

## **SAFETY REGULATIONS FOR WORK AND RESIDENCE AT TARFALA RESEARCH STATION 2020**

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## INTRODUCTION

Our wish is that all staff and visitors to Tarfala Research Station (TRS) experience the fantastic Kebnekaise environment in a safe way. The location of TRS in a high alpine setting far from the nearest road (24 km) and any medical assistance imposes particular requirements when it comes to safety during fieldwork and at the station.

We sometimes work long days on glaciers, and we measure and collect samples from lakes, watercourses and ecosystems. We move around in harsh terrain on foot, by the use of skis, or snowmobile, boat and helicopter. Glaciers are dynamic and the conditions change quickly, which means that previously “safe” routes may have turned dangerous due to the formation of new crevasses and moulins. Rivers and creeks change course and nature when glaciers melt, and the rate of flow is governed by changing melt and precipitation conditions. Avalanches can occur in unexpected locations, and the mountainsides can become more unstable when the ice melts, increasing the risk of landslides.

The station manager (the director or superintendent) has the responsibility to assess the general safety situation prior to planning field operations and station tasks.

The overall ability to cope with various risks must be high during your stay at TRS. This overall ability builds on experience, knowledge, material/equipment, communication, medical equipment, provisions, protection, endurance and time. Rapidly changing weather can rapidly alter field conditions, which prompt continuous risk assessments.

Before your visit to Tarfala you must read through and accept these safety regulations. These specify the basic safety framework. Due to rapid variation in field conditions it is impossible to regulate all activities in detail. This means that you, as staff member or visitor, have to perform your own risk assessments. Our travel plans will assist you in this.

If there is any work operation you feel uncertain about, please discuss with the station manager (director or superintendent).

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TRs location  
SWEREF99 TM  
N 7537394 E 651402  
Phone: +46 (0)72 715 50 39

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## ACCIDENTS & ILLNESS

### Alarm procedure in the event of a serious accident

- Make sure you are in a safe position yourself.
- Call 112, a phone is located in the kitchen and in the office in the laboratory/lecture hall building.
- The lecture hall functions as the emergency gathering spot.
- Explain clearly what happened and the location of the injured person.
- Inform the station manager (who has First Aid training).
- Be ready to answer the phone and radio.
- The telephone line/radio connection at TRS may not be blocked by anyone else without due cause.
- Keep a log during the emergency response.

### Equipment

- First Aid equipment is available in the kitchen, the workshop, the laboratory and in the lecture hall.
- Medication for dealing with allergic reactions is available in the kitchen.
- There is a defibrillator in the entrance to the mess building.
- There is a stretcher and a neck brace in the old sleeping quarter storage.

### Illness

Due to the **corona** pandemic all staff have to immediately report any symptom of covid-19 illness to the station manager (director or superintendent). If any staff member reports symptoms the station will be closed and staff will return to Stockholm, via hospital if necessary.

Due to the corona pandemic TRS does not host any visitors during the spring.

Contact **healthcare information service on phone number 1177** for advice if you and/or the person affected are unsure about symptoms and possible treatment.



## FIRE

### General

The inaccessible location of TRS means that we cannot count on assistance from the fire service. All buildings are equipped with fire alarms and fire extinguishers. The fire extinguishers are positioned just inside the outer doors of the buildings, marked with signs.

Fire blankets are located in the kitchen, the sauna, the laboratory and the workshop.

Open flames are not permitted in any building except the mess. Smoking is only permitted in designated areas outdoors. Never throw cigarettes on the ground.

### **Fire**

1. If you discover a fire, make sure all staff and guests leave the building.
2. Attempt to put out the fire as long as this does not entail danger.
3. Inform the station manager.
4. Call 112.

### **Evacuation**

All windows in the dormitory can be opened and used as emergency exits. The windows have a release catch on the right side of the frame. Make sure you know how to open the window. Also regularly check that no snowdrift is blocking evacuation via the window.

