

REANALYSIS OF RECENT AVALANCHE ACCIDENTS IN VAL D'ARAN, CENTRAL PYRENEES: A COMMUNICATION CHALLENGE FOR DIFFERENT USER GROUPS

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ABSTRACT: For centers issuing avalanche advisories nowadays, communicating with the end user has become a bigger issue than the analysis of the danger itself. Addressing a diverse public in terms of age, attitude, skill level, objectives, means of progression and even language –particularly in Europe- has become a challenge that is not always dealt with successfully. Despite the fact that we are in the era of instant communication, the message does not always get to the target or, when it does, it does not always modify the attitude towards the risk of the different user groups.

When an accident is analyzed, the avalanche danger, avalanche problems and advice on terrain in the avalanche advisory of that particular day are all examined against the terrain choice and decision making of the group that led to the accident occurrence. Specific communication challenges for each different user group are highlighted, and ideas and strategies to deal with each of them are discussed. Issues such as spreading avalanche information on the mountain gear rental shops, the language and the SEO of the avalanche advisory web sites, avalanche information for side-country users, or technical information including strategic mindsets for professionals are discussed in the paper.

KEYWORDS: Pyrenees, avalanche accident, communication challenges, human factors

1. INTRODUCTION

In the Pyrenees, avalanche accidents are frequent, with an average of 5-6 fatalities every year. The 12 fatalities registered during the winter of 2017-2018 have raised concern for this issue among the general public as well as in the Avalanche Centers, who are working to provide a clearer and more detailed and homogeneous information between regions.

Val d'Aran is a small county (625 km²) located on the Atlantic watershed of the Central Pyrenees. The snow climate is oceanic with an average annual snowfall of 6-7 meters and a snowpack reaching 3 meters in the Alpine heights in mid-winter. Since 2004 Val d'Aran counts with a local Avalanche Centre, in charge of a daily backcountry advisory and a forecast operation for two highly frequented and economically important highways. During the winter season there is a huge and varied community of avalanche terrain users. Avalanche forecasters and local community are indeed much closer than in other larger forecast regions, which favors dissemination and effectiveness of avalanche education and awareness programs.

In this context, some of the typical questions we ask ourselves as avalanche forecasters are:

- Is the standard avalanche bulletin useful for all the user groups? Is this information clear and detailed

enough for all of them?

- Are the educational programs well structured and do they arrive efficiently to target users?

- What can we do as an avalanche center to prevent avalanche accidents and fatalities?

In Switzerland, Etter et al. (2008) show that an improvement in avalanche prevention throughout the years can currently be determinant in the decrease of avalanches fatalities. In this sense, the newer centers also use the most advanced communication tools (Johsen, 2013).

The very wide target of users forces centers to write advisories which are clear enough yet at the same time include enough detail so that they are useful for most users.

2. CASE STUDIES

Through the analysis of four avalanche accidents occurred in the last two seasons in the region of Val d'Aran, we examine and show the shortcomings in the whole avalanche forecast and communication process, from the data analysis, bulletin preparation and spread of information to the moment when the information reaches the user (media, private and public organizations role).

The accidents have been selected to represent different terrains and user types, and for each one we look into the weaknesses in user's decision-making. Also, heuristic traps (McCammon, 2004, 2006) and mind-sets (Atkins, 2014) have been considered.

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bounds and side-country riders

Pala Laveja is a north aspect big slope, side-country of the Baqueira-Beret ski resort, and a very frequented and skied one during the season.

In February 9, 2017, two Finnish skiers were involved in a slab avalanche (SS-AR-R3-D3) triggered by another group who were moving further above in the slope (Figure 1).

The result was 1 person completely buried and dug out by companion rescue in less than 10 minutes. The injured was unconscious for 10-15 minutes and hypothermic. After the rescue he was evacuated to hospital for a more in depth examination. Deficiencies in language communication caused information to be lost during the exchange between the skiers and the patrol and rescue teams and then with the hospital staff.

Danger level was 3-Considerable with Drifting snow and New snow as main avalanche problems.

Despite the fact that the Finnish skiers were well trained in avalanche rescue, this case highlights poor training in avalanche terrain decision making. At the moment of the accident several groups were skiing the same path at the same time.

The two Finnish skiers explained that they could not find the avalanche bulletin for the day because of poor positioning of the website in the SEO.

