

French Avalanche Analysis 2006-2007

Text and Graphs: David George – PisteHors.com

Photographs: Alain Duclos (http://www.data-avalanche.com/alea_avalanches/)

Last winter we were buried under a veritable avalanche of hyperbole as the mainstream press blamed out of control freeriders for the worst season of avalanche fatalities since 1970. There were suggestions that off-piste skiing was about to be banned with even the (now) French President taking an interest in the bad boys of the backcountry. What a difference 12 months makes. To date 20 people have been killed by avalanches. The lowest figure since 1989 and the press has moved on to speculate about other topics.

An abridged version of this article was originally published in the Autumn 2007 edition of The Avalanche Review.

Weather Conditions

The prime suspect for fatalities and avalanche accidents during the record 2005-2006 season was the weather. A thin snow pack with very cold temperatures for a sustained period and over a wide geographic area lead to the formation of a unstable layer of depth hoar. Skiers, both professional, experienced and neophytes found unstable conditions in areas and altitudes where they were unaccustomed.



Illustration 1: *Massive slab avalanche on the Albaron in the Maurienne - April 2007 (photo Alain Duclos)*

Last winter also saw record breaking weather conditions of another type. The mountains were 2 to 3C hotter than average with even higher maximum temperatures. The result was a late start to the season

with little snow below 1800 meters. Off piste skiing and ski touring was only really practical in the higher parts of the Alps and Pyrenees. The first skiable snows came in the first week of December with a storm blowing up from the Mediterranean and giving best conditions in the Hautes-Alpes and Isere departments. The rest of the month was dry and relatively warm. A layer of depth hoar formed above 2200 meters on colder slopes where there were high temperature gradients due to the thin snow-pack. Snow followed at the start of January but the first three weeks saw temperatures 9°C above norm. It rained to 2700 meters rendering many north facing slopes unskiable, covered in a thick layer of ice. The rain and freeze-thaw cycle had the effect of stabilizing the snow-pack below 2500 meters and skiers experienced spring skiing conditions in the middle of winter. Cold weather finally arrived on the 23rd when the maximum temperature fell from 5.3°C to -8.4°C over a 24 hour period at Pralognan (1420 meters) near Courchevel. This was accompanied by fresh snow but depths only reached average in mid February and then only above 2200 meters. March continued with unstable weather with further small snowfalls into the first week of April. Winter then finished abruptly with a 3 week thaw followed by a return to colder, unsettled weather in May and June. This gave ski tourers a good end to the season, at least in the high mountains.

Avalanche Incidents

16 of the 20 avalanche deaths, including a single fatality in the Pyrenees range, were clustered into four groups. 14 of the fatalities occurred in the neighbouring departments of the Savoie and Hautes-Alpes, 4 of the others in Chamonix.

The first fatal accidents began early January. They principally concerned off-piste skiers. On the 2nd a young skier was killed by an avalanche off-piste in les Arcs. Tired, he had left a group of friends and was returning to resort alone. He wasn't equipped with a beacon. The avalanche risk was Considerable. The following day, with the avalanche risk now at High across the Alps, a resident of Chamonix, the son of a senior employee of the lift company, was off piste skiing in the Grands Montets sector when he was buried under 1 meter of snow. He didn't have an avalanche beacon and was only found by a probe line after 40 minutes of searching. The most serious incident involved two ski tourers in the Hautes-Alpes. They were buried by a large avalanche. Both men were experienced and properly equipped. One of the men was located by a police helicopter equipped with a transceiver. His colleague was found later by S&R dog.

