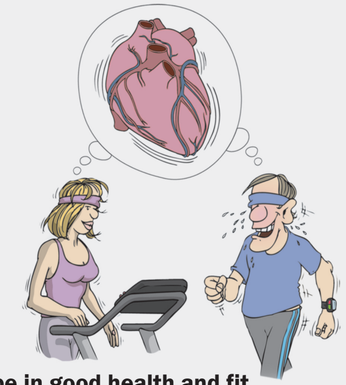
hier ziehen →

safe ski mountaineering

10 Recommendations of the Alpenverein:

Ski mountaineering, snowshoe tours and snowboarding tours are a great way to get fit, experience nature and socialise.

The aim of the following recommendations is to effectively respond to the risks in the mountains in winter. The practical skills are taught in training and avalanche courses; you will gradually gain more experience.



1 be in good health and fit

Ski tours are an endurance sport. They make your heart, circulation and muscles work hard, so good health, a high fitness level and an honest assessment of your capabilities are required. Avoid having to rush and adopt a pace without anybody in your group getting out of breath. Make sure you pace yourself and have enough energy for the descent. Regular endurance and strength training make ski mountaineering more enjoyable by improving your fitness. If you have been out of training for a while, after a sickness or at an advanced age, an examination by a sports physician can help you assess your physical limits.

2 plan your tour carefully

Maps, guidebooks, the internet and experts are good sources of information about routes, distances, differences in altitude and the currents conditions. Pay particular attention to the weather forecast, as cold conditions, strong winds and poor visibility greatly increase the risk of accidents. Also plan alternative routes and find out the emergency number for the country's mountain rescue service (European emergency number: 112). The decisive question when planning a tour: Do the current conditions allow for my tour destination? Bear in mind that the plan is a mental draft which must be examined continuously on tour. Even the most careful plan is worthless if the fixation on a destination is strong to the point of not factoring in new information gained on the spot. Planning an alternative makes it easier to react flexibly to adverse conditions.

4 study the avalanche bulletin

Before going on tour, find out the details regarding the avalanche danger: Which level? What? Where? Pay particular attention to information about the danger level (1-5), about avalanche prone locations (Where is it dangerous today?) and the danger patterns (What is the main danger today?). New snow, wind-drifted snow, old snow (persistent weak layers), wet snow and gliding snow are the 5 typical avalanche problems. They indicate the predominant source of danger. "Check 2" of Stop or Go© helps focus our attention on those problems that we can recognise in nature. Typical danger zones are gullies and bowls filled with wind drifted snow, lee slopes adjacent to the ridge line, shady slopes, sunny slopes, transitions from little to much snow.

3 use complete equipment

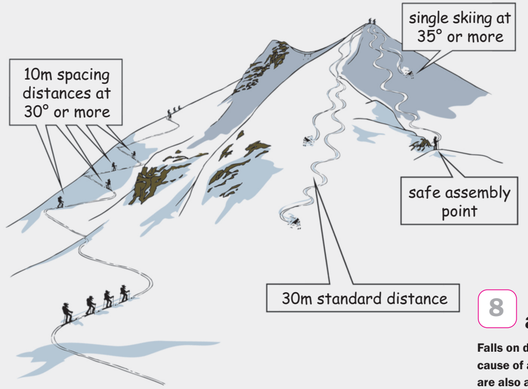
Make sure you have the right equipment for winter conditions and that your backpack weighs little. For avalanche rescue, an avalanche beacon, shovel and probe are standard equipment as well as a first-aid kit, bivouac sack and mobile phone. An airbag system increases the chances of survival. The Alpenverein recommends 3 antenna avalanche beacons and metal avalanche shovels. Important point: Even though the technical emergency equipment is being improved continuously, efficient help in case of emergency (coordination, emergency call, probing, shovelling, first aid) must be trained and practiced.

6 take breaks and orienteer

Liquids, energy and breaks are required to maintain performance and concentration. Hot isotonic drinks are ideal for quenching your thirst and keeping you warm. Continually get your bearings ("I know where I am") and be wary of following any existing tracks. Drink and eat (carbohydrates) about every hour in order to refuel your body. Breaks shouldn't last longer than 5 minutes to keep the body at "operating temperature". Make sure you choose locations for your breaks that are protected from alpine dangers like avalanches, crevasses and rock fall.

