the Radio Emergency Action (Mayday procedure), p. 59.

### Medical Back-Up – Radio Medical

- › Call Radio Medical at **+45 75 45 67 66** or send an e-mail to **rmd@rsyd.dk** for medical assistance. When asked for name of the vessel, state "GEUS".
- › Provide necessary information and follow guidelines for medical consultations.
- › Use provided documents (digital format or inside Medical Box) to record observations before calling Radio Medical.

## Health Risks

### TRAUMAS

- › Trauma patients require prompt medical treatment within the first 60 minutes after injury.
- › Proper conduct and following emergency procedures can minimize treatment time and prevent complications.

### WET-COLD EXPOSURE

- › Wet clothing exposed to wind can lead to hypothermia.
- › Shelter the patient from wind and cold; remove wet clothing.
- › Wrap the person in blankets and provide warm, sweet drinks (never alcohol).
- › Avoid ambitious excursions in wet weather and always carry waterproof clothing.

### RISK OF DROWNING

#### Rescue Considerations

- › Prioritize rescuer's safety.
- › Throw floating devices for conscious victims.
- › Address panicking behavior promptly.

#### Post-Rescue Actions

- › Assess for hypothermia.
- › Remove wet clothes and wrap blankets or dry clothes around victim, see Fig. 4.2 p. 65.
- › Provide warm fluids for conscious victims (never alcohol).

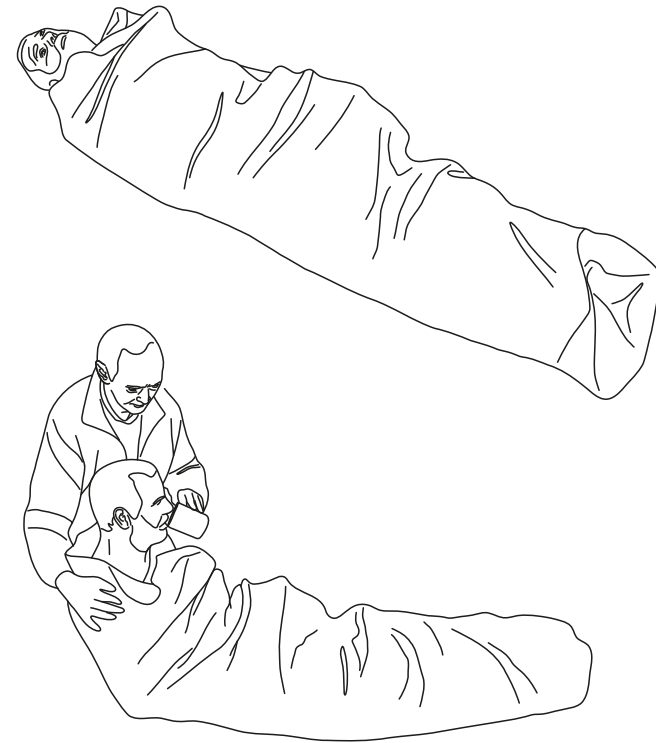


Fig. 4.2

#### Dealing with hypothermia:

1. Remove wet clothes
2. Wrap up body and legs
3. Envelope the whole person in blankets
4. Give warm beverage (no alcohol!)

**FROSTBITE****Understanding frostbite**

- › Frostbite is an injury caused by freezing of the skin and underlying tissues.
- › Risk of frostbite in freezing cold and windy or wet conditions, especially to extremities (nose, fingers, toes etc.)
- › Frostbite occurs below -1.6°C. Be aware of wind-chill factor, see table Wind-Chill-Factor, p. 67.
- › Danger of frostbite when losing feeling in fingers or feet – keep moving!
- › By quick freezing, tissue may be saved but requires careful thawing.

**Treatment and Management**

- › Warm affected areas gradually.
- › Seek medical help if thawing is unsuccessful.
- › Treat frostbite like a burn and avoid puncturing blisters.

**CARBON MONOXIDE POISONING****Prevention and Recognition**

- › Ventilate enclosed spaces with fuel-burning devices.
- › Recognize symptoms like headache, dizziness, nausea, shortness of breath and confusion.
- › Turn off combustion appliances and provide fresh air.

| WIND-CHILL FACTOR |                                                              |       |    |    |    |     |     |     |     |     |     |     |
|-------------------|--------------------------------------------------------------|-------|----|----|----|-----|-----|-----|-----|-----|-----|-----|
| Temp. in °C       | ->                                                           | 25    | 20 | 15 | 10 | 5   | 0   | -5  | -10 | -15 | -20 | -25 |
| Km/h              | m/s                                                          | knots |    |    |    |     |     |     |     |     |     |     |
| 0                 | 0                                                            | 0     | 25 | 20 | 15 | 10  | 5   | 0   | -5  | -10 | -15 | -20 |
| 7                 | 2                                                            | 4     | 25 | 20 | 15 | 9   | 5   | -1  | -6  | -11 | -16 | -21 |
| 14                | 4                                                            | 8     | 23 | 17 | 12 | 5   | 0   | -6  | -12 | -18 | -24 | -30 |
| 22                | 6                                                            | 12    | 23 | 16 | 10 | 3   | -3  | -10 | -16 | -23 | -29 | -36 |
| 29                | 8                                                            | 16    | 22 | 15 | 8  | 1   | -6  | -13 | -19 | -26 | -33 | -40 |
| 36                | 10                                                           | 19    | 21 | 14 | 7  | 0   | -7  | -15 | -22 | -29 | -36 | -43 |
| 43                | 12                                                           | 23    |    | 14 | 6  | -1  | -9  | -16 | -23 | -31 | -38 | -46 |
| 50                | 14                                                           | 27    | 13 | 6  | 6  | -2  | -10 | -17 | -25 | -32 | -40 | -47 |
| 58                | 16                                                           | 31    |    | 5  | 5  | -3  | -10 | -18 | -26 | -33 | -41 | -49 |
| 65                | 18                                                           | 35    |    |    |    | -11 | -19 | -26 | -34 | -42 | -50 | -58 |
| 72                | 20                                                           | 39    |    |    |    |     |     | -27 | -35 | -43 | -50 | -59 |
|                   |                                                              |       |    |    |    |     |     |     |     |     |     |     |
| 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.          |       |    |    |    |     |     |     |     |     |     |     |

## 4.3 Helicopter operations

### Safety protocols

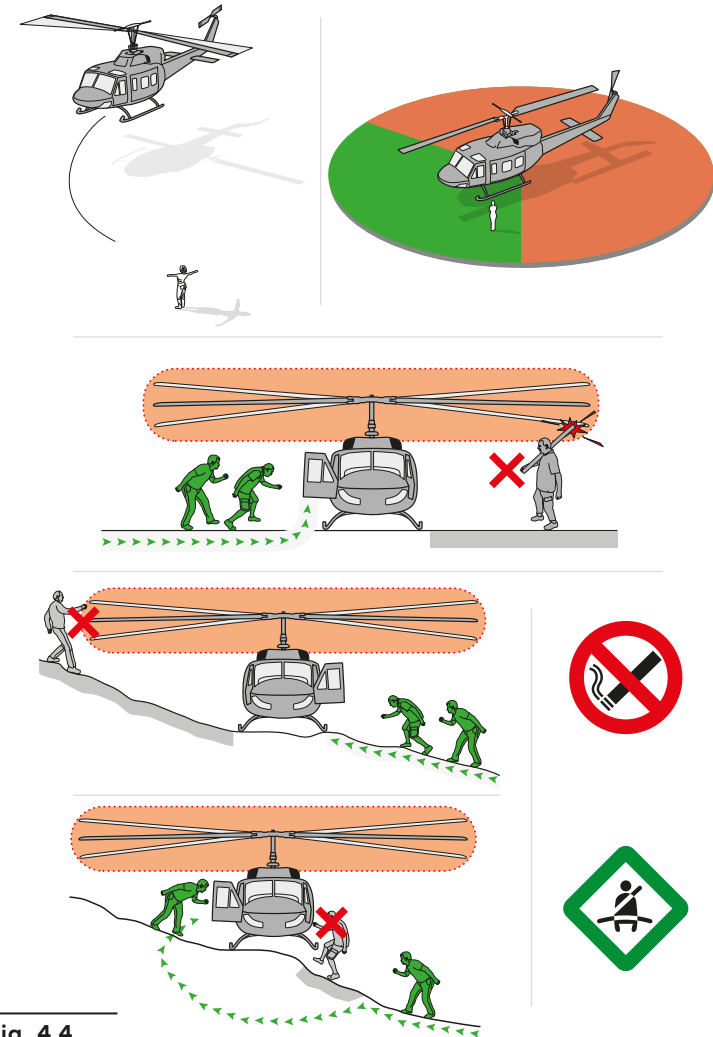
- › Always approach helicopter from the front or the side and be in sight of the pilot, see Fig. 4.4 p. 69.
- › Establish eye-contact with the pilot, and never approach until a signal is given from the pilot.
- › Follow pilot instructions and regulations.
- › Secure loose items before take-offs and landings, carry long items horizontally.
- › Stay calm during operation.
- › Ensure firearms are unloaded.
- › Avoid smoking near helicopters.