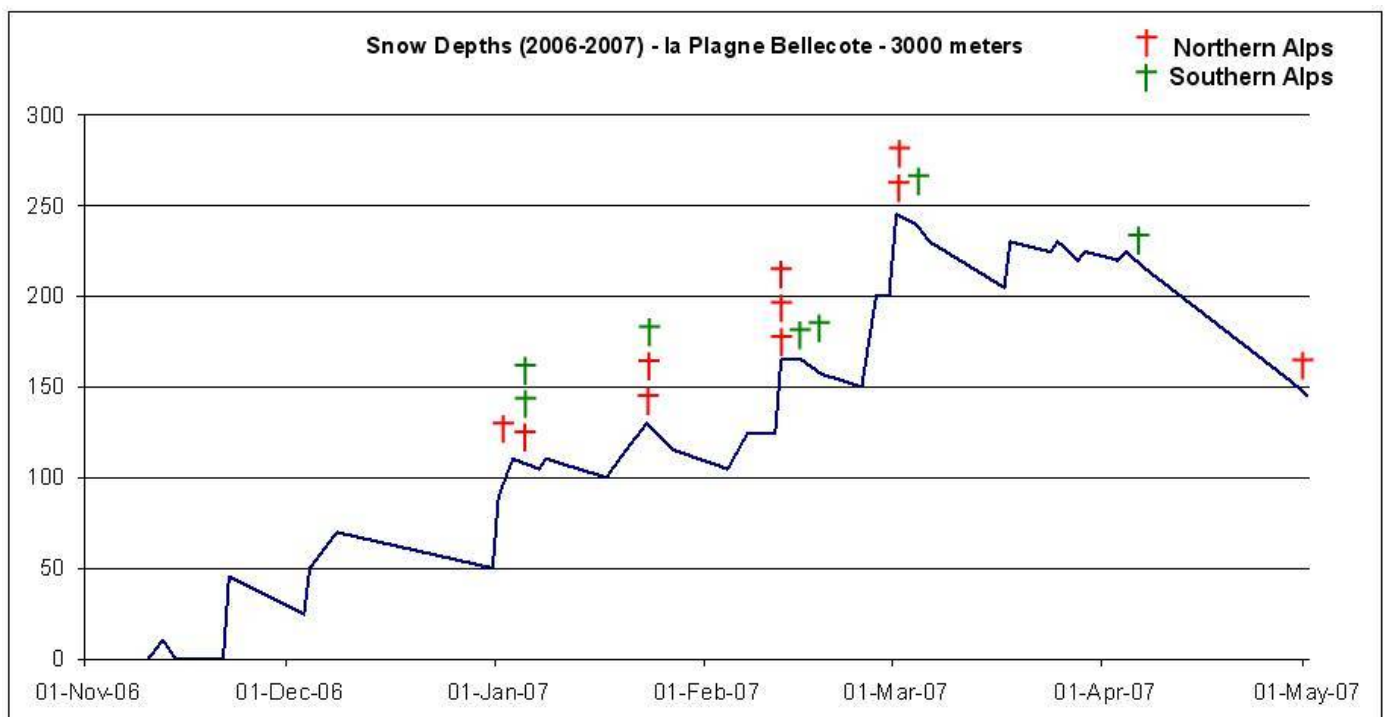


Illustration 2: Snowfall data and avalanche deaths

Incidents continued to the 7th when a snowboarder was seriously injured at l'Alpe d'Huez. There were some lucky escapes, a skier buried under 4 meters of snow at Val d'Isere and another buried over an hour in the notorious Cote Brune sector at Meribel. On the 5th two off duty ski patrollers were caught at Tignes. One of the patrollers was Jake Christian, a member of the Telluride Ski Patrol who was on a season-long work exchange at Tignes. He escaped with relatively minor injuries. His colleague was not so lucky and at the time of writing is still in a coma. They were dug out by witnesses equipped with beacons.



Illustration 3: *Another view of the Albaron slab (photo: Alain Duclos)*

On the 27th January the avalanche risk in the Alps was Considerable with a strong wind blowing from the north to north-east. 30 to 50cm of fresh snow had formed new slabs under the action of south then northerly winds. These were poorly bonded to a crust or resting on facets. An Italian ski tourer died in the Pelvoux despite being swiftly rescued by friends. In the Arêches, home of the Pierra Menta ski mountaineering competition, two local instructors were killed while ski touring together. A search was only started when they failed to return in the afternoon. In the Pyrenean resort of Porte Puymorens, where the avalanche risk was Moderate, a climber died after being swept 200 meters down a rocky couloir.

There were a couple of minor incidents around the 9th February following 30cm of fresh snow in the Haute-Savoie but the third cluster of fatal incidents followed further snow on the 12th. An off-piste skier had a lucky escape in the resort of Saint-Nicolas-de-Véroce after getting avalanched alone in a bowl after being advised not to go off piste by patrollers. His friend had been killed by an avalanche in the same area a year earlier. There were also minor incidents involving a patroller and his dog in Flaine and at la Clusaz in a known avalanche zone. There followed 5 fatalities and a number of other incidents. On the 13th a skier crossing between open ski runs at Tignes was buried and killed by a small slide and a terrain trap. At la Plagne the body of another lone skier was located by tracing his movements on his hands free lift pass. He was just meters away from an open slope, buried in a terrain trap with his legs visible. A lone monoskier was killed off-piste at le Corbier. A common factor was that none of the victims had avalanche beacons and there were long delays before they were reported missing. The

avalanche risk was High and generalized above 1800m.