5 weigh up the avalanche risk

Detecting avalanche danger is a very difficult endeavour. Base your decisions on strategic risk assessment methods (reduction methods) and learn to recognise signs of danger in the terrain. Avoid danger zones and turn around when in doubt. The core of the strategy Stop or Go© is connecting danger level with slope gradient. Since an estimate to the degree is impossible, we limit ourselves to 4 gradient classes: "moderately steep" (less than 30°), "steep" (30 - 34°), "very steep" (35° - 39°) and "extremely steep" (40° and more). Two rules of the thumb: A gradient of 30° or more requires kick turns, steep terrain interspersed with rocks that show has at least 40°.



7 keep your distances

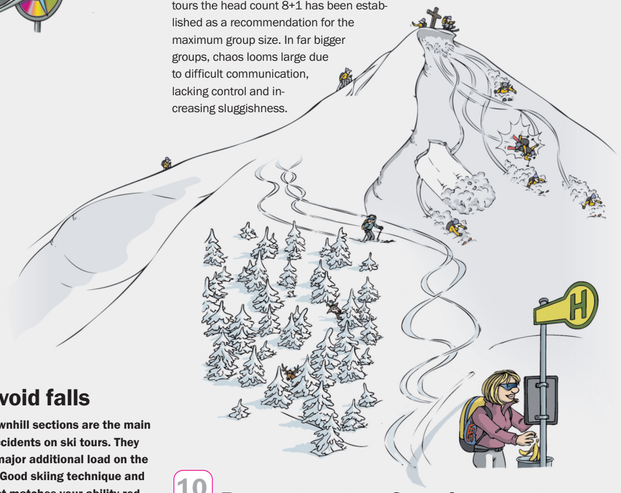
Spacing out reduces the load on the snowpack and contains damage. Spacing distances of 10 m between mountaineers when ascending a steep slope also make kick turns more comfortable. On downhill sections, always maintain a distance of at least 30 m. Ski down very steep slopes one by one. Distances also prevent collisions while descending and limit the damage: in case of an avalanche, chances are that fewer skiers will be buried.

8 avoid falls

Falls on downhill sections are the main cause of accidents on ski tours. They are also a major additional load on the snowpack. Good skiing technique and a speed that matches your ability reduce the risk. A ski helmet can protect against head injuries. Beware of falls from heights when the snowpack is frozen and on rocky terrain. More than two thirds of all accidents on ski tours happen when skiers fall while descending. For the snowpack a fall is an enormous "shock": 5 to 7 times the body weight impacts on the snowpack!

9 go in small groups

Small groups (up to six people) are safer. Communication with other winter sports enthusiasts and mutual consideration prevent dangerous situations. Stay with your group. Inform someone you trust of your destination, route and return time. Important note for solo skiers/snowboarders: minor incidents can turn into major emergencies. The ideal group size for ski mountaineering is around 4 people, for guided tours the head count 8+1 has been established as a recommendation for the maximum group size. In far bigger groups, chaos looms large due to difficult communication, lacking control and increasing sluggishness.



10 Respect nature & environment

The mountains provide a valuable environment for experiencing wilderness. Enjoy this freedom! Be considerate of wild animals, respect protected areas and do not enter reforestation areas. Use public transport or car-share to get to your starting point. Support the alpine clubs in their endeavours to conserve the unspoilt mountain enviroment. Regrettably it still does not go without saying: "Keep our mountains clean, pack out all trash!". Banana and orange skins take 1 - 3 years to rot, paper tissues 1 - 5 years and cigarette butts 2 - 7 years.

Club Arc Alpin

These recommendations have been harmonised by the CAA and have been passed by the general meeting 2015. Members of the CAA: Alpenverein Südtirol (AVS), Fédération Française des Clubs Alpins et de Montagne (FFCAM), Club Alpino Italiano (CAI), Deutscher Alpenverein (DAV), Liechtensteiner Alpenverein (LAV), Österreichischer Alpenverein (ÖAV), Planinska Zveza Slovenije (PZS), Schweizer Alpen-Club (SAC).

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stop or go©

Stop or Go© is a strategy to help avoid

avalanche accidents in the backcountry.

Stop or Go© provides a structured decision making tool

(“Check 1” based on Werner Munter + “Check 2”) as well

a checklist of standard procedures for planning and on tour.

About 80 % of avalanche accidents can be prevented using Stop or Go©.

Qualified trainers teach how to use

Stop or Go© properly.