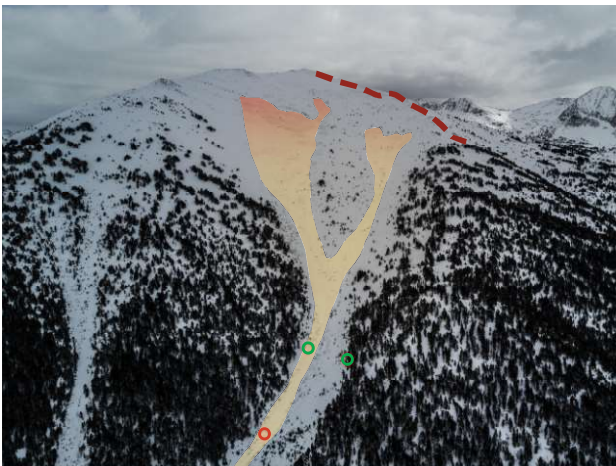


Figure 1: Laveja path. Colored outline: slab avalanche surface; slashed line: limit of ski resort; green circle: initial position of affected group. red circle: final position of victim. Photo author: Bernardo Gimenez.

2.2 December 15, 2017. Salana Peak. Backcountry skiers

The Salana peak (2485 m) is a frequented route in Val d'Aran during winter. The easy access and multiple options for downhill makes it a very attractive option for a mid-day trip for not very experienced mountaineers.

In December 15, 2017, there were several groups climbing the peak. A group of two, after seeing another group descend on the north face, decided to ski a more exposed line. They had read the bulletin and knew that the north aspect was the most unstable one. After a ski-cut that fell, they still decided to ski down the slope. A wind slab over a persistent weak layer (HS-AS-R1-D2) was triggered by the first skier, who managed to stay near the upper crown. The bulletin for that day assigned a 2-Moderate avalanche danger level on north aspects with Drifted snow and Persistent weak layer as the main problems.

2.3 December 16, 2017. Tuca de Barques (2635 m). Backcountry terrain and guided group

In December 16, 2017, a group of two guides with five clients took a ski-touring trip in an unfrequented area due to its difficult access during the winter. The guides were very well trained, with avalanche skills and vast experience.

During the ascent, signs of instabilities were observed (shooting cracks) but they decided to continue upwards. After reaching the ridge, the lead guide triggered a slab (HS-AS-R2-D2) which caught only him. He was partly buried in the debris and without injuries (Figure 2).

Few days after, near the crown, the avalanche center team made a field observation describing a very unstable snowpack structure with an active persistent weak layer. The avalanche danger was rated 3-Considerable with Drifted snow and a Persistent weak layer, especially on north and east aspects and in the Alpine. The mind-set transmitted from the avalanche center was to Step Back.



Figure 2: Bargues peak slab. Crown and upper part of avalanche triggered. Photo author: Nacho Morales.

2.4 April 1, 2018. Llubriqueto. Inexperienced Snow-shoers

Llubriqueto is located in Vall de Boí, near the south border of Val d'Aran. The site of the accident is a south face aspect at 2000 m altitude. A group of 5 people with a dog were taking a snow-shoeing trip and decided to cross a very steep slope at 3 PM. A natural wet avalanche (WL-N-R1-D2) fell in that moment. The debris caught a member of the group and drag them down. No serious injuries occurred.

The regional avalanche danger was 2-Moderate from mid-day with Wet avalanche as the main avalanche problem. The group had no avalanche training and no winter mountain experience. Without any avalanche security equipment, they were totally unaware that they were in avalanche terrain and therefore exposed to possible avalanches.

3. DISCUSSION

From the examples described above we want to spot common factors but also specific elements related to the users' profiles. In this section, we want to identify the main weaknesses of each type of user, and suggest some changes in our current daily work that can improve the avalanche advisory itself as well as the advisory communication, the user's skills and the group decision-making.

3.1 Out-of-bounds and side-country

In the Pyrenees, like in other mountain areas, the increase of activities in or near ski resorts has led to an increase of avalanche accidents.

From the first example we can identify some of the main problems in this terrain. The first one is the huge amount of people accessing unprotected areas without enough training. The diversity of user profiles is also very vast. In this context, some well trained professional free riders are mixed with inexperienced users who may look well trained (people with very technical equipment but without experience or enough training).

To have an effect in this kind of users, a close work between the ski resort and the avalanche center is essential. Gunn et al. (2010) examine this kind of terrain and classify groups by risk level. In order to improve the generally poor level of avalanche skills in ski resort users, a true implication from ski resorts is required, with clear information to their users and brave campaigns of awareness. McCammon et al. (2008) suggest different strategies for informing Out-of-bond users. It is evident that simply placing signposts with the avalanche danger level on the limits of the ski areas is not enough. And this is even worse if the avalanche danger displayed is merely the result of the assessment of a ski resort command based on subjective elements, sometimes related to the snow instability (result of arti-

cial triggering), and sometimes to other factors (large number of expected customers, attempt of not taking responsibility).

Language is another information problem in the area. Several users with different mother tongues visit the area and currently the avalanche advisory is not translated into foreign languages. Also, there is a need to improve the SEO positioning in order to make it easier to find the information for users from afar. In this regard, somehow linking the avalanche center with the very well-known ski resort could be the key.