On the 15th a ski tourer was killed in the resort of Crevoux in the Hautes Alpes. Climbing with a friend from the top of lifts the victim was caught by a large avalanche and a terrain trap. He was not equipped with a beacon. The risk was High and the bulletin advised that the snow-pack was very unstable at altitude. There had been two avalanches in the same area on the 13th. The cycle ended on the 18th when ski tourer triggered a slide in the Hautes-Alpes. The man was found by members of his group using beacons. He had been buried for forty minutes but could not be revived.

There had been close to a meter of fresh snow on the 4th of March in the Northern Alps. A group of young but relatively experienced and properly equipped skiers from Lyon University's Mountaineering Club had been reading the bulletins and decided on a ski tour close to Valloire in the south of the region where they felt it was safer. The bulletin gave the risk as Considerable increasing to High during the day with the snow-pack described as only weakly stabilized for the first 60-120cm with the presence of graupel acting as a weak layer. One of the group recalled how they had skied 150 meters of powder on a north face descending one at a time. While climbing back up they noticed the weak layer in the snow-pack but already having skied the slope gave them confidence. They were also under time pressure as they had left someone at the summit. Following a line of rocks in the hope these would provide anchors the avalanche was at least 1 meter deep and took most of the face, some 1000 meters killing two of the skiers. It was probably one of the biggest slides of the season. There had been several minor incidents in the area in the days prior to this slide.

On the 6th a group 8 ski tourers from the French Alpine Club were caught by an avalanche in the Ubaye close to the border with Italy. The group had originally scheduled a week's ski touring in the Vanoise in the Northern French Alps but changed their plans after consulting the avalanche bulletins. After a day's touring they planned the following day with three route choices depending on the conditions on the ground. Descending after lunch they skied a short north-east to east slope at 2700m. There were some accumulations of snow between rock outcrops and the group leader didn't think there was much risk of a slide on what he estimated was a 25 degree slope. After skiing the slope without incident three other members were caught by the slide and one of them was completely buried. A considerable depth of snow accumulated in front of rocks. They had difficulty in localizing the victim due to the burial depth. The group worked in relays to dig a hole, rechecking with probes and beacon as they dug. They finally uncovered the face of their friend after 25 minutes. He was unconscious and failed to respond to over an hour of resuscitation. There was no cell phone reception in the area and at that point the group leader descended to a nearby refuge to call search and rescue. Due to worsening weather conditions the rescue helicopter was unable to reach the group. A decision was made to evacuate the survivors, under difficult conditions, and recover the body of the victim the following day.

On the 8th of April a talented international women climber was killed ski touring in the Hautes-Alpes. She was buried for 30 minutes before located by her beacon. The avalanche risk was Moderate but strong winds had formed localized slabs. The final incidents were at high altitude on Mont-Blanc. A Finnish ski mountaineer was caught on the north face at the end of May. Swept into a terrain trap (rimaye). Then on the 17th June two Swiss climbers, one a high mountain guide, were also killed after being buried in a rimaye. We finished the "avalanche year" with a final minor incident in the Belledonne mountains at the end of September, 2007 when 50cm of fresh snow was accompanied by high winds at altitude. Two climbers were avalanched in a steep couloir sustaining minor injuries requiring hospitalization. A reminder that new snow should always be treated with respect.

Conclusions

Over the last few years there has been an increase in the number of fatalities involving off piste skiers and snowboarders compared to ski tourers. The first group now constitutes over 50% of all victims. This trend can be attributed to the growth in popularity of lift served off piste skiing and snowboarding aided by the introduction of better equipment and the increasing safety awareness of ski tourers who now systematically carry avalanche beacons. Last season all but one of the ski touring fatalities carried a beacon whereas none of the off-piste fatalities was equipped. Last season saw a reversal of recent trends with 12 ski tourers killed compared to 5 off piste skiers and no snowboarders. The other 3 fatalities were climbers.

Some off piste skiers are still ignoring the dangers they face when leaving open and marked runs especially when the risk is Considerable or higher. Vox-pops by the media over last winter show that many skiers do not consult the avalanche bulletin and don't know the meaning of warning flags. In 4 of the off-piste incidents weather conditions and lone skiing caused considerable delays in locating the victims.