Standard Procedures

500m 1000m 500m 1000m

1 : 25000 1 : 50000

40° 35° 30°

Standard procedures for planning

- **Avalanche bulletin** Danger level, location & source
- **Weather report** Visibility, wind, temperature, precipitation
- **Map/guidebook/internet** Gradient, aspect, current conditions
- **Group** Size, skills, attitude to risk
- **Emergency equipment** Beacon, shovel, probe, mobile phone, first aid kit, bivouac sack; recommendation: airbag, helmet

Check 1

Standard procedures on tour

- **Beacon check** at the starting point
- **Spacing** Ascent: 10 m at >30°, descent: 30 m, ski singly at >35°
- **Setting the ideal track** What is above/below me? Terrain traps?
- **Orientering & navigation** “I know where I am” (visibility!)
- **Group** clear communication, pace, breaks, group dynamics

Check 1+2

Decision making strategy

Check 1

1 low	2 moderate	3 considera.	4 high	5 very high
	< 40°	< 35°	< 30°	abstain
	area around track 20 m	entire slope	all potential start. zones	from touring

* go densely covered traces | forest | crust

stop* or go©

Check 2

- new fallen snow
- recently wind-transported s.
- settlement noises and cracks
- recent avalanches
- thoroughly moist snow

Dangerous for me?

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avoid / turn around ← **stop or go©**

Booklet Skitouren (German language). Risk management Stop or Go©& Avalanche Emergency 162 pages, numerous photos and illustrations. Orders of this cardfolder and the booklet Ski Mountaineering at **www.alpenverein.at/shop**

danger level

The harmonised European Avalanche Danger Scale (1-5) summarises the intricate conditions in the snow pack which are the cause for stability, triggering probability, size and frequency of avalanches.

1 **1 - Low.** Triggering is possible only from high additional loads in isolated areas of very steep, extreme terrain. Issued about 1/5 of wintertime, about 2 % of casualties.

2 **2 - Moderate.** Triggering is possible primarily from high additional loads on the indicated steep slopes. Issued about 1/2 of wintertime, about 22 % of casualties.

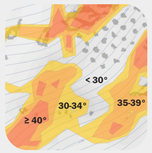
3 **3 - Considerable.** Triggering is possible even from low additional loads, particularly on the indicated steep slopes. Issued about 1/3 of wintertime, about 59 % of casualties.

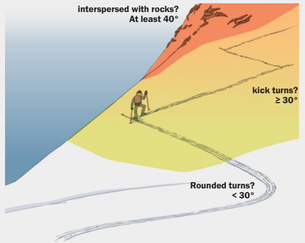
4 **4 - High.** Triggering is likely even from low additional loads on many steep slopes. Issued on few days in wintertime, about 9 % of casualties.

5 **5 - Very high.** Large-sized and often also very large-sized natural avalanches can be expected, even in moderately steep terrain. Issued very rarely, on average once in wintertime. Disastrous avalanches, not relevant for ski mountaineering.

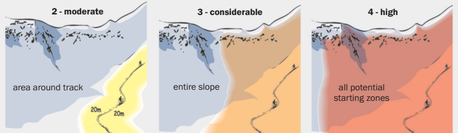
slope gradient & terrain

The slope gradient is the most important terrain parameter when it comes to avalanche danger! Avalanche releases are possible at gradients of about 30° and more, the average steepness of avalanches triggered by skiers is just under 40°. If you stay under 35°, the risk of triggering an avalanche is reduced by 84 %. The slope gradient is estimated by looking at the steepest spot of at least 20 m in altitude difference. There are four classes of slope gradient: moderately steep: less than 30° (white), steep: 30° - 34° (yellow), very steep: 35° - 39° (orange), extremely steep: more than 40° (red).





Danger level and terrain: The higher the avalanche hazard (danger level), the more probable are remote triggerings, also from locations in moderately steep terrain. When assessing the gradient of a slope, therefore, we must always consider a larger area.



new snow

Freshly fallen snow (snow fallen during the last 3 days) almost always increases the avalanche danger. The first clear day after intensive snowfall is particularly prone to accidents. In addition to the amount of snow, key factors for the increase in danger are the prevailing conditions like wind, temperature and the state of the old snow cover. Fallen during unfavourable conditions, the “critical depth of new fallen snow” (according to W. Munter) is accumulated much faster than during favourable ones. A “critical depth of new fallen snow” always entails an increase to at least considerable avalanche danger (level 3).