### **Assembly**

In the event of a fire which has involved evacuation, everyone must assemble in the Mess building for a missing people count.

If the Mess building is affected, everyone must assemble in the lecture room.

Group leaders are responsible for checking the numbers of their party.

## **FIELDWORK/EXCURSIONS/LEISURE TRIPS**

### **General**

Consult the station manager before planning the field activity/trip. For all field activity a 'responsible person' must be appointed who will be in charge, ensure that trip plans are filled in and check out the trip plan once the group has returned, and also ensure that the appropriate safety equipment is taken along.

### **Trip plan**

Always fill in a trip plan before setting off and always report (on the same plan) once you are back. In the trip plan you state who and how many are going, your planned routes and destinations, and what equipment you are taking. Filling in a trip plan aids both risk assessment and a potential search and rescue operation.

### **Communication**

Always bring a radio with you out in the field. A communication check must be performed before departure. Mobile phone reception is unreliable around Tarfala. For trips on the glaciers, see section on *Glacier safety*.

### **Leisure trips**

Consult the station manager when you plan a trip. All leisure activities are undertaken at your own risk. It is important that the activities are adapted after the abilities of participants. It can be difficult to assess the degree of difficulty for activities in high alpine terrain. Because the weather situation often change rapidly, good safety margins are always needed.

## GLACIERS

### General

The station manager (director or superintendent) must approve all glacier travel. Crevasses, moulins, snow bridges, rockfalls, avalanches and rapidly changing weather conditions, etc. constitute risks during work on a glacier. Equipment for fieldwork on glaciers is supplied by TRS. If you use your own equipment, it must first be approved by the station manager.

### Guidelines

Glacier travel is divided into travel over (1) snow-free glacier, travel over (2) snow-covered glacier during the melt season (June-September) and travel over (3) snow-covered glacier during the winter season (January-May). During the melt season, so-called “safe” routes are established for travel over snow-free and snow-covered glacier.

#### ***Category 1: travel over snow-free glacier, i.e. hiking on bare glacial ice***

During travel over snow-free glacier, crevasses and moulins can usually be identified and thus avoided.

Personal safety equipment:

- Sit harness.
- One (1) screw carabiner.
- Ice cleats or crampons.

The group must also bring:

- 30 m 8 mm rope for any rescue that becomes necessary.
- Two (2) ice screws for anchoring.
- One (1) 120 cm loop with screw carabiner.
- Two (2) First Aid equipment.

#### ***Category 2: travel over snow-covered glacier during the melt season***

During travel over snow-covered glacier, crevasses and moulins are hidden.

Personal safety equipment:

- Sit harness.
- Two (2) prusik cords.
- Five (5) screw carabiners.
- One (1) 120 cm loop.
- Crampons or ice cleats.
- Two (2) ice screws.
- Ice axe

The group must also bring:

- Glacier rope (length depends on the size of the group).
- Equipment for being able to make a winch for hoisting.
- First Aid equipment.

#### ***Category 3: travel over snow-covered glacier during the accumulation period/winter***

Remember the risk of avalanche during the winter.

Personal safety equipment:

- Sit harness.
- Two (5) screw carabiners.
- Two (2) prusik cords.
- Avalanche transceiver.
- Avalanche probe.
- Shovel.

The group must also bring:

- Glacier rope (length depends on the size of the group).
- Two (2) ice screws for anchoring.
- Equipment for being able to make a winch for hoisting.
- First Aid equipment.

### **Rescue and medical equipment on Storglaciären**

Extra rescue equipment, to be used in the event of an accident on Storglaciären during the summer season (June-September), is placed at the weather station which is located at the centre of the glacier at SWEREF 99 TM N7536382, E649907. The equipment is for use in emergency situations only. Inform the station manager if, and how the equipment was used.