*Proper procedure during helicopter landing: Personnel crouch and remain in place, securing all loose items to prevent debris from becoming airborne due to rotor wash.*

**Fig. 4.3**



## HELICOPTER OPERATIONS



**Fig. 4.4**

*Illustration showing correct and incorrect ways to approach and board a helicopter, including crew signaling and safe zones.*

## 4.4 Boat operations

### Safety measures

- › Use safety setup from the "Safety at Sea" courses.
- › Use signaling and first aid equipment.
- › Keep a safe distance from icebergs, as they can tilt at any time, and from glacier fronts where calving may occur.
- › Avoid risky maneuvers and maintain preparedness for emergencies.
- › Read and comply with Appendix E: Safety Instructions for Rubber Boats p. 110–111.

### Mandatory safety gear

- › Wear life jackets and survival suits during small boat operations.
  - › Under certain conditions – weather permitting – one may choose not to wear the survival suit:
    1. Transport between base ship and coast.
    2. Operations so close to the coast that walking onto land is possible.
- › Bring first aid kit and signal flares.
- › Bring communication devices (satellite phone, Garmin Inreach, VHF radio, PLB).
- › Bring repair kit and paddles.
- › Bring equipment for an emergency camp.
- › If applicable, bring firearms.

### Man Overboard – Emergency Response

- › Avoid panic and minimize movement.
- › Use boat maneuvering techniques to assist the person overboard.
- › Always have someone pointing to the person overboard.



**Fig. 4.5**

*Passengers wearing survival suits seated in a life raft with equipment securely fastened to prevent loss or injury during transport.*



**Fig. 4.6**

*Survival suit offers thermal protection and inherent buoyancy, making it vital for survival in cold water.*

*In some situations, life jackets alone may be permitted – always follow the captain's instructions.*



## 4.5 Safety when rock sampling

### Safety equipment and procedures

- › Wear safety gear including glasses and gloves.
- › Adapt speed and movements to the surroundings and terrain to avoid injuries.
- › Communicate with team members to avoid accidents.
- › Follow specific instructions for drill sites and channel sawing.

### Prevention of back troubles

- › Be careful when handling heavy loads.
- › Maintain warmth and flexibility through insulation and exercises.
- › Distribute weight evenly and avoid overexertion.

## 4.6 Safety on glaciers

### Glacier safety practices

- › Use proper equipment as known from the glacier safety courses.
- › Be cautious of crevasses, snow conditions, and avalanche risks.
- › Plan according to changing terrain and weather conditions.
- › Use ropes and harnesses for travel on glaciers with risks of snow-covered crevasses.
- › Be aware of crevasse risks and avalanche danger.

### Avalanche risk – Identifying hazardous conditions

- › Recognize signs of recent snowfall and avalanche activity.
- › Assess terrain features and snow stability indicators.
- › Avoid high-risk areas during stormy or warm weather conditions.

## 4.7 Snowmobiles

### Operational safety

- › Perform pre-ride checks on snowmobiles.
- › Dress appropriately and carry emergency gear.
- › Follow fueling and maintenance procedures meticulously.

### Snowmobile safety

- › Never travel outside town or camp area with only one snowmobile.
- › Do not operate a snowmobile when impaired (alcohol or drugs).
- › Carry a snow shovel to dig out the snowmobile if stuck.
- › Bring a snow probe for checking crevasses on glaciers.
- › Bring a drill to check the thickness of sea ice when crossing fjords.

### Basic checks

- › Perform basic checks on the snowmobile before use, including suspension, track, skis, and controls.
- › Ensure proper fuel mixture for two-stroke engines and check oil levels frequently.
- › Carry sufficient fuel while operating snowmobiles.
- › Watch out for ice accumulation at the bottom of fuel canisters.
- › Park snowmobiles with caution and remove accumulated snow from the undercarriage.



**Fig. 4.7**

*Scooter driving always takes place on two separate scooters. In this picture, the photographer is sitting on the scooter in the front. The individuals are wearing scooter suits, scooter boots, scooter gloves, as well as helmets and balaclavas. The latter is necessary to avoid frostbite on the face when air seeps in through gaps in the helmet. Each scooter is equipped with a GPS that makes it possible to back-track. A rifle is mounted in a case on the side of the scooter for quick access.*

### Traveling with other drivers

- › Use hand signals for communication while traveling with other drivers.
- › Constantly monitor drivers following you and maintain visibility.
- › Gain speed before ascending steep slopes and use caution on descents.
- › Minimize travel on bare ice and be cautious of hidden obstacles.
- › Avoid driving in poor weather conditions and maintain a safe speed.

## 4.8 River crossings

- › Assess the safety of river crossings carefully, considering water depth and flow.
- › Plan routes and exits carefully and ensure proper waterproofing of gear.
- › Test water depth and move carefully through the river, keeping two points of contact (use a walking stick or similar).
- › If carried away by the current, try to stay afloat and maneuver to face downstream.

## 4.9 Wildlife safety

Most animals in Greenland are non-aggressive if left alone. Polar bears and muskoxen may be troublesome if provoked; firearms are recommended/mandatory for remote areas.

Rifles and sometimes revolvers are supplied for self-defense in uninhabited/remote areas. Authorities must be notified if an animal is killed in self-defense.

**Important:** Foxes can carry rabies; wash wounds thoroughly if bitten and seek medical advice.

*Muskoxen rarely pose problems. However, single bulls may be aggressive and territorial during the mating season, usually August. Stay at distance, find another route.*

**Fig. 4.8**



### Firearm handling and safety

- › Attend the mandatory GEUS' shooting courses before the field season.
- › Treat firearms with respect and conduct safety checks before and after use.
- › Basic safety rules include considering firearms as loaded, never aiming at something you don't want to shoot, keeping fingers away from the trigger, and ensuring a clear background.
- › Practice safe firearm handling and storage in the field, keeping weapons within reach, unloaded during cleaning, and following proper protocols in base camps.
- › Use signal flare guns and pencil flares for signaling and deterrence, following safety guidelines.
- › Ensure all field participants are properly instructed in firearm safety.
- › If needed, spend some time in the field familiarizing yourselves with the firearms, always paying attention to the safety guidelines above.

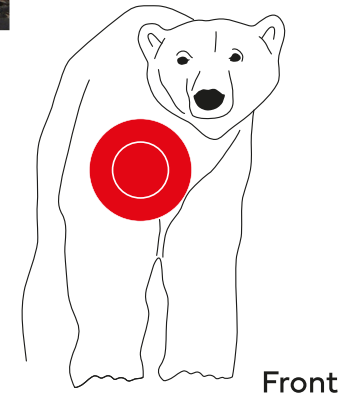
#### NOTE:

- **Rifles** Conduct the 'S-M-B' procedure when handling rifles, visually inspecting for obstructions and checking safety switches.
  - S: Safety switch** (the safety switch should be in the backward safe position).
  - M: Magazine** (open/release the magazine).
  - B: Bolt** (open the bolt and bring it into rear position, safety switch in middle position).
- **Revolvers** have no safety switch and should not be cocked when holstered.



**Fig. 4.9 & Fig. 4.10**

*Polar bear in the field and from front angle, red circle indicate recommended target area.*



### 4.10 Explosives

- › Blasting operations require specific approval from mineral authorities.
- › Blasting should only be carried out by properly trained and certified personnel.

## 5. Contacts

Find contact points of local authorities, hospitals, partners of co-operation, and other useful contacts.

A broader overview of field activities, contact points and infrastructure can be found at the portal [www.isaaffik.org](http://www.isaaffik.org) – a collaboration between scientific and educational institutions and the Danish Armed Forces sharing information and logistical solutions relevant for Greenland.