Unfavourable conditions:
Strong winds, low temperatures (below -8°C), melt-freeze crust, hoar, seldom skied slope
Favourable conditions:
Light or no winds, temperatures little below 0°C, regularly skied slope.

Critical depth of new fallen snow ...

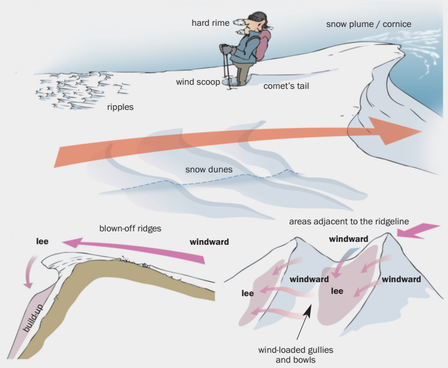
... during favourable conditions: 30-50 cm

... during average conditions: 20-30 cm

... during unfavourable conditions: 30-50 cm

recently wind-drifted snow

Slab avalanches are built by the wind! Therefore it is crucial to recognise evidence of past winds. Wind transports snow from windward (= facing the wind) to leeward (= facing downwind) areas, where it is deposited as wind-drifted snow. Recently wind-drifted snow is soft, but bonded and particularly prone to triggering! Telling characteristics of wind-drifted snow are the dull and “tense” surface texture and the sharp edges when setting track. The following indicators for past wind are known:



whoomphing / cracking / recent avalanches

Sounds of a collapsing snowpack (“whoomphing”) and/or cracks in the snow cover are unmistakable alarm signals of an unstable snowpack (persistent weak layers) and an indication for at least considerable avalanche danger (level 3). The problem is due to weak layers - even in the old snowpack - which are very hard to detect.
Recent naturally triggered slab avalanches are typical alarm signals for high avalanche danger (level 4).

thoroughly wet snow

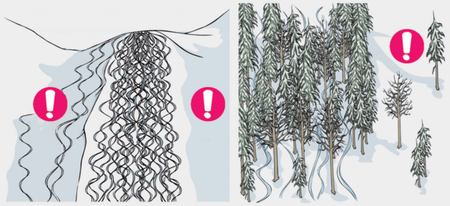
Rain, intensive solar radiation and daytime warming cause a thoroughly wet snow-pack. The resulting loss of stability dramatically increases the avalanche danger (typical for springtime). Attention: When the snowpack is thoroughly moist, the feature “densely covered in traces” is not an indication for safety or a “go factor”.

*go factors: densely covered in traces, forest, melt-freeze crust

Densely covered in traces: Numerous converging and intersecting traces make up a corridor that makes it impossible to ski down without touching any of the existing traces. “Densely covered in traces” is only a sign for relative safety within that corridor. Careful! Does not apply if snowpack is thoroughly moist!

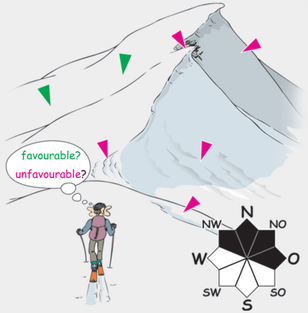
Forest: Single trees and sparse forest do not protect from avalanches!
Only thick, closed forests do.

Melt-freeze crust: A clear sky overnight turns corn snow (“firn”) into a supportable melt-freeze crust - a guarantee for a very stable snowpack. Only a few centimetres strong, the crust softens during daytime warming and disappears. Therefore, an early start and a descent in good time are of particular importance in spring.



aspect

About 60 % of all fatal avalanche accidents occur on north-facing slopes (NW-N-NE)! Solar radiation quickens the settlement of the snowpack and, as a result, has a positive influence on snow layering and stability. A clearly favourable aspect (according to the avalanche bulletin and our own assessment on tour) permits us to make the Stop or Go© decision according to the next lower danger level.



1. English Edition, Nov. 2017 / Österreichischer Alpenverein / Olympiastr. 37, Innsbruck / Editorial: M. Larcher, G. Mössmer / Translation: Leonore Rothwangl / Illustration: G. Sojer / Picture: N. Freudenthaler / Grafic: grafische auseinandersetzung, telfs / Print: Univers Cardfolder EU-Patent EP 1097441, Druckerei Alpina

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