

## PRE TRIP PREP

- Don't be too ambitious in your plans - consider
  - What is the wx doing
  - How fit and experienced is your group
  - Have alternatives already planned
  - Re-evaluate as you go along
- Don't go on your own, advise family and friends where you are going, specific route, huts, camps, when you are due out , and the equipment that you are carrying
  - Sign into and out of national parks with DoC
- Check the weather conditions before you go, and take a long range forecast into the hills with you - look up
  - <http://metSERVICE.com/default/index.php>
  - <http://www.metVUW.com/forecast/>
- Check the avalanche conditions and forecast at
  - <http://www.avalanche.net.nz/>
- It may be 20 deg C on the Coast before you depart into the mountains, but on a blue sky day it will be nearer minus 10 deg C on the top of Mt Tasman. Pack sufficient clothing
- Check your equipment for wear and tear before going on a trip. Repair or replace as required:
  - Crampon straps, rivets, rings, anti ball plates
  - Ice axe leash
  - Gaiter straps
  - Boot laces
  - Proof leather boots
  - Skis waxed
  - Ropes, accessory cords, slings
  - Carabineers, nuts, cams, pegs, belay device
- A small repair kit is really useful
  - small multi tool with pliers, duct tape, cable ties, wire, screwdrivers for ski bindings, spanners & alan keys for crampons and ice axes, needle and thread, seam sealant, superglue
  - use a small plastic screw top container to keep everything together.
- Batteries
  - Take spare batteries - try and have equipment that uses all the same size rechargeable batteries, eg. torch, transceiver, GPS, camera - less spares and rechargers to carry
  - Ensure batteries are fully charged before each trip
  - Rechargeable batteries leak charge over time, eg only 70% charge after storage for one month
  - Warm batteries work better than cold ones

- Consider taking a solar panel and battery charger in remote areas for the group - check all connections work before the trip!

## FEET

- If your boots and socks are likely to get wet, and lets face it, they are in NZ, then at the end of the day put on dry socks, and before putting these into your wet boots to walk about outside, place them into a plastic bag which keeps socks dry and warm
- If you start to develop hot spots on your feet, stop immediately in a safe place and tape them up to prevent the situation getting worse
- Wearing too many pairs of socks can actually make your feet colder by restricting blood flow, worse, cold injury
- Tape up any areas that you know will get sore before you start
- Trim your toe nails before a trip
- Crocs are great hut shoes weighing not a lot and comfy az
- Walk in using runners or crocs if your ankles and balance are excellent
- If you walk into the hills in your big mountain boots, then tape up shins, heels, and try lacing below the top of the boot
- Don't forget your foot beds
- To prevent snow getting trapped in your lace beds and making your feet cold, cut up some foam and insert under your laces
- Put your boot liners or leather boots inside your sleeping bag to prevent them freezing overnight, or alternatively wrap them up in something and use hand warmers to warm them in the morn
- Boil up water before bedtime and fill your nalgene bottle and place in your sleeping bag to keep your toes toasty warm - make sure the bottle is rated for boiling water, and the top is screwed on! This not only gives you warm feet it provides a drink in the night if needed
- Take a blister kit even if you don't get blisters - when you need it - you need it, and nothing else will really do the job

## HANDS

- Can you do everything with gloves on? Practice tying knots, attaching/removing crampons, screw gate carabineers, zipped pockets, camera - find a system that works for you
- Sew keeper straps onto your gloves, and when taking them off, fasten them somewhere if there's a chance they can escape
- Leather work wear gloves are great for rope handling and glacier crossings to protect your hands from the afternoon sun without them becoming too hot

## TENT/BIVI SITE

- If you are spending the night in a tent or bivi, take a little time to consider where to place it, and prepare the ground surface. Stamp snow down so it is smooth and firm, or move rocks to make it more even
- Create a wind break using cut snow blocks or rocks if necessary
- Lie down on the area before you pitch the tent
- Place damp/wet clothes in your sleeping bag at night to dry them out
- Remove damp socks and wear clean dry ones during the night - this will prevent your toes getting cold and your damp socks will dry better next to your core (yes that's on your skin)
- If you are cold in the night, consider placing your down jacket over the top of your bag - this way it will fully loft and keep you warm whereas inside your bag the down will be compressed and not as warm
- Improve the insulation between you and the ground using your pack, shell clothing, or rope
- If temps will be cold, place all battery operated kit inside your sleeping bag at night, eg. head torch, GPS, transceiver, spare batts - cold batts do not work as well as warm ones. Also place water and pee bottle inside too
- After each night air your down sleeping bag so that moisture absorbed from your body overnight evaporates leaving you with a toasty bag each night
- Have things that you may need in the night handy, eg. Watch, headache pills, water, nasal decongestant to aid breathing, ipod, torch, pee bottle
- Have a pre prepared pile of snow or ice ready near the tent entrance so you can get water boiling without getting out of your pit
- Try and keep snow out of your tent by scooping it up and placing it outside - not on your pile of snow for drinking!
- Only burn your stove in the tent with plenty of ventilation
- Have a designated area for toileting and be sensitive to the environment that you are in