### SHIPMENTS TO/FROM GREENLAND

|                                                                   |                             |                                    |
|-------------------------------------------------------------------|-----------------------------|------------------------------------|
| <b>Royal Arctic Line (RAL)</b><br>Booking of goods from Greenland | booking@ral.gl              | +299 70 15 00                      |
| <b>Customer Services, Greenland</b>                               | kundeservice@ral.gl         | +299 31 91 00                      |
| <b>DHL Global Forwarding (Denmark) A/S</b>                        | greenland@dhl.com           | +45 36 90 55 30                    |
| <b>Kim Corfitz Nielsen,</b><br>Op. Supervisor                     | kim.corfitz.nielsen@dhl.com | +45 36 90 55 00<br>+45 36 90 55 29 |



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| <b>Head Quarter, Nuuk</b><br>www.mit.gl                                                             | mit@mit.gl  | +299 70 16 00 |
| <b>Ilulissat Airport</b><br>(open Mon–Sat: 08.00–17.00, Sun: closed)                                | bgjn@mit.gl | +299 38 27 30 |
| <b>Jakob Schytz,</b><br>Airport Manager, Ilulissat Airport                                          |             | +299 53 88 88 |
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| <b>Nerlerit Inaat Airport<br/>(Constable Point)</b><br>(open Mon–Fri: 09.00–16.00, Sat–Sun: closed) | bgco@mit.gl | +299 70 16 00 |
| <b>Nuuk Airport</b><br>(open Mon–Sat: 08.00–17.00, Sun: closed)                                     | bggh@mit.gl | +299 32 60 05 |
| <b>Qaanaaq Airport</b><br>(open Mon–Fri: 09.00–16.30, Sat–Sun: closed)                              | bgqq@mit.gl | +299 38 27 76 |
| <b>Qaarsut Airport</b><br>(open Mon–Fri: 09.00–16.00, Sat–Sun: closed)                              | bguq@mit.gl | +299 38 27 50 |
| <b>Upernavik Airport</b>                                                                            | bguk@mit.gl | +299 38 27 65 |

## AUTHORITIES

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## HOSPITALS AND HEALTH CARE CENTERS

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| <b>Dronning Ingrids Hospital – Nuuk</b>    | dihshv@peqqik.gl | +299 64 40 00 |
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| <b>Ilulissat Regional Hospital</b>         |                  | +299 94 32 11 |
| <b>Nanortalik Hospital</b>                 |                  | +299 61 32 11 |
| <b>Qaqortoq Regional Hospital</b>          |                  | +299 64 22 11 |
| <b>Sisimiut Regional Hospital</b>          |                  | +299 86 42 11 |
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| <b>Hotel Aurora</b> | connect@greenland-escape.com | +299 38 40 45 |
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|                         |                              |               |
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| <b>Police Office Ittoqqortoormiit</b> |                  | +299 99 10 22                  |
| <b>Police Office Ilulissat</b>        |                  | +299 94 32 22                  |
| <b>Police Office Kangerlussuaq</b>    |                  | +299 70 13 24                  |
| <b>Police Office Maniitsoq</b>        |                  | +299 81 32 22                  |
| <b>Police Office Nanortalik</b>       |                  | +299 70 11 23                  |
| <b>Police Office Narsaq</b>           |                  | +299 70 11 24                  |
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| <b>Police Office Qeqertarsuaq</b>     |                  | +299 92 12 22                  |
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| <b>Tusass (Tele Post) Nuuk</b>               |                             | +299 36 40 94                  |
| <b>DMI Weather Report Services, Nuuk</b>     | onuuk@dmil.gl               | +299 84 10 22<br>+299 97 10 27 |
| <b>Danmarks Meteorologiske Institut, DMI</b> | www.dmi.dk                  | +45 39 15 75 00                |
| <b>Meteorologisk Institutt, NRK</b>          | www.yr.no                   |                                |

**TRAVEL AGENCIES**

|                                                                                                          |                          |                 |
|----------------------------------------------------------------------------------------------------------|--------------------------|-----------------|
| <b>Carlson Wagonlit Travel – Copenhagen</b>                                                              | staten.dk@contactcwt.com | +45 33 63 77 65 |
| <b>Greenland Travel – Copenhagen</b>                                                                     | info@greenland-travel.dk | +45 33 13 10 11 |
| <b>Tina Mogensen, Head of Department</b>                                                                 | tm@greenland-travel.dk   | +45 33 76 62 26 |
| <b>Greenland Travel – Ilulissat</b>                                                                      |                          | +299 94 75 40   |
| <b>Greenland Travel – Nuuk</b>                                                                           | nuuk@greenland-travel.gl | +299 34 85 85   |
| <b>Greenland Travel – Nuuk</b><br>Hotline (24/7)*<br>*Surcharge of DKK 500 outside office hours: 8am–4pm |                          | +299 55 22 93   |
| <b>Rejseenheden</b>                                                                                      | rejsebestilling@ens.dk   |                 |

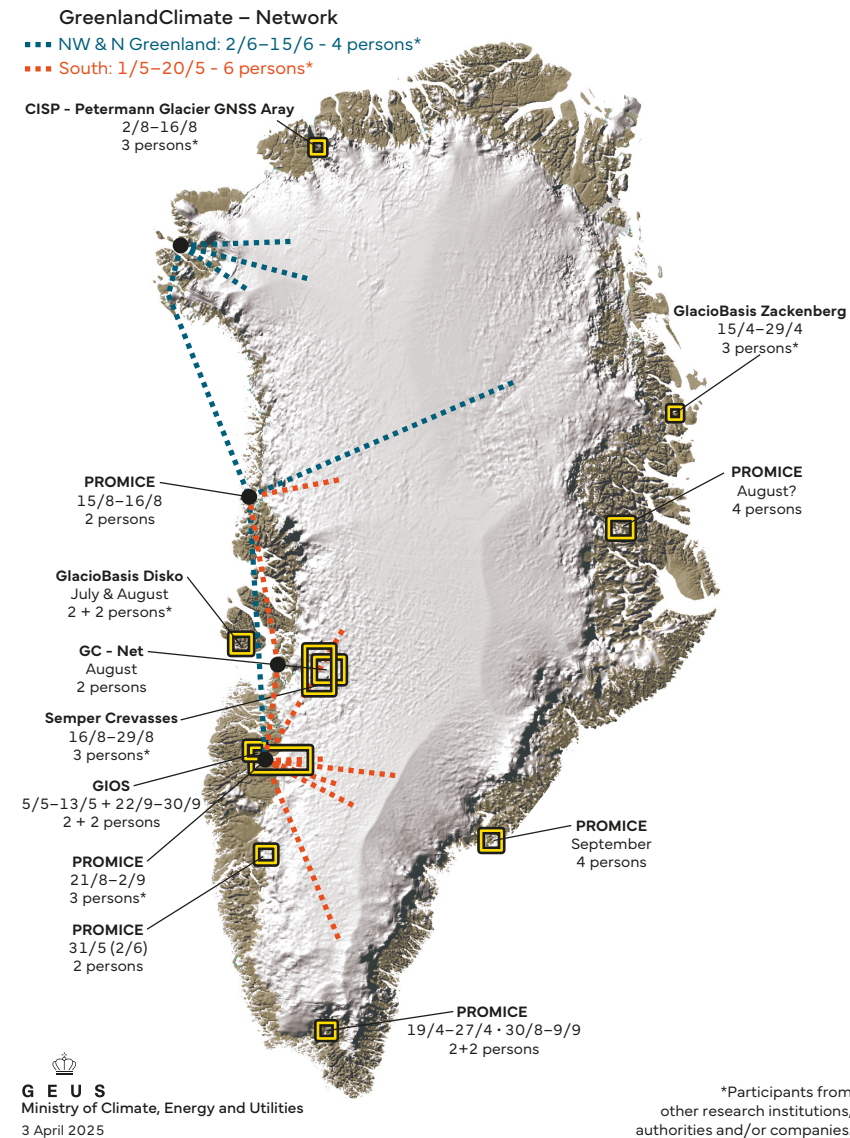


# APPENDIXES

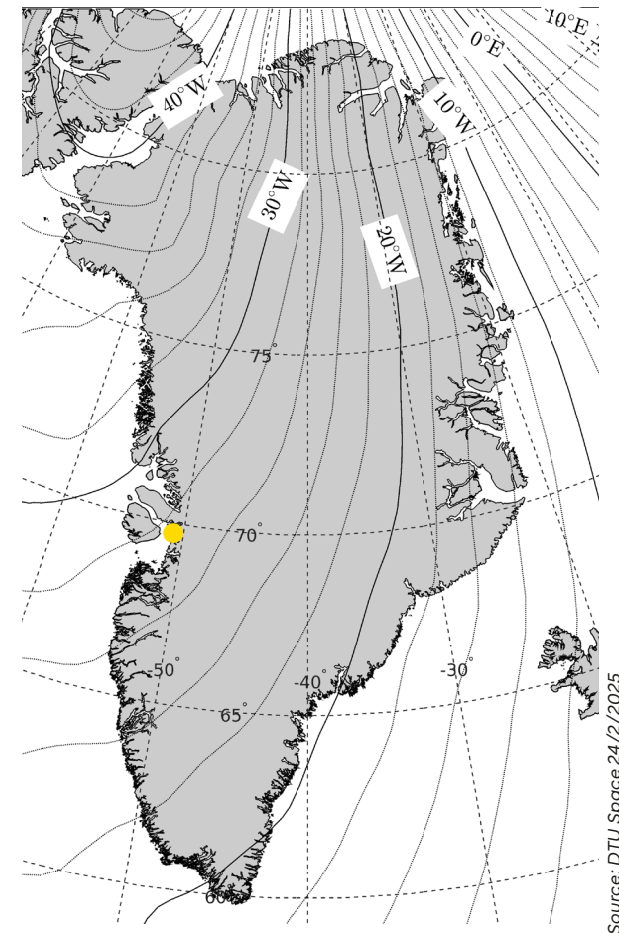
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## Appendix A: Map of Field Activities 2025



## Appendix B: Magnetic Variation in 2025



Greenland lies relatively close to the North magnetic pole. The deviation is large and varies from year to year.