The rucksack contains:

- One (1) Large First Aid kit.
- Two (2) Small First Aid kits (in lid pocket).
- One (1) Rope.
- Two (2) Sit harness.
- Two (2) Ice axe.
- Two (2) Ice screw.
- Three (3) Short prusik loop.
- Two (2) Long prusik loop.
- Two (2) Long tape loop.
- Two (2) Mini Traxion.
- Two (2) Figure of eight descenders.
- One (1) TIBLOC ascender.
- Four (4) Carabiner with screw.
- Nine (9) Carabiner without screw
- Three (3) Hand warmer.

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## FLOWING WATER

### General

Flow rates in watercourses that drain glaciers and lakes in Kebnekaise are determined by the weather and season; the temperature determines the melting of snow and ice, and large quantities of precipitation rapidly raise water levels. We therefore need to assess the level of risk constantly. Even smaller watercourses can be difficult to cross, since algae often grow on the stones, making them slippery. Icing can occur even in the summer.

### Guidelines

When crossing streaming water, use boots with a rough-patterned sole and a hiking pole.

A life jacket and sit harness (glacier type) must be used when working near to watercourses with deep flowing water. When working on watercourses that have deep water and there is a risk of falling in, for example when attaching or removing instruments or when injecting tracer solutions, life jacket, harness (glacier type) and helmet must be used. The harness should be fixed to a rope which is in turn fixed to an anchorage (bolt) in solid rock or a large boulder.

### Equipment

- Life jacket
- Sit harness.
- Rope.
- VHF radio/telephone.
- Boots with rough-patterned or felt sole.
- Helmet.
- Hiking pole.

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Tarfala Bridge location  
SWEREF99 TM  
N 7532790 E 653416

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## LAKE – SUMMER

### In general

The temperature of lakes and watercourses is often lower than 5°C. At such low water temperatures, breathing and physical capacity are very quickly affected by chilling.

### Safety

Fieldwork on Tarfalsjön or any other lake must only be performed when visibility is good and wind speed low.

- There must always be at least 2 and no more than 3 people in the boat.
- Plan your sampling properly and keep the boat tidy.
- For work on lakes and watercourses located outside the Tarfala valley, coordinates and lake name must be stated in the trip plan.
- If you fall in the water get back to the boat calmly. Making forceful movements increases heat loss.

### Personal equipment

- Dry suit.
- Life jacket (check the gas cartridge in inflatable life jackets\*).

### Equipment per boat

- Throwing line (1).
- VHF radio + telephone in waterproof case in the boat (1).
- Facility for someone in the water to be able to climb aboard.
- Grip facilities.
- Rag/sponge

### Care of inflatable boat:

- Inflate all chambers so that the boat feels rigid.
- Never inflate the boat out on the lake, be aware of that the water's relatively low temperature can reduce the pressure in the chambers.
- Check that the valves are not leaking air by tightening the valves with the valve tool.
- Wipe any clay/sand off shoes and sampling equipment.

Anchors, grapnels or similar that are not suitable for inflatable boats should be stored in a plastic container/bucket.

## LAKE – WINTER

### In general

The water temperature of lakes and watercourses is close to 0°C. At such low water temperatures, breathing and physical capacity are very quickly affected.

### Guidelines for fieldwork on lake ice

Coordinates must be stated in the trip plan for work on lakes and watercourses located outside the Tarfala valley.

Never go out on the ice alone.

The ice thickness must always be checked by means of test drilling or with an ice-spike. Blue ice must be at least 10 cm thick.

Avoid the inflow and outflow of lakes, where the ice is often thinner.

Ice is affected by solar radiation during the spring, sometimes without it being visible on the surface which is often covered by snow. Often the ice nearest to land weakens first, so make sure there is safe ice to get you back to land.

### Personal equipment

- Ice claws, adjusted high under the chin.
- Waterproof gloves.
- A complete change of clothing, including extra footwear. Pack this in a watertight manner and in such a way that it can be carried in a rucksack equipped with a crotch strap for work on ice thinner than 20 cm.

### Equipment per group:

- Shovel.
- Ice-spike.
- Throwing line (2).