## SNOW SHELTERS

- Making snow shelters is warm work and the external layer of clothing will get wet
- Remove thermal layers and put on your full shell clothing so your thermal layers do not get soaked with sweat and snow
- Ensure that the roof is sculpted smooth so there are no drip points!
- Cut a small hole in the side walls to store things in
- Keep the shovel inside the snow shelter!
- Maintain ventilation, either with a partially open doorway or ski pole vents in the roof
- Mark the snow above your shelter so no one walks across and falls into it eg, crossed skis, poles...
- Make the sleeping platform higher than the lowest point as cold air will pool and sink to lowest point - door should be lower than sleeping area so cold air does not flow in

## COOKING

- Check your stove works before you leave for your trip, and don't forget matches - I carry spare lighters - one in repair kit, one with stove as a minimum
- Ensure you cook with plenty of ventilation as gasses produced from burning fuel is not good for you! The fuel needs oxygen to burn as do you...
- This is still possible inside a tent - cook at one end with the doors open
- Appoint one person to manage the stove operations to prevent spillages, although these can still happen - a wee absorbent cloth is good for mopping up spills!
- Keep spare fuel away from the cooking area
- Make a good solid flat base for the stove to sit on - in snow a shovel will prevent the stove disappearing into the depths of the snow pack...
- Place gas canister in your bag at night so it starts up on cold mornings
- Try placing the gas canister in a little water in a pan lid - this will prevent excessive cooling of the canister and improve the efficiency of the stove as cold gas is not as efficient
- Leave a small amount of water in the pan before adding more snow to melt - snow on its own will burn in the bottom of the pan
- When cooking pasta or noodles don't throw the water away - simply add some powdered soup to make a great noodle/pasta soup - pumpkin works great for me
- Weighing your gas canisters at the end of each trip and writing the weight of gas remaining onto the canister will help calculate your gas usage, and amount of gas left - don't forget to subtract the weight of an empty canister
- Take enough fuel for your trip and unplanned days - for MSR stoves per person per day take 100-125ml, and 200-250ml if melting snow
- Alcohol based hand wash is important to use after going to toilet and before cooking
- Take good food - it will make you function better
- Don't forget a spoon - eating with a rock piton is funny if it aint you!
- Instead of a separate bowl and mug and plate - take a 500ml measuring beaker with the handle cut off for drinking and eating out of
- Have a repair kit for your stove, eg. MSR o'rings

## DRINKING - do it regularly especially in hot weather and at altitude

- Bladders with tubes are good for approach walks and trekking, but are not ideal for mountain climbing as the mouthpiece can be knocked off, they can freeze up despite neoprene covers
- For mountain climbing take a couple of wide necked nalgene bottles that you can put boiling water in
- A weak salt/sugar solution will aid gut emptying of fluid into your digestive tract and improve your hydration, or a small amount of Raro (Koolaid) powder
- If its cold make up a hot drink - it will warm you up, and prevent it from freezing as quick
- Get hold of a thermal insulated cover for your nalgene or make one up from closed cell foam for your bottle