It is therefore necessary to adjust any compass to the local magnetic deviation so that all field measurements are automatically made with respect to true North.

## Appendix C: Conversion Tables

| SPEED CONVERSION                                                                                                            |        |        |        |      |        |
|-----------------------------------------------------------------------------------------------------------------------------|--------|--------|--------|------|--------|
| Unit of Speed                                                                                                               | m/s    | km/h   | mph    | nm/h | kn     |
| 1 m/s                                                                                                                       | 1      | 3.60   | 2.2369 |      | 1.9438 |
| 1 km/h                                                                                                                      | 0.2777 | 1      | 0.6214 |      | 0.5400 |
| 1 mph                                                                                                                       | 0.4470 | 1.6093 | 1      |      | 0.8690 |
| 1 nm/h                                                                                                                      |        |        |        | 1    | 1      |
| 1 kn                                                                                                                        | 0.5144 | 1.8520 | 1.1508 | 1    | 1      |
| Meters per second = m/s    Kilometer per hour = km/h    Miles per hour = mph<br>Nautical mile per hour = nm/h    Knots = kn |        |        |        |      |        |

| DISTANCE AND LENGTH CONVERSION |                      |
|--------------------------------|----------------------|
| Unit name                      | Equivalents          |
| Millimeter to Centimeter       | 1 mm = 0.10 cm       |
| Centimeter to Millimeter       | 1 cm = 10 mm         |
| Meter to Centimeter            | 1 m = 100 cm         |
| Meter to Feet                  | 1 m = 3.2808 Feet    |
| Kilometer to Meter             | 1 km = 1000 m        |
| Kilometer to Miles             | 1 km = 0.6214 Miles  |
| Inch to Centimeter             | 1 inch = 2.54 cm     |
| Foot to Meter                  | 1 foot = 0.3048 m    |
| Foot to Inches                 | 1 foot = 12 inches   |
| Yard to Feet                   | 1 Yard = 3 Feet      |
| Furlong to Feet                | 1 Furlong = 660 Feet |
| Mile to Feet                   | 1 Mile = 5280 Feet   |
| Mile to Kilometer              | 1 Mile = 1.6093 km   |
| Nautical Mile to Kilometer     | 1 nm = 1.852 km      |

| GEOGRAPHIC COORDINATES CONVERSIONS                                                                                                                                                                                                                                                                              |                              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| Informally, specifying a geographical location usually means giving the location's latitude and longitude. The numerical values for latitude and longitude can occur in a number of different formats:                                                                                                          |                              |
| Coordinate Formats                                                                                                                                                                                                                                                                                              | Example                      |
| degrees° minutes' seconds"                                                                                                                                                                                                                                                                                      | 40° 26' 46" N, 79° 58' 56" W |
| degrees° decimal minutes'                                                                                                                                                                                                                                                                                       | 40° 26.767' N, 79° 58.933' W |
| decimal degrees°                                                                                                                                                                                                                                                                                                | 40.446° N, 79.982° W         |
| <b>Note:</b> that geographic coordinates given during internal communication (via RACAL MF radio, VHF, satellite telephone, or email via satellite telephone) between field teams and a GEUS base camp normally are given by degrees decimal minutes (this is also what the helicopter pilots normally prefer). |                              |
| Coordinate Formulas and Conversions                                                                                                                                                                                                                                                                             |                              |
| <b>Note:</b> 1 degree = 60 minutes    1 minute = 60 seconds    1 degree = 3600 seconds                                                                                                                                                                                                                          |                              |
| <b>CONVERSION FORMAT:</b>                                                                                                                                                                                                                                                                                       |                              |
| degrees° minutes' seconds" to decimal degrees°                                                                                                                                                                                                                                                                  |                              |
| <b>CONVERSION FORMULA:</b>                                                                                                                                                                                                                                                                                      |                              |
| $\text{degrees} + \frac{\text{minutes}}{60} + \frac{\text{seconds}}{3600} = \text{decimal degrees}$                                                                                                                                                                                                             |                              |
| <b>CONVERSION FORMAT:</b>                                                                                                                                                                                                                                                                                       |                              |
| decimal degrees° to degrees° minutes' seconds"                                                                                                                                                                                                                                                                  |                              |
| <b>CONVERSION FORMULAS:</b>                                                                                                                                                                                                                                                                                     |                              |
| $\text{degrees} = [\text{decimal degrees}]$                                                                                                                                                                                                                                                                     |                              |
| $\text{minutes} = [60 \times (\text{decimal degrees} - \text{degrees})]$                                                                                                                                                                                                                                        |                              |
| $\text{seconds} = [3600 \times (\text{decimal degrees} - \text{degrees} - \frac{\text{minutes}}{60})]$                                                                                                                                                                                                          |                              |
| where the notation [x] means take the integer part of x.                                                                                                                                                                                                                                                        |                              |

| TEMPERATURE CONVERSION                            |  |         |                                   |
|---------------------------------------------------|--|---------|-----------------------------------|
| Conversion scala from Fahrenheit to Celcius       |  |         |                                   |
| Fahrenheit                                        |  | Celcius |                                   |
| °F                                                |  | °C      |                                   |
| 212                                               |  | 100     | Boiling point of water            |
| 194                                               |  | 90      |                                   |
| 176                                               |  | 80      |                                   |
| 158                                               |  | 70      |                                   |
| 140                                               |  | 60      |                                   |
| 122                                               |  | 50      |                                   |
| 104                                               |  | 40      | Average body Temp. 37°C (98.6°F)  |
| 86                                                |  | 30      |                                   |
| 68                                                |  | 20      |                                   |
| 50                                                |  | 10      |                                   |
| 32                                                |  | 0       | Freezing (melting) point of water |
| 14                                                |  | -10     |                                   |
| -4                                                |  | -20     |                                   |
| -22                                               |  | -30     |                                   |
| -40                                               |  | -40     |                                   |
| -58                                               |  | -50     |                                   |
| -76                                               |  | -60     |                                   |
| -94                                               |  | -70     |                                   |
| -112                                              |  | -80     |                                   |
| -130                                              |  | -90     |                                   |
| -148                                              |  | -100    |                                   |
|                                                   |  |         |                                   |
| Conversion Formulas                               |  |         |                                   |
| Note: °F : Fahrenheit °C : Celcius                |  |         |                                   |
| $^{\circ}C = (^{\circ}F - 32) \times \frac{5}{9}$ |  |         |                                   |
| $^{\circ}F = (^{\circ}C \times \frac{9}{5}) + 32$ |  |         |                                   |

| BEAUFORT WIND FORCE SCALE            |                 |                  |                      |                  |                          |                                             |                                                     |          |                       |
|--------------------------------------|-----------------|------------------|----------------------|------------------|--------------------------|---------------------------------------------|-----------------------------------------------------|----------|-----------------------|
| Specifications and equivalent speeds |                 |                  |                      |                  |                          |                                             |                                                     |          |                       |
| Beaufort wind scale                  | Mean Wind Speed |                  | Limits of wind speed |                  | Wind descriptive terms   | Probable wave height in metres <sup>1</sup> | Probable maximum wave height in metres <sup>2</sup> | Seastate | Sea descriptive terms |
|                                      | Knots           | ms <sup>-1</sup> | Knots                | ms <sup>-1</sup> |                          |                                             |                                                     |          |                       |
| 0                                    | 0               | 0                | <1                   | <1               | Calm                     | -                                           | -                                                   | 0        | Calm (glassy)         |
| 1                                    | 2               | 1                | 1-3                  | 1-2              | Light air                | 0.1                                         | 0.1                                                 | 1        | Calm (rippled)        |
| 2                                    | 5               | 3                | 4-6                  | 2-3              | Light breeze             | 0.2                                         | 0.3                                                 | 2        | Smooth (wavelets)     |
| 3                                    | 9               | 5                | 7-10                 | 4-5              | Gentle breeze            | 0.6                                         | 1                                                   | 3        | Slight                |
| 4                                    | 13              | 7                | 11-16                | 6-8              | Moderate breeze          | 1                                           | 1.5                                                 | 3-4      | Slight-Moderate       |
| 5                                    | 19              | 10               | 17-21                | 9-11             | Fresh breeze             | 2                                           | 2.5                                                 | 4        | Moderate              |
| 6                                    | 24              | 12               | 22-27                | 11-14            | Strong breeze            | 3                                           | 4                                                   | 5        | Rough                 |
| 7                                    | 30              | 15               | 28-33                | 14-17            | Near gale                | 4                                           | 5.5                                                 | 5-6      | Rough-Very rough      |
| 8                                    | 37              | 19               | 34-40                | 17-21            | Gale                     | 5.5                                         | 7.5                                                 | 6-7      | Very rough-High       |
| 9                                    | 44              | 23               | 41-47                | 21-24            | Strong gale <sup>3</sup> | 7                                           | 10                                                  | 7        | High                  |
| 10                                   | 52              | 27               | 48-55                | 25-28            | Storm                    | 9                                           | 12.5                                                | 8        | Very High             |
| 11                                   | 60              | 31               | 56-63                | 29-32            | Violent storm            | 11.5                                        | 16                                                  | 8        | Very High             |
| 12                                   | -               | -                | 64+                  | 33+              | Hurricane                | 14+                                         | -                                                   | 9        | Phenomenal            |