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Tarfala lake location (STF building)

SWEREF99 TM

N 7538250    E 650937

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## COMMUNICATION

### General

- Radios are kept in a charging station in the office (laboratory building).
- Radios must be signed out and on return signed in again.
- A communication check must be performed before departure.
- On return, radios must be switched off and put back in the charging station.

### Channels

Tarfala uses two channels, channel 5 in mode 1 (one) and channel 77 in mode 2 (two), on the hand-held radio units.

Information on which channel to use is displayed on the noticeboard in the Mess entrance and by the charging station in the office.

Mode 1: uses communication via a radio-repeater on Kekkonen Peak, and provides radio coverage throughout the Tarfala valley and across large parts of the Storglaciären.

Mode 2: provides direct radio communication between devices. The terrain restricts radio communication to roughly the range of your field of vision.

## Communication protocol

Maintain a good radio discipline, keep calls short and remember that everyone is listening. Only one person can speak at a time.

### *Call*

Press the transmit button and wait two seconds before you begin to speak.

Always start your call with the name of the person you want to contact. Then say your own name, followed by “over” (“kom”).

### *Reply*

Reply with your name and where you are.

If you initiated the conversation, finish the call with “standing by” (“klart slut”).

If you were called up and have nothing more to add, finish with “standing by” (“slut kom”).

### Cellular phone

The reception in Telia's and Tele2's network is generally good around the station but uncertain in most of the Tarfala valley.

### Satellite phone

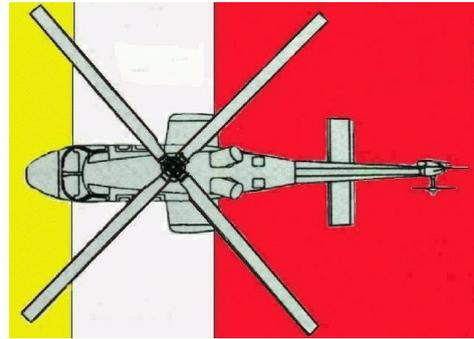
TRS has two Iridium telephones for fieldwork outside the Tarfala valley.

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## HELICOPTER

### General

The station manager or other appointed staff member directs loading and unloading on the helipad.



- Always await instructions from the pilot or staff member in charge.
  - Always approach the helicopter from the front, within sight of the pilot.
  - The red zone indicated on the picture is a prohibited area.
  - Use hearing protection if you are asked to assist.
  - There must be no loose objects that can be drawn up in the rotors.
- **On Tarfala's helipad**  
Walk to and from the helipad safely via the marked "entrance" to the north of the pad, never pass under the barrier.
  - If the helicopter is pointing southwards, look for a safe approach from the south/below the pad.
  - Passengers carry their luggage to a specified place near the helipad.
  - Wait there for instructions from the station manager or the pilot as to where to enter.

### Sling load

When working with sling load use a helmet, hearing protection and, if available, an aircraft radio for communication with the pilot. This is usually a task for the station manager.



## SNOWMOBILE

### General

Snowmobiling in mountain terrain can be hazardous and requires training and experience in both risk assessment and snowmobile handling.

TRS snowmobiles are to be used for work purposes only, for transport, research and environmental monitoring.

### Training requirements/permits

All snowmobile drivers must hold a license to drive snowmobiles in accordance with the Swedish Road Administration's regulations (B driving licence issued before 1 January 2000, or a separate snowmobile licence).

All snowmobile drivers must be given an introduction to the TRS snowmobiles by an experienced driver. All snowmobile drivers must have the permission of the director to drive a snowmobile within the framework of TRS operations. An up-to-date list of all approved snowmobile drivers for TRS is available at the research station, at the

Department of Physical Geography, and on TRS website. [\(link\)](#)

### **Requirements for protective equipment**

By law, a safety helmet approved as per ECE 22 must be used.

In terrain prone to avalanches, drivers and passengers must carry avalanche transceivers, shovel and probe.

Earplugs, suitable clothing and eye/face protection for winter conditions shall be used.