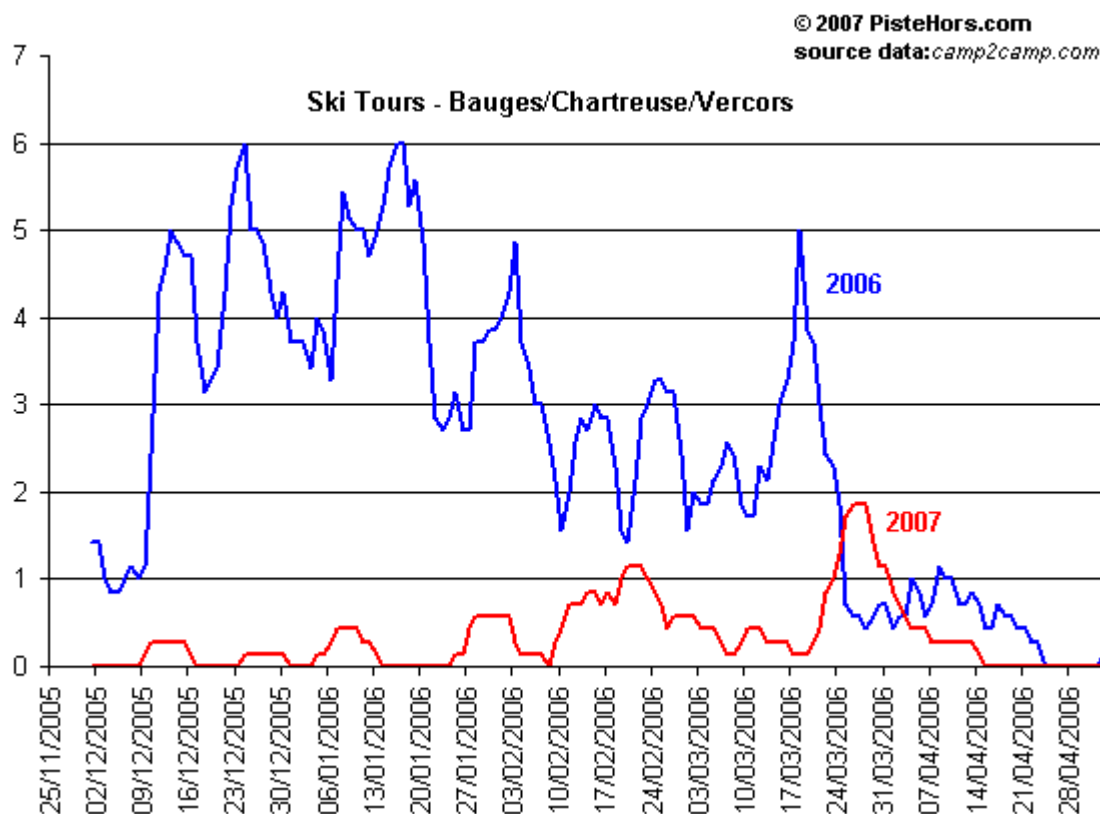


Illustration 4: A poor season at mid altitudes

The average number of fatalities over the last 18 seasons, since skiing in all its forms started to form a major component of statistics, is 30.8. However from 2000, with the exception of 2005-06, the average has been 27. This at a time when off-piste skiing and ski touring have been gaining popularity. Set in this context last season's figures are still good. What can account for this relative success? Using the Camp2Camp.com database of ski tours we plotted all the trips for the Northern Alps a 14 day moving average (to iron out the variations caused by week-end warriors) against the last 6 years. This shows that the season started 3 weeks later and only reached average with the good conditions from mid March to April there was then a rapid tail-off. Apart from the Pyrenees there was practically no ski season in other French mountain ranges outside of slopes covered by artificial snow. There were quite simply less people out in the mountains. A similar database maintained by Skitour.fr showed that for 500 members the average number of trips dropped 6.2% to 5.46 compared to 2006 and the vertical of each trip increased 4.1% to 1356m. This increase suggests that skiers were searching for snow on longer mid to high mountain routes. This statistic might account for the larger number of ski tourers in last season's figures as these higher routes are more dangerous, even in good winters.

A large proportion of the ski touring fatalities were part of experienced or well equipped groups. Why is this group over represented? It is possible that these skiers were the ones motivated, informed and experienced enough to find snow in a difficult season. The number of fatalities is in line with the average for the last 18 seasons. In last year's review we speculated that the long rise in figures for off-piste skiing may be coming to an end as people get a taste for touring. The number of skiers in resort on AT gear is on the increase. Often this is used to access fresh tracks with short climbs from the top of lifts. Last season there was only one fatality of this type, the skier at Crevoux and given the other indicators there doesn't seem to have been a significant influx of new ski tourers.