## Appendix D: Emergency Response Procedure

### SUMMARY

#### Background

As a result of the evaluation of the field season 2016, GEUS decided to make a formal Emergency Response Procedure (ERP) in order to get a clearer understanding of the roles and the responsibilities in the event of an accident or serious illness during fieldwork in Greenland. The procedure was processed and approved by the Fieldwork Safety Committee, under the Working Environment Committee on 10 May 2017. Updates of relevant names, telephone numbers and new requirements have been made in later versions. This version is updated in December 2025.

The purpose of an Emergency Response Procedure is to protect life and minimize the extent of the accident.

#### Roles and responsibility

Four groups of key players have been identified to have a role in connection with serious illness, incidents or accidents in Greenland:

1. Persons on site
2. Primary contacts
3. GEUS' Emergency Response Team
4. Secondary contacts.

The roles and responsibilities of the constituents of the four groups are described at pp. 104–105, together with their contact information.

The emergency call procedure from the field is summarized in a flow chart, p. 103. The flowchart concentrates on the main agents involved in the first phases of an accident, namely the persons and other players (e.g. a base camp) on site and the Primary contacts. The flowchart is made simple in order to give the persons close to the emergency space to assess the correct action in the situation.

### PRIMARY CONTACTS AND THEIR ROLES

#### Greenland's official SAR preparedness Plan

The Police in Nuuk is a Primary contact in GEUS' Emergency Response Procedure. In the event of a critical / serious accident or incident, participants in GEUS fieldwork will be covered by Greenland's official SAR preparedness Plan. The Preparedness Plan is shared

between JRCC (Joint Rescue Coordination Center) and the Police in Nuuk, who is responsible for the naval and aviation management and the local search and rescue, respectively. The distribution of responsibilities, tasks, etc. is described in this document (in Danish) latest update November 2022.

#### Police

As GEUS fieldwork is mainly carried out on land or close to the coast (local waters), the Police in Nuuk is a Primary contact in GEUS' ERP. Any rescue operation, whether at sea or on land, must therefore be reported to the Police in Nuuk.

#### Radio Medical

Radio Medical is included in the ERP as a Primary Contact. Radio Medical is a 24-hour emergency center (with a total of seven doctors), to which GEUS fieldwork participants can call around the clock and get in contact with a medical doctor. Radio Medical is the Emergency Response Center of all Danish seafarers. GEUS has made an agreement with RM to be able to use their services, on the condition that we follow the same guidelines as other users of Radio Medical.

#### GEUS' Duty Officer

The Duty Officer (bagvagt) at GEUS is a Primary Contact and is central to the ERP. The Duty officer is either a head of department or an employee with extensive field experience appointed to be responsible for taking calls from participants in GEUS fieldwork. A crucial aspect of the Duty Officer's function is to assist the persons on site (close to the emergency) with any practical and necessary actions and calls, see p. 104.

Further, role of the Duty officer is to assist the injured/sick and/or their colleague(s) / project leader with an immediate assessment of the situation and to contribute with sparring and support of how to manage the immediate situation. For example, it may be appropriate for the Duty Officer to contact Radio Medical, the Police or the relatives of a sick or injured person.

In case of an accident more serious of nature, the Duty Officer must contact GEUS' management as soon as possible and inform them about the situation.



A special Emergency telephone number is linked to the Duty Officer's primary phone for an agreed period of time. The telephone numbers of persons on call during the field season are part of a telephone rotation system that forwards a call to the next colleague in case the Duty Officer does not answer his/her phone – to ensure that emergency calls from the field are always answered.

The Duty Officer has access to all relevant documents regarding Fieldwork in Greenland (FeltarbejdeGrønland) on a special drive with updated lists of fieldwork participants, next of kin, field parties and expeditions (including contact numbers), together with an overview of the persons linked to specific 'PLBs (Personal Locator Beacons).

**PREPARATION AND REVIEW OF SECURITY PROCEDURES**

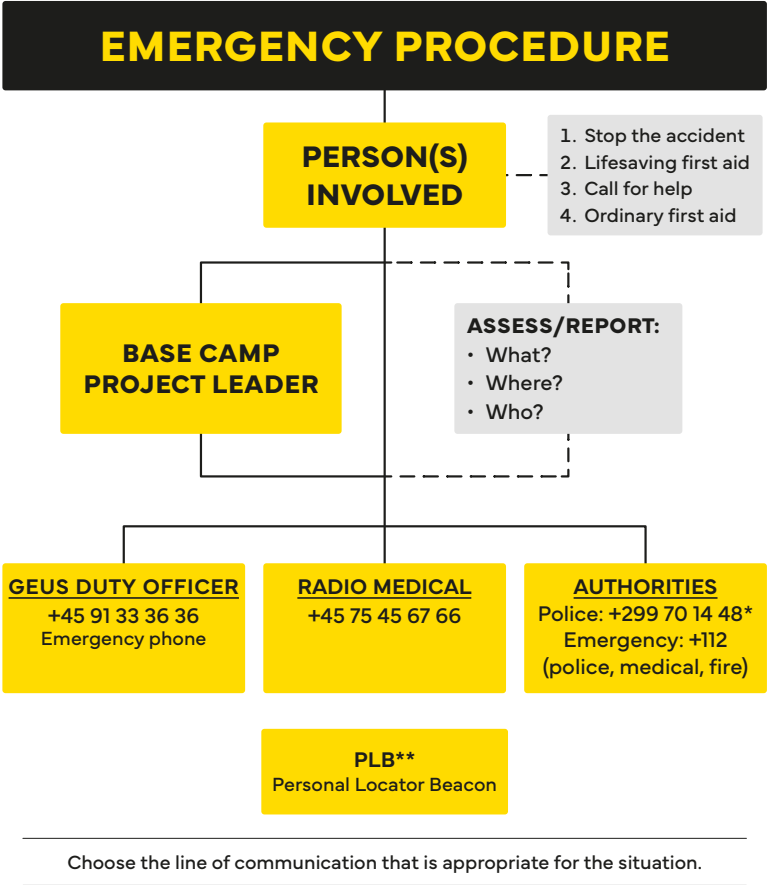
A huge part of GEUS' efforts to avoid accidents consist in thorough preparation before going to the field, and evaluations and follow-up on safety and occupational health issues. Preparations before fieldwork

include health clearance of all field participants, mandatory updated safety courses and quality equipment. All field parties or participants in GEUS fieldwork are equipped with means of communications such as VHF, PLB and satellite phone.

All relevant formalities and rules regarding GEUS fieldwork in Greenland are assembled in "Safety Instructions for fieldwork in Greenland". Further, GEUS has a Field Manual (Field Instructions and Standards), describing guidelines, procedures and circumstances to consider and act on during fieldwork in Greenland.

The expedition leader or project leader assumes the role of safety officer (unless designated to someone else) for the specific expedition. The project leader is also responsible for working out a field plan and safety assessment for the planned fieldwork well ahead of departure from Denmark.

Meetings must be held with the field participants to review and discuss safety aspects and special conditions for the specific expedition, and the head of department must sign the document.