When travelling in difficult terrain and at speeds above 30km/hour, the snowmobile's emergency stop cord must be used.

### **Safe driving**

The distance between snowmobiles must allow both visual and radio contact.

Snowmobiles must wait for one another at safe locations in difficult terrain prone to avalanches, and where there are steep slopes and narrow passages that reduce visibility and thus also communication. Driving through the Tarfala valley south of the station and along other routes where snow conditions can be difficult requires travel plans.

For the Tarfala valley this plan needs to include a stop to assess continued driving and possibly a change of driver, before the relatively difficult sections of Spelbacken, Dalkröken and the lower crossing of the Tarfala stream is passed. Solo driving in the Tarfala valley is only permitted under certain conditions.

### **Safety equipment**

When in use, snowmobiles must be equipped with:

- First Aid equipment.
- Map
- Avalanche probe
- Shovel
- Equipment (rope, block/tackle, etc.) for winch/hoisting
- Engine oil 1l (two stroke engine)
- Extra drive belt, tool for changing drive belt
- Extra spark plug, tool for changing spark plug
- Hand warmers

## **LABORATORY**

### **General**

- Contact the station manager before using TRS laboratory, microscope or other equipment, to be given an introduction to laboratory safety and procedures. All use of chemicals in the laboratory and in the field must be approved by the station manager. A safety data sheet for each of the chemical used must be available in a binder in the labs equipment cupboard.

### **Safety**

- Familiarize yourself with the emergency exits; via the main building entrance and the northeast window in the laboratory which is marked with an emergency sign, and ensure that they are not blocked.
- Familiarize yourself with the location of fire extinguishers, fire blankets, First Aid equipment and eye wash.
- Use relevant protective equipment: lab coat, gloves, goggles and, if necessary, a breathing mask.
- All chemical solutions and samples must be marked with their contents, your name and date.
- A safety data sheet for each of the chemical used must be available in a folder in the lab.
- Environmentally hazardous waste: Ask the station manager before you pour something down the sink; the drain goes straight out into nature. All environmentally hazardous substances must therefore be poured into dedicated waste drums.
- Glass waste (broken beakers, glass pipettes, microscope slides, etc.) are to be separated into clean or contaminated containers.

### **Cleaning up**

Make sure you wash and return all equipment and material used to its proper storage area.



## **WORKSHOP**

### **General**

The workshop is a workplace intended for TRS staff primarily.

- If a visitor needs to use the workshop or workshop equipment, please contact the station manager.

### **Safety**

Evacuate the workshop via the main entrance, the snowmobile garage or the paint store.

- Familiarize yourself with the emergency exits and ensure that they are not blocked.
- Familiarize yourself with the location of fire extinguishers, fire blankets, First Aid equipment and eye wash.
- Use hearing protection and safety goggles.
- Use power tools with caution.
- Never use tools if you are unsure how to handle them.
- “Hot Work” certification is required for using cutting or burning tools (welding, angle grinding, etc.).
- The use of chain saws requires a license (min. level A).
- Take care when using solvent, rags must be thrown into the outdoor incinerator.

### **Cleaning up**

Make sure you return all equipment and material used to its proper place.

Clean the floor and benches.

## **KITCHEN**

### **General**

The kitchen 'chef' is responsible for planning and directing kitchen work. Other staff or visitors shall stay clear of the kitchen and food store unless asked for assistance by the chef or the station manager.

### **Risks**

- Sharp objects: knives, tins, glass, food processor.
- Heat: hotplates, oven, griddle, dishwasher, hot water and oils.
- Slippery floor.

### **Preventative action for the cook**

- Familiarize yourself with the location of the First Aid equipment, fire extinguisher and fire blanket.
  - Make sure the emergency exits are not blocked.
  - Keep the kitchen tidy.
  - Use proper shoes with a non-slippery sole.
  - Store cleaning products in such a way that they do not get confused with food items.
  - The kitchen easily becomes a meeting place, so send unnecessary people out if needed.
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