On the other hand, Moner et al. (2018) show that avalanche accidents in the side-country are related to different Avalanche problems than those in the backcountry. This suggests that, in the future, it is not a far-out idea to publish a specific information section attached to the general advisory specifically addressed to these users.

3.2 Backcountry skiers

Like other collectives, backcountry skiers show a wide range of profiles depending on experience and training. Different training levels lead to different assessments of the avalanche terrain. Halladvik et al. (2017) conclude that novice users assess terrain for a specific site as significantly less severe than experts.

In the accident analyzed, the profile is an experienced ski-touring group without training on avalanche terrain or snowpack assessment skills. They had read the avalanche bulletin but did not have the skills to apply that information to the terrain.

This is a common case in the Pyrenees, with a large tradition of mountain activities but very new avalanche educational programs. These programs must consider this group of users and should include products specially designed for them. In this regard, the A.C.N.A. (The Spanish nonprofit avalanche association) (Marti, et al., 2013), includes in their training program specific products such as "Alert: you are entering avalanche terrain", a practical field day for initiated users. The challenge is to get this group of users to actually take this kind of training.

Also, common heuristic traps strongly affect this collective. In the example Social facilitation and Scarcity played a significant role in making a wrong decision. To improve this aspect, the heuristic traps could be included in the advisory, in an awareness section.

3.3 Mountain guides and experienced professionals

These are the most trained and skilled users of avalanche advisories. Frequently the avalanche bulletin is not enough for them and they ask for

more specific information about snow stability, problems distribution or avalanche activity. Nevertheless, they are not free from suffering an accident affecting themselves or their clients.

Like the backcountry group, heuristic traps play an important role within this collective, but well trained professionals are capable of recognizing and fighting against mental shortcuts. Otherwise, during the daily preparation and route finding, external pressure is often present. In such small areas as Val d'Aran, engagement with the client and possible competition with other professionals could lead to taking wrong decisions during trip planning. In this sense, encouraging briefing and debriefing between all professionals (ski, touring and heli guides) and promoting data exchange should benefit all professionals (Haegeli and Atkins, 2016).

Additional data for decision-making process is valuable for the professionals. Nowadays the Avalanche Hazard Assessment report (Statham et al., 2018) is sent daily from the avalanche center to the most advanced users and professional collaborators. This includes the strategic mind-sets (Atkins, 2014). Recognizing the generic mind-set and using it as an operational factor is a good strategy that professionals do not always value enough.

3.4 *Inexpert users*

The last case study shows an extreme but not unusual situation in our environment: the family or friend group, generally from far away places with no mountains and with no winter mountain skills whatsoever and no training on planning and decision-making skills in avalanche terrain. Snow-shoers are strongly affected because they do not need any technical preparation. Despite this fact, studies like Winkler et al. (2018) show that in Switzerland this user-group had a tax of mortality near six times less than backcountry skiers.

The occasional presence of this kind of user in the mountain makes it difficult to plan a short-term training program for them. The actions must be directed to ensure a safe one time activity. With this aim, information and advice from local establishments (hotels, sports and rental stores) are required as well as their offering the services of mountain guides even for tours without high exposure.

For rental stores, the provision of this information should be mandatory and perhaps also the rental of safety equipment as an inseparable pack.

For these users, the implication of ski resorts is also valuable. Very frequently the clients of the ski resort decide to change their outing due to poor snow conditions or weather, and they switch to hiking or snow-shoeing trips despite the high snowpack instability.

3.5 *Other remarks*

Specific and complete avalanche accidents studies in the Pyrenees can be useful to spot their main features and post specific advice for them. Along this line, Moner et al (2018) detect main Typical Avalanche Problems related with accidents in a Central Pyrenean avalanche accidents dataset.

The same article concludes than the use of Avalanche Terrain Exposure Scale (ATES) classification and Avaluator Trip Planner™ is a useful tool for backcountry users both experienced and inexpert. In this regard, the ATES classification is spreading in the Pyrenees (Bacardit et al, 2018) using additional information (cruxs, avalanche path and most common itineraries).

4. CONCLUSIONS

This paper provides specific examples of typical avalanche accidents in the Pyrenees, which help identify common lacks among users and mistakes in their decision making.

This kind of analysis, together with other specific studies, should improve the knowledge of avalanche accidents features and help design appropriate strategies both from the public and the private sector to minimize the accident rate.

Beyond special warnings for high danger situations, the use of new technologies to spread special messages in the most dangerous situations detected could improve the public security.

Special attention should be paid to In and Out of bounds and side-bounds areas. The improvement of the information and education provided by ski resorts is required.

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