## GENERAL

- Take your camera for the stunning mountain vistas, summit shots and sunsets
- A lens cleaning cloth will save scratching the lens with the hem of your thermals
- Take a spare battery and memory card on longer trips
- Don't take cotton clothing - it will get wet and result in body cooling later in the day when you don't need it - merino is great, its natural and it does not stink like other synthetic fibres produced from oil derivatives...
- Protect your face from the sun with a light wrap around scarf, or a thin buff, or similar, which can be held in place under a baseball cap
- Wrap duct tape around your ski pole - it can act as a grip whilst touring, and its great for fixing stuff
- Ensure all exposed skin is covered in sun cream, and you have lip balm with a high UV rating
- Remember to cover under your nose and chin and your ears
- If you remove your gloves or neck scarf later in the day as the temp soars remember to apply sun cream to newly exposed areas of skin
- To protect goggles from scratching and damage, cut a piece of old foam slightly larger than the lens and hold in place with one or two elastic bands inside your goggles case
- An ingenious way to protect goggles from damage in your pack is to make a goggles case from two 2L drinks bottles (this also works for a mobile phone case using smaller bottles)
- Attach a strap to your sunnies so they can hang from your neck, which means they will not slide down the mountain or get scratched up in a pocket or on a rock - tape some thin accessory cord if you are on a budget
- Take chocolate for your guide if you are on a guided trip
- If you have purchased new equipment before your trip, ensure that you try them out before going into the hills, eg. Boots, crampons fit boots, ski bindings are set up for your boots and your DIN settings
- Placing your first ice screw on the lead is not the time to find out that it aint sharp, and will not penetrate the ice! Sharpen them before you go - see BD website
- It's a good idea to take something to do on rest days, especially if on a long trip, eg. Books, cards, board games - some pack liners have amusing stuff printed on them ;-)
- Take a first aid kit and know how to use it - place the contents into a plastic screw topped container which protects it from damage and keeps it all together and is easily pack able
- Practice your navigation skills - reading a map and compass is a key mountain skill
- The use of altimeters and GPS are useful aids to navigation
- stay focussed and maintain a sense of humour whatever happens
- Have some food, lip balm, sun cream in a wee dispenser, and anything else you may need on your climb in your jacket pockets so you don't waste time stopping to take your back pack off every time you need something

## TOILET

- So you need to take a crap - either use a toilet, bury it more than 50M from a water course, or take a cornstarch poo bag, double bag it and place in a poo pot or sturdy dry bag, and carry it out

## AVALANCHES HAPPEN IN SUMMER TOO

- Keep your avalanche skills up to date
  - Know how to recognise avalanche terrain
  - If an avalanche occurred where would your party end up?
  - Is the weather making the snow more stable or unstable?
  - practice your transceiver searching, probing and digging skills

## REPAIRS

- Holes & tears in your shell clothing are easily fixed with two circular pieces of duct tape - one piece on the outside and one on the inside - ensure area is clean and dry and tape is warm to make glue stickier, and if at home I warm iron my patches on - use a cloth so duct tape does not stick to the iron!
- If your gaiter straps keep breaking, then try using wire, sling material or accessory cord

## MOUNTAIN HAZARDS

Hazards can be classified as natural (caused by natural occurrence), man made (caused by an individual's lack of preparation, carelessness, improper diet, misuse of equipment), or combination (human trigger). You should be familiar with the following types of hazard.

**Rockfall.** This is probably the most common hazard encountered by the mountaineer. Your understanding of its causes, and measures used to lessen its impact, is essential. You should try to become familiar with the structure and composition of a rock area you wish to negotiate. Rock that has been subjected to severe weathering is more prone to rockfall. Beware of "soft" and stratified rock; these rocks are particularly prone to rockfall and can be loose and unstable. The mountaineer should do everything possible to avoid danger. Avoiding areas where rockfall is likely, and if unavoidable, enter those areas at the most suitable time of day, avoiding gullies in favour of ridges.

Observe and learn the indicators of rockfall in the field. For example, fresh debris at the bottom of a cliff or scree at the bottom of gullies. It is also important to know at what times rockfall is most likely to occur. This is usually early in the day on east and north mountain faces as the sun warms them, and in late afternoon on west and south faces. However this is a guide, and there are no hard and fast rules.

**Icefall.** This hazard can be triggered by natural, man made, or combination factors. It is a common hazard when climbing in snow, ice, or glaciated terrain. The parameters of rockfall also apply to ice as well.

**Avalanches.** Terrain, climate, and weather are the basic elements to account for avalanches. The two main causes being the weight of large amounts of accumulated snow, and steep slopes that exceed the cohesive forces within the snowpack itself, or between the snowpack and the ground. There are two types of snow, powder snow (loose snow), and compact (slab) snow. Avalanches can be disastrous for the mountaineer. Your chances of survival after being buried by an avalanche are only 50% after 30 minutes. After two hours the chance for survival is remote. The best plan is avoidance. If in any doubt about the possibility of avalanche, turn back.

**Combination Factors.** This type of hazard consists of the previously mentioned factors i.e. rockfall, icefall, and avalanche combined.

**Lightning.** The danger from lightning is greater on rock than on snow or ice. Lightning can be expected when static electricity is great enough to cause tickling of the scalp, the hair to stand on end, and a slight crackling and appearance of a blue light (St. Elmo's Fire) on metal objects. The following guidelines can help reduce injuries due to lightning: Avoid summits and ridges. Stay away from prominent objects, especially metal. Avoid gullies filled with water. Avoid overhangs and recesses. Avoid cracks in wet rock, lightning will follow them. Take up a squatting position on dry ground if possible, or a backpack, with your knees drawn up. Keep your hands and upper torso insulated from the ground. Avoid metal objects extending from the upper body to the ground.