*\*The police has the authority to set in motion Search and Rescue (SAR) operations.  
\*\*To be activated only as the ultimate resort in case of life threatening emergencies. PLB's are connected to Greenland's Joint Rescue Coordination Centre (JRCC). Activating the PLB sets a full Search and Rescue (SAR) operation in motion. See guidelines on p. 55.*

**Fig. Appendix D: Flowchart – Emergency Procedure**

Flowchart indicating the immediate options for assistance for people in need while in the field. The actual situation will determine which solution is the best. In an emergency a field participant may also choose to contact one of the other contacts listed, see below, or any other contacts in the area or in the network, deemed appropriate for the situation.

| EMERGENCY MANAGEMENT – KEY ROLES AND RESPONSIBILITIES |                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PERSONS ON SITE<br>BASE CAMP/PROJECT LEADER           |                                        | <ul style="list-style-type: none"> <li>• Stops the accident/assists with lifesaving first aid/calls for help/provides ordinary first aid.</li> <li>• Arranges help/evacuation by means of helicopter/plane – if available</li> <li>• Decides whether or not the situation calls for immediate action, e.g. to use the PLB<sup>1</sup> or call to police in Nuuk for assistance (SAR)</li> <li>• Contacts Radio Medical<sup>2</sup></li> <li>• Contacts Duty Officer at GEUS (Bagvagt)</li> </ul> |
|                                                       |                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| PRIMARY CONTACTS                                      | Duty Officer (Bagvagt)                 | <ul style="list-style-type: none"> <li>• On duty 24/7 to take calls from field participants/project leaders in case of illness or serious injury that call for immediate action.</li> <li>• Helps evaluating the action to be taken (SAR, inform authorities/police/next of kin etc.) together with employees on site and GEUS Management</li> <li>• Coordinates and decides communication strategy with GEUS Management</li> </ul>                                                              |
|                                                       | Radio Medical                          | <ul style="list-style-type: none"> <li>• Assists with medical advice + surveillance of patient/injured, until the person is well OR can be evacuated/transported home.</li> </ul>                                                                                                                                                                                                                                                                                                                |
|                                                       | Police (Chief Constable Office) – Nuuk | <ul style="list-style-type: none"> <li>• Is responsible for the management of local rescue service, i.e. SAR operations in coastal sea areas and ashore.</li> </ul>                                                                                                                                                                                                                                                                                                                              |
| EMERGENCY RESPONSE TEAM (GEUS)                        | GEUS Management                        | <ul style="list-style-type: none"> <li>• Helps evaluating the action to be taken and gives 'go' to SAR.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                               |
|                                                       | Head of press and communication        | <ul style="list-style-type: none"> <li>• Controls what information comes out/minimizes rumors.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                        |
|                                                       | Daily safety officer                   | <ul style="list-style-type: none"> <li>• Reports incident/accident to The National Board of Labour Market Insurance.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                  |
|                                                       | Logistics coordinators                 | <ul style="list-style-type: none"> <li>• Assists with any tasks needed to keep situation under control.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                               |

| EMERGENCY MANAGEMENT – KEY ROLES AND RESPONSIBILITIES |                                                 |                                                                                                                                             |
|-------------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| SECONDARY CONTACTS                                    | Queen Ingrid Hospital, Nuuk                     | • Central hospital for Nuuk and for all of Greenland.                                                                                       |
|                                                       | Tasiilaq Hospital                               | • Local hospital on the East coast of Greenland.                                                                                            |
|                                                       | Air Greenland                                   | • Assists in rescue operations in all parts of Greenland. (SAR will in most cases be initiated by the Police in Nuuk)                       |
|                                                       | Norlandair                                      | • Can assist with evacuations (air ambulance), especially from the East coast of Greenland to Iceland.                                      |
|                                                       | Blue West Helicopter                            | • Can assist in rescue operations, especially on the East coast of Greenland, when helicopters are in Greenland.                            |
|                                                       | Poison Control Hotline – Giftlinjen             | • Offers assistance in the event of ingestion/absorption of poisonous substances.                                                           |
|                                                       | Europæiske Travel Insurance Alarm Center (24/7) | • Assists with the repatriation of persons (sick, injured or deceased). Assistance must be closely coordinated with Radio Medical and GEUS. |
|                                                       | Falck Health Care                               | • Offers assistance by psychologists (debriefing) for individuals and groups.                                                               |
|                                                       | The National Board of Labour Market Insurance   | • Receives and handles claims of industrial injury.                                                                                         |

<sup>1</sup> Please notice that no feedback will be given when the alarm has been released, i.e. one do not know if and when the emergency call has been received.

Therefore – whenever possible – direct contact to the police in Nuuk will always be the best solution.

<sup>2</sup> Radio Medical's guidelines and instructions must be followed. Upon request about name of ship, 'GEUS' should be informed.

| EMERGENCY MANAGEMENT – CONTACTS |                                                                                  |                             |                                                |
|---------------------------------|----------------------------------------------------------------------------------|-----------------------------|------------------------------------------------|
|                                 | Navn                                                                             | E-mail                      | Telefon                                        |
| PRIMARY CONTACTS                | <b>GEUS Duty officer (Bagvagt)</b>                                               |                             | +45 91 33 36 36                                |
|                                 | <b>Radio Medical* (24/7)</b><br>Upon request about name of ship, inform: 'GEUS'  | rmd@rsyd.dk                 | +45 75 45 67 66                                |
|                                 | <b>Police (Chief Constable Office) – Nuuk</b>                                    | politi@politi.gl            | +299 70 14 48                                  |
| EMERGENCY RESPONSE TEAM (GEUS)  | <b>GEUS' management</b><br>Flemming Larsen<br>Anne Merete Koefoed                | flar@geus.dk<br>amk@geus.dk | +45 91 33 34 04<br>+45 20 75 78 31             |
|                                 | <b>Head of press and communication</b><br>Anja Fonseca                           | anfon@geus.dk               | +45 41 23 99 92                                |
|                                 | <b>Daily safety officer</b><br>Uli Heyden                                        | uh@geus.dk                  | +45 91 33 34 53                                |
|                                 | <b>Logistics coordinator</b><br>Marianne Vestergaard                             | mve@geus.dk                 | +45 31 10 30 38                                |
|                                 | <b>Logistics coordinator</b><br>Henrik Spanggaard                                | hsp@geus.dk                 | +45 20 85 33 79                                |
| SECONDARY CONTACTS              | <b>Queen Ingrid Hospital, Nuuk</b><br>Rescue Service, Nuuk                       |                             | +299 34 40 00<br>+299 34 44 00                 |
|                                 | <b>Tasiilaq Health Center</b>                                                    |                             | +299 98 12 11                                  |
|                                 | <b>Air Greenland, Charter</b><br>24 hour contact                                 |                             | +299 34 34 34<br>+299 34 31 40                 |
|                                 | <b>Norlandair (air ambulance, East coast)</b><br>Fridrik Adolfsson (Frissi), CEO |                             | +354 899 7300 (emergency no.)<br>+354 894 5390 |
|                                 | <b>Blue West Helicopter</b><br>Sigtryggur Kristofersson (Diddi), CEO             |                             | +299 28 27 29<br>+354 895 5656 / 557 1557      |
|                                 | <b>Giftlinjen (24/7)</b>                                                         |                             | +45 82 12 12 12                                |
|                                 | <b>Europæiske Travel Insurance</b><br>Alarm Center (24/7)                        |                             | +45 70 10 90 30                                |
|                                 | <b>Falck Health Care</b>                                                         |                             | +45 70 10 20 12                                |
|                                 | <b>The National Board of Labour Market Insurance</b>                             | aes@aes.dk                  | +45 72 20 60 00                                |

\*Radio Medical's guidelines and instructions must be followed.

#GEUS policy no: 008 314 169 (CVR no. must be informed: 5514 5016)

| GEUS' DUTY OFFICER – INSTRUCTIONS                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Situation                                                                                                                                                              | The Duty Officer must...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>PREPAREDNESS PLAN – EMERGENCY TELEPHONE</b>                                                                                                                         | <ul style="list-style-type: none"> <li>All persons (management level) included in GEUS' Preparedness Plan for the field season should be aware of the schedule for the whole season. All involved receive calls in rotation (i.e., if the Duty Officer does not take a call, the call is automatically forwarded to the next person on the list). Duty officers participating in the Preparedness Plan are expected to have their telephone available and open.</li> <li>The Duty Officer on watch must have his/her telephone charged and open at all times (not on 'silent' or 'off').</li> <li>The Duty Officer must be able to access all relevant documents (emergency contact numbers, sat phone numbers, list with next of kin etc.) within no more than one hour at the <b>FeltarbejdeGrønland</b> drive. Alternatively, the Duty Officer must have an updated print of the documents, or a USB memory stick with the documents.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>CALLS FROM THE FIELD</b>                                                                                                                                            | <ul style="list-style-type: none"> <li>The Duty Officer on watch takes all calls from all participants in GEUS fieldwork. Calls will likely be from a mobile or a satellite telephone with poor connection and poor sound, and several breaks during the call must be expected.</li> <li>If the line falls out, the Duty Officer must keep his/her telephone charge open and await another call from the field.</li> <li>The Duty Officer must first get an idea of the severity of the call (yellow, green, red, see below) and next – as soon as possible – to get answers to the following questions:               <ol style="list-style-type: none"> <li>1. First quickly identify the urgency of the call, see below</li> <li>2. What happened?</li> <li>3. Who is calling?</li> <li>4. Where is the caller?</li> <li>5. What options of solutions are available locally to get help?</li> <li>6. What efforts have been done so far to help/alleviate the situation?</li> <li>7. Should reporting be made to anyone?</li> </ol> </li> <li>If the call of a field party or expedition has been identified, the Duty Officer should – whenever possible – find out their vicinity to hospitals, field stations or base camps (e.g. of the Military, Research or the like). The Duty Officer should also seek any other information about the call from the field (number of participants, period of fieldwork etc.).</li> <li>The Isaaffik.org website gives a good overview of towns, settlements, infrastructure and a range of relevant players in Greenland, including contact information.</li> </ul> |
| The responsibility and the duties of the Duty Officer increase with the severity and the scope of the call – outlined schematically below with examples of situations. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>GREEN SITUATION</b>                                                                                                                                                 | <ul style="list-style-type: none"> <li>There is <b>no danger to life</b> or wellbeing of the field team.</li> <li>Calls from the field should be answered and managed relatively quickly. The Duty Officer may have to help out changing an air ticket, find contact information for a person or a company. In those cases the Duty Officer will do as requested, and he/she does not need to inform any colleagues in GEUS, unless he/she finds it would be useful.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