The drop in the number of off-piste fatalities is interesting. Certainly before January there was barely

enough snow in resort to ski outside of open runs. It is true that there is often a fine line between a serious and fatal accident. Some of the incidents could easily have had tragic consequences. However the ratio of victims per fatal avalanche as well as the overall number of avalanches reported compared to fatalities doesn't suggest that skiers in 2007 were luckier than normal or that accidents were less severe. What is true is that for the most part avalanches were spread into four clearly defined cycles and largely limited to an arc on the French-Italian border stretching from Chamonix to the Ubaye. There were no fatalities amongst guided groups. The weather clearly played a role with rain to high altitude and a good freeze/thaw cycle in January. Avalanches generally occurred at a slightly higher altitude - perhaps putting some dangerous terrain out of reach of ski lifts. The French Ski Lift Operators Association (SNTF.org) reported a 12% drop in skier/days in last season compared to the previous year although this drop is less marked, 8%, when compared to the period 2002-2007. However in the big high altitude resorts the drop was just 6%. There were also two major avalanche cycles during the main French winter holiday period.

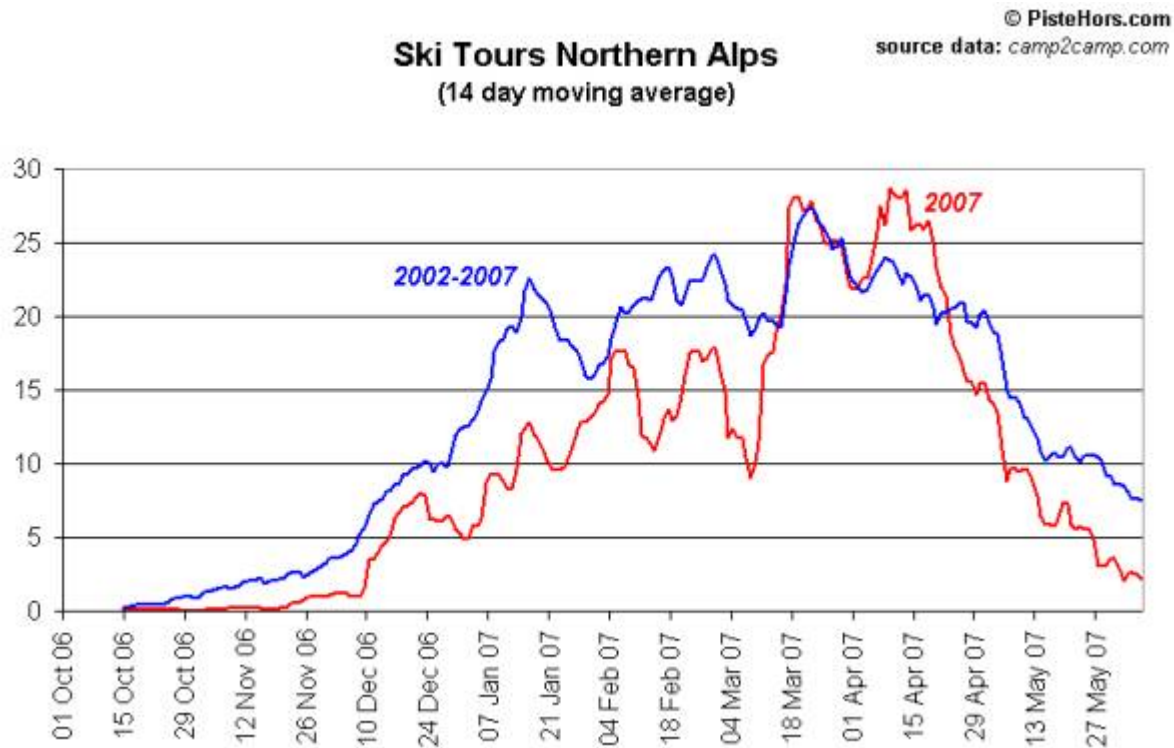


Illustration 5: *Slow start with normal conditions in Feb/March*

2006-07 will be remembered as an unusual winter. The stable snow conditions and poor snow cover were the principal reasons for the improved figures although the proportional increase in the number of ski touring fatalities amongst experienced skiers is worrying.

References:

Snowfall data from Meteo France (<http://www.meteo.fr>)

Additional information on avalanche incidents from the ANENA (National Association for the Study of Snow and Avalanches) <http://www.anena.org> and http://www.data-avalanche.com/alea_avalanches/

Ski touring data from <http://www.skitour.fr> and <http://camp2camp.org>