**Crevasses.** Crevasses are formed when a glacier flows over a slope and makes a bend, or when a glacier separates from the rock walls that enclose it. A slope of only 2 to 3 degrees is enough to form a crevasse. As a glacier makes a bend it is likely that crevasses will form at the outside of the bend. Making the safest route on a glacier the inside of the bends, and away from steep slopes and icefalls. Extreme care should be taken when moving onto or off a glacier because of the moat that is likely to be present.

## **BASIC STORM PRECAUTIONS**

Weather can be erratic on mountains, and it is always wise to be prepared for wide variations in temperature, and amounts of precipitation, either as snowfall or very cold rain. You should be self-sufficient enough to cope with normal weather changes using materials from your backpack. Movement during a storm can be difficult, due to poor visibility and bad footing on steep terrain. The dampness of rain and snow, and the penetrating properties of wind can cause you to chill quickly. The following precautions should always be taken in this situation:-

- If you are climbing in a group (and this is nearly always a wise move), maintain visual contact.
- Keep warm. You should maintain energy and body heat by eating and drinking (hot drinks) often. Carry supplies that can be eaten quickly whilst on the move.
- Keep dry. Wear wet weather clothing when appropriate, but do not overdress, which can cause excessive perspiration and dampen clothing. As soon as you have reached and/or secured shelter you can put on dry clothing.
- Do not rush. Hasty movement during storms will often lead to breaks in contact and unnecessary accidents.
- If you do become separated and lost. Find shelter, stay where you are and keep warm, dry, and calm.
- Do not use ravines as routes of approach during a storm. They often fill with water and are prone to flash floods.
- Avoid high pinnacles and ridge lines during electrical storms.

- Avoid areas of potential avalanche or rockfall danger.

Keep these few points in mind when in potential storm situations and you won't go far wrong. Of course if you know there is a possibility of a storm before you set out then simply don't go on that occasion. There will be many other opportunities when the conditions are more suitable.

## CLIMATE AT ALTITUDE

Climate is an important factor to be taken into consideration when climbing. The human body is affected by the mountain climate, and is sensitive to weather change. Mountain weather can be extremely erratic, within a short time, or a minor change in locality, the wind may vary from stormy to calm, and from extreme cold to comparative warmth. The severity and variance of the weather at altitude means it has a major impact on mountain climbers.

The safety or danger of almost all high mountain regions depends upon the weather, especially in winter. A change of just a few degrees in temperature above or below freezing point can affect the speed and ease of travel. Terrain that can be crossed swiftly and safely one day may become impassable or highly dangerous the next. The reverse can happen just as quickly.

Severe weather can decrease morale and increase basic survival problems. These problems can be minimised when you have trained yourself (or been trained) to accept the weather by being self sufficient. As a mountain climber, properly equipped and trained, you can even use the weather to your advantage.

Mountain air is relatively pure. The higher the elevation the purer it becomes. In fact above 4500 meters air is almost germ free. Falling snow also purifies the air by capturing and holding impurities which may be present. Pressure is low in mountainous areas due to altitude. The barometer usually drops by one inch for every 300 meters (approx. 950 feet) gained in elevation. The decreased pressure causes the air to expand, decreasing the amount of oxygen and moisture in a given volume. Consequently, oxygen decreases with elevation.

High mountain air is dry, and may be drier in the winter. Due to this increased dryness equipment does not rust as quickly, and organic material decomposes slowly. The dry air also causes you to increase your consumption of water. Due to the cold you do not naturally consume the quantity of fluid that you would at higher temperatures. Therefore, to avoid dehydration, a conscious effort should be made to maintain your fluid intake.

The thinner, drier, air at altitude has a reduced molecular content, and consequently a reduced filtering effect on the sun's rays. Both visible and ultraviolet ray intensities are greater. This increases the possibility of sunburn, especially when combined with snow cover that reflects the rays upwards. It is a good plan at these altitudes to have, and use, good sunblock, and ski goggles or mask.