## CALLS FROM THE FIELD TO/FROM DUTY OFFICER – LOG

[illegible]

|           |       |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|-----------|-------|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| DK        | UTC+2 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 1  | 2  | 3  | 4  |
| EGR/ICEL. | UTC   | 5 | 6 | 7 | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 1  | 2  |
| W+N GR    | UTC-2 | 3 | 4 | 5 | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |

## Appendix E:

### Safety at sea | Rubber Boats

| SAFETY INSTRUCTIONS FOR GEUS' RUBBER BOATS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| This safety instruction applies to GEUS' rubber boats                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| Rubber boats from GEUS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| <b>1. Identification of the owner</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| Geological Survey of Denmark and Greenland (GEUS)<br>Øster Voldgade 10, DK-1350 Copenhagen K, Denmark                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| <b>2. Sailing activities</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| <ul style="list-style-type: none"> <li>The rubber boat is used in connection with geological fieldwork in Greenland.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| <b>3. Identification of risks</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
| <ul style="list-style-type: none"> <li>Man overboard is the largest risk when sailing rubber boats. It is crucial that all persons using the rubber boat wear life jackets, and in many cases even survival suits.</li> <li>A person who has fallen over board must be brought back in the boat as quickly as possible. Another risk is failure of the outboard motor; hence a repair kit must always be in the boat. Unforeseen changes in weather conditions, such as increasing wind or fog must always be taken into account.</li> </ul>                                                                                                                                                                                                                                                                                         |  |
| <b>4. Measures to address risks</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <ul style="list-style-type: none"> <li>We recommend that at least two persons are onboard while sailing. Always use the kill cord lanyard on the dead-man button (dødemandsknap).</li> <li>Be careful when entering or leaving the boat. Never wear a heavy rucksack that can pull you down if you fall into the water.</li> <li>Always wear life jackets and, where appropriate, survival suits.</li> <li>Bring a small spare outboard motor during long trips in isolated areas.</li> <li>Use a lifeline in rough weather.</li> <li>Do not sail close to icebergs; remember they are a lot larger under water than above water and that they can tip over and cause tsunamis of different sizes.</li> <li>Before departure consider good places to anchor (nødhavne) if the weather changes, this can happen very fast.</li> </ul> |  |
| <b>5. Description of the vessel and equipment</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
| The rubber boat is 4.3m long and 1.75m wide, it has a 25 HP outboard motor HP outboard motor, and is equipped with a repair kit, an extra propeller and spare pins to the propeller.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
| <b>6. The crew and its competence</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| The driver of the boat must have taken a course in rubber boat driving or otherwise be familiar with sailing. The driver must also have an updated first aid course, i.e. max. 2 years old.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |

| SAFETY INSTRUCTIONS FOR GEUS' RUBBER BOATS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>7. Operational precautions to be followed by crew and passengers</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <ul style="list-style-type: none"> <li>Never enter or leave a rubber boat with a heavy rucksack</li> <li>Use life jackets and, where appropriate, survival suits</li> <li>Use the kill cord lanyard on the dead-man button (dødemandsknap)</li> <li>Bring satellite phone, VHF radio, PLB and a handheld GPS</li> <li>Bring first aid kit + signal flares</li> <li>Bring the necessary equipment for an emergency camp</li> <li>Bring repair kit and paddles</li> <li>Bring a rifle in areas with potential encounters with bears and walrus'</li> </ul> |  |
| <b>8. Precautions to ensure that everyone can be saved in an accident</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| <ul style="list-style-type: none"> <li>It is recommended that two boats sail together on long trips in isolated areas</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| <b>9. Measures to ensure that assistance can be called for</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
| <ul style="list-style-type: none"> <li>Bring satellite phone, VHF radio and a GPS.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
| <b>10. Measures to ensure that information on the number of persons on board are known and kept on land and are readily available in case of rescue operation</b>                                                                                                                                                                                                                                                                                                                                                                                        |  |
| <ul style="list-style-type: none"> <li>Inform colleagues or others on shore about the boat trip and the expected time of return. Arrange to contact or to be contacted at fixed hours in the case of a prolonged trip.</li> </ul>                                                                                                                                                                                                                                                                                                                        |  |
| <b>11. Measures to ensure that safety instructions are always given to new persons coming on board before start of sailing</b>                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
| <ul style="list-style-type: none"> <li>The expedition leader or the driver of the boat must make sure that all persons are instructed on how to behave, especially in case of an emergency.</li> </ul>                                                                                                                                                                                                                                                                                                                                                   |  |
| <b>12. Precautions that describes how to follow up on adverse incidents or accidents</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
| <ul style="list-style-type: none"> <li>After the field season, the fieldwork must be evaluated.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |

If a person is unconscious due to hypothermia, continue cardiopulmonary resuscitation until exhausted if acting alone. If assistance is available, interchange every two minutes to avoid exhaustion. Continue for 60 minutes.



## Appendix F:

### Safety at sea | Coring platform

| SAFETY INSTRUCTIONS FOR GEUS' CORING PLATFORM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| To which vessel do this safety instructions apply?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |
| Coring platform from the company Uwitec in Austria. The coring platform consists of four aluminium plates and four inflatable yellow pontoons. The fleet is 360cm long and 280cm wide. It weighs 270kg and payload is 2,600kg. It is equipped with a railing.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
| 1. Identification of the owner                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
| Geological Survey of Denmark and Greenland (GEUS)<br>Øster Voldgade 10, DK-1350 Copenhagen K, Denmark<br>Contact: Ole Bennike, Department of Marine Geology, obe@geus.dk, +45 91 33 35 27                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
| 2. Sailing activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |
| <ul style="list-style-type: none"> <li>The coring platform is primarily used in lakes and coastal waters and mostly during summer in Greenland.</li> <li>Work on the coring platform may only take place in calm weather, i.e. up to a maximum of 6–7 m/s.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |
| 3. Identification of risks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| <ul style="list-style-type: none"> <li>Speedboats and dinghies pose a potential risk as they may sail into the platform or into the platform's floating ropes if they are used for mooring.</li> <li>Another risk is that people may fall into the water. As the water temperature in Greenland, even in summer, is close to 0°C, it is important that the person gets back on the platform quickly.</li> <li>There must be at least two people on the platform, so there is always someone who can help the other one out of the water.</li> <li>When working, survival suits are not worn.</li> <li>The platform is equipped with a railing (which can be removed very easily).</li> <li>During the coring work, the platform must lie still and be anchored or moored with floating ropes.</li> <li>Coring equipment, ropes and other equipment in a very limited space can pose a risk of being overlooked so that you trip over them. It is important to keep the platform tidy and to inform colleagues if you move equipment etc.</li> <li>While sailing, please sit on the boxes and hold on to the tripod.</li> <li>Bring extra dry and warm clothes on board, so that a wet and exhausted person can change clothes.</li> </ul> |  |