## THE ROPE

Ropes provide access up, down, and across mountain obstacles. Climbing ropes are designed to withstand severe force while ensuring your individual safety. The construction standards for these ropes are prescribed by the Union of International Alpine Association. No one rope is ideal for all

situations. The climber must determine the situation in which ropes may be used (such as urban, rock, ice, climbing, rappelling) and in what type of terrain and climate. Rope selection is affected by the following factors:-

- Fall factor measures the severity of a fall. This is calculated by dividing the length of a fall by the amount of rope paid out at the belay point. The higher the fall factor, the greater the amount of force generated.
- Rope drag, intermediate protection, and other factors of the safety chain (belay anchor, attachment to belayer, belayer, rope, intermediate protection, attachment to climber, and climber) reduce the severity of a fall.
- Impact force is the sudden stress put on the safety chain when a fall is held. The whole system is only as strong as the weakest link.. If there is a weakness at any point, the shock loading from the impact force can cause a failure of the system. The impact force occurs once the fall has stopped (usually with a sudden jerk on the climber's body). It is the maximum load placed on a rope after all the energy from a fall has been absorbed in the ropes stretch.
- Knotability is the ease in tying and untying knots in the rope, as well as the ability to hold a knot once tied.
- Elongation, or stretch, dissipates the energy produced by a fall, throughout the rope rather than directly to the climber's body. Other than in a fall, the rope should stretch as little as possible.
- The rope should be soft, flexible, resistant to kinking, durable, water, repellent, have a high fall rating, and have no sheath slippage.

There are two types of rope that are generally used in climbing. Static ropes, and dynamic ropes. Static ropes are used for rappelling, rescue operations, load hauling, and rope installations. They allow for minimal stretch. Static ropes are called "Kernmantle", they have an inner core and an outer sheath. Due to their construction, spinning and kinking is reduced considerably.

Dynamic ropes are used for climbing, and allow stretch within the fibres of the rope. This elasticity allows the energy produced in a fall to be dissipated through the rope rather than the climber's body. This stretching can be a disadvantage in certain operations, such as rappelling. Dynamic ropes are more susceptible to wear, and should be checked regularly, and certainly before each climb.

## CLOUDS

Clouds are indicators of weather conditions, proper reading of cloud shapes and patterns can provide a pretty good forecast without need for technical equipment that can go wrong, get broken, or lost. Learn some basics about clouds and it will always be a good standby.

Clouds are classified by shape and height. Shape provides information about the stability of the atmosphere and chance for precipitation. Height (above ground level) gives an indication of the distance of a travelling storm and the chance for precipitation.

The two major types of cloud, as classified by shape, are cumulus and stratus. Cumulus clouds are the so called "puffy" clouds, resembling tufts of cotton. Their form from top to bottom is often equal to, or greater than, their width. They have sharp distinct edges, composed of water droplets. Air temperatures within the cloud are warmer than -30 degrees. These clouds are usually indicators of instability at the altitude where they occur, and stormy weather associated with these clouds is

usually violent, with heavy rain or snow, and strong gusty winds. A precipitating cumulus cloud is called a cumulonimbus cloud.

Stratus clouds are layered, and appear flat, expanding more in the horizontal plane than the vertical. They are indicators of a stable atmosphere, but may also indicate the approach of a storm. Stormy weather associated with stratus clouds does not include violent winds, and precipitation is usually light but steady, lasting for anything up to 36 hours. Lightning is rare, but sleet and fogs are also associated with these clouds. A precipitating stratus cloud is called a nimbostratus. If a cloud cannot easily be determined cumulus or stratus it may be evolving from one type to another, indicating a change in atmospheric stability. This is called a stratocumulus cloud.

Clouds are classified into three height categories (above ground). Low, middle, and high. Low clouds are below 2000 meters and are either cumulus or stratus, or their precipitating counterparts nimbostratus or cumulonimbus. Most precipitation originates from low clouds, because rain or snow usually evaporates before reaching ground from higher clouds. These clouds are indicators of impending precipitation, especially if the clouds appear dark at their base, which means they are more than 1000 meters thick.

Middle clouds are positioned between 2000 and 6100 meters. They have a prefix of alto, being called altostratus or altocumulus. These appear less distinct than lower clouds because of their height. Middle clouds usually signify fair weather, especially if they are rising. Lowering middle clouds mean potential storms, though usually some time away. Watch out for lowering altostratus with winds from the north. This indicates warm front conditions, lowering air pressure, and the approach of rain or snow and a travelling storm system within 12 to 24 hours. High clouds are positioned more than 6100 meters above ground. They are cirrus, cirrostratus, and cirrocumulus. These clouds are usually frozen, indicating air temperatures at that level of below -30 degrees. A thin veil of cirrus often covers the sky, partly obscuring the sun, and at night producing a ring of light around the moon. Its arrival means moisture aloft and the approach of a travelling storm system. Precipitation usually 24 to 36 hours away.

Climb safe.