| SAFETY INSTRUCTIONS FOR GEUS' CORING PLATFORM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| 4. Measures to address risks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <ul style="list-style-type: none"> <li>If floating ropes are used, they must be marked with buoys.</li> <li>If the work takes place in the vicinity of inhabited areas, an information meeting is held where GEUS employees explain the planned fieldwork.</li> <li>A rubber boat is moored to the platform, so that field participants can sail ashore or to a base ship, for example in connection with a man-over-board incident.</li> </ul>                                                                                                                                               |  |
| 5. Description of the vessel and equipment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
| <ul style="list-style-type: none"> <li>The platform is built to collect sediment cores from lakes or coastal areas. It is equipped with a tripod, a spool with a Kevlar rope and a 25hp outboard motor.</li> <li>In the middle of the platform there is a hole of approx. 50 x 40cm. Work is typically done at shallow water depths, 0–5m.</li> <li>During sailing, employees must sit on boxes with coring equipment.</li> <li>Life jackets must be worn on board the platform, and you must be dressed in warm/wind-proof clothing suitable for the weather and wind conditions.</li> </ul> |  |
| 6. The crew and its competence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| <ul style="list-style-type: none"> <li>The GEUS employee in charge is responsible for the platform and for the sampling from the seabed or lakebed. The employee must, as a minimum requirement, have updated courses in first aid and maritime safety (STCW A-VI/1-1 Personal Survival Techniques).</li> </ul>                                                                                                                                                                                                                                                                               |  |
| 7. Operational precautions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |
| <ul style="list-style-type: none"> <li>The platform operates exclusively on lakes and in coastal areas. Accommodation is on land or on a base ship.</li> <li>There can be a maximum of up to three people on board, as more people on the platform is not practical.</li> </ul>                                                                                                                                                                                                                                                                                                               |  |
| 8. Precautions to ensure that everyone can be saved/rescued in an accident.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |
| <ul style="list-style-type: none"> <li>The coring platform's pontoons can be punctured by sharp objects, ice or with a shot from a rifle.</li> <li>Potentially, a bear or walrus will be able to destroy the pontoons.</li> <li>The rubber boat, which is always moored to the platform, can be used in the event of an accident.</li> </ul>                                                                                                                                                                                                                                                  |  |

**SAFETY INSTRUCTIONS FOR GEUS' CORING PLATFORM****9. Precautions to ensure that assistance can always be called upon in case of an accident.**

- Bring VHF radio, satellite phone and/or a mobile phone on the coring platform. In Greenland, PLB (Personal Locator Beacon) is also brought along.
- The work from the coring platform takes place close to shore, anchored or by floating ropes, which can be used to pull the platform and crew ashore.
- Any nearby base ship with rubber boats/life rafts will be able to come to a rescue.
- Villages or military bases and/or research stations can also form a lifeline.
- In advance always check where the nearest hospital is and the access to help and transport/evacuation.

**10. Precautions to ensure that the number of persons on board is known and noted ashore and that the information is easily accessible in the event of a rescue operation.**

- Inform local contacts/the base ship of the number of people on the platform, the duration of work on board the platform and the work area.

**11. Precautions to ensure that new staff are always given safety instructions before starting work**

- GEUS' project manager is responsible for reviewing the safety instructions with all the field participants before starting work. The instructions are repeated if there is a change in the crew.

**12. Precautions that describes how to follow up on near-miss incidents or accidents**

- GEUS' project manager is responsible for following up on near-miss incidents as soon as possible after they happen.
- The incident can be described in note form until it is possible to prepare a more detailed report of it, which is then sent to GEUS' work HSE manager (arbejdsmiljøleder).

## Appendix G: First Aid Action Card

### SAMPLE

Symptoms  
Allergies  
Medications  
Previous illnesses  
Last meal  
Event

Use **SAMPLE** for initial medical history

### ATMIST

Age  
Time  
Mechanism of injury  
Injury  
Symptoms  
Treatments given

Use **ATMIST** for rapid patient handover

Source: Safe Nordic Medical Solutions / [www.safenordicsolutions.com](http://www.safenordicsolutions.com)

### CABCDE

| Scene Safety                                            | Hazards, Hypothermia                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Catastrophic bleeding</b>                            | <ul style="list-style-type: none"> <li>Use Tourniquet (TQ), Pressure point or direct pressure to treat massive bleedings (Max 2 hrs. then convert to bandage or contact Medical doctor).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Airways</b>                                          | <ul style="list-style-type: none"> <li>If the person is able to speak, airways are open</li> <li>Semi-conscious or unconscious = jaw thrust or chin lift or NPA.</li> <li>Fingersweep if foreign object, Suction if fluid, Recovery position if needed.</li> <li>Spinal immobilization?</li> </ul>                                                                                                                                                                                                                                                                                                               |
| <b>Breathing</b>                                        | <ul style="list-style-type: none"> <li>Inspect visual entire chest, front and back, remember armpits. Hole in chest – seal the hole with a bandage</li> <li>Vitals: Breathing rate (&lt;10 or &gt;30), SAT, cyanosis, quality of breathing.</li> <li>No breathing and unconscious = cardiac arrest → CPR</li> </ul>                                                                                                                                                                                                                                                                                              |
| <b>Circulation</b>                                      | <ul style="list-style-type: none"> <li>Check for bleedings and major injuries from top to toe. Treat major bleedings as you go</li> <li>Bleedings: Direct pressure/TQ – pack to bone – bandage – reassess</li> <li>Vitals: Pulse (radial, femoral, carotid) BP, CRT, skin, temp (hypothermia)</li> </ul>                                                                                                                                                                                                                                                                                                         |
| <b>Drugs and Disability</b>                             | <ul style="list-style-type: none"> <li>Level of consciousness, AVPU (Alert, Verbal, Pain, Unresponsive)? Behaviour?</li> <li>PERRLA (Pupils are Equal, Round, React to light, Accommodate)</li> <li>Pain medication in case of severe pain (contact Radio Medical ASAP)</li> <li>Antibiotics if skin is lacerated or signs of infection (contact Radio Medical ASAP)</li> <li>Vitals: Quick neurological exam</li> </ul>                                                                                                                                                                                         |
| <b>Environment<br/>Prepare EVAC<br/>Everything Else</b> | <ul style="list-style-type: none"> <li>Prevent and treat hypothermia fast and aggressively!</li> <li>Pay attention if shivering stops (bad sign).</li> <li>Immobilize fractures with flex-splints or improvised splints.</li> <li>Sprains are treated with 20 minutes of direct pressure on the point of most pain.</li> <li>Immobilized if not able to walk or use extremity.</li> <li>Prevent frost injuries. If no sensation in finger and toes → stop immediately and rewarm limbs.</li> <li>Avoid re-thawing deep frostbites in the field – radio medical and evac.</li> <li>Vitals: Temperature</li> </ul> |

Always contact Radio Medical or other medical physician if serious injury or disease.

Source: Safe Nordic Medical Solutions / [www.safenordicsolutions.com](http://www.safenordicsolutions.com)

# Emergency Contacts

|                                                   |                         |                        |
|---------------------------------------------------|-------------------------|------------------------|
| <b>Duty Officer (Bagvagt), GEUS</b>               |                         | <b>+45 91 33 36 36</b> |
| <b>RADIO MEDICAL (24/7)</b>                       | <b>rmd@rsyd.dk</b>      | <b>+45 75 45 67 66</b> |
| When asked for name of the vessel, inform: "GEUS" |                         |                        |
| <b>Chief Constables Office, Nuuk</b>              | <b>politi@politi.gl</b> | <b>+299 70 14 48</b>   |
| Bjørn Tegner Bay, Chief Constable                 |                         |                        |

## Other Emergency Numbers & Contacts

|                                        |  |                        |
|----------------------------------------|--|------------------------|
| <b>Dr. Ingrid Hospital (Sana Nuuk)</b> |  | <b>+299 34 40 00</b>   |
| <b>Rescue Service, Nuuk</b>            |  | <b>+299 34 44 00</b>   |
| <b>Poison Control Hotline</b>          |  | <b>+45 82 12 12 12</b> |
| Giftlinjen (24/7)                      |  |                        |

## Other Contacts at Geus

|                                                   |                     |                        |
|---------------------------------------------------|---------------------|------------------------|
| <b>Geological Survey of Denmark and Greenland</b> | <b>geus@geus.dk</b> | <b>+45 38 14 20 00</b> |
| Øster Voldgade 10, DK-1350 Copenhagen             |                     |                        |
| <b>Uli Heyden</b>                                 | <b>uh@geus.dk</b>   | <b>+45 91 33 34 53</b> |
| HSE Manager                                       |                     |                        |
| <b>Marianne Vestergaard</b>                       | <b>mve@geus.dk</b>  | <b>+45 31 10 30 38</b> |
| Logistics Coordinator                             |                     |                        |
| <b>Equipment Section, Taastrup</b>                | <b>hsp@geus.dk</b>  | <b>+45 20 85 33 79</b> |
| <b>GEUS Nuuk</b>                                  | <b>geus@geus.gl</b> | <b>+299 36 12 62</b>   |

## Insurance

|                                   |                        |
|-----------------------------------|------------------------|
| <b>Europæiske Rejseforsikring</b> | <b>+45 33 25 25 25</b> |
| <b>ERV Alarm (24/7)</b>           | <b>+45 70 10 90 30</b> |

**GEUS' Policy no. (extra insurance): 50012403**

**GEUS' CVR no.: 55145016**

(GEUS' CVR no. will be required in contact with Europæiske Rejseforsikring)