

FREERIDE VS. FREEDEAD: CASE STUDY OF AN AVALANCHE ACCIDENT WITH A CHAOTIC RESCUE IN THE PYRENEES

Jon Apodaka*¹

¹ Arriskeus Natural Hazards & Environmental Consulting, Vitoria-Gasteiz, Spain.

ABSTRACT: As if a "*Boeing 747*" was spoken, today there are many practitioners of winter mountain activities that carry their own black boxes, installed with their individual protection equipment, in order to portray some experiences that over time the memory will forget. For scientists and specialists, its function is to store data that, in the event of an accident or incident, allow them to analyse what happened in the previous and subsequent moments. The use of videos as a tool for analysis, evaluation, research and dissemination, exceeds the user's expectations, facilitating the reception of the message to the general public and presenting itself as a very successful tool in terms of visualizing the problem refers. In this case study is analysed from the point of view of the local avalanche forecaster, an accident by avalanche that will occur on a closed slope due to danger of avalanches within the ski area of a ski resort in the Spanish Pyrenees. Through the unpublished video images recorded by a skier who participates in the rescue, you can observe different behaviours of the participants in the rescue, materials used and moments that highlight the difficulties of finding a person buried without DVA. Throughout the presentation analysed the geographic location, the weather and snowpack situation, the forecast of the avalanche advisory, the characteristics of the avalanche and the chronology of the events during about 15 minutes in which a young man is buried more than a meter deep until it is finally found by luck. Very didactic images that give rise to learn and discussion among rescue team members, ski-patrols, forecasters, skiers or practitioners of mountain activities and mountain guides.

KEYWORDS: accident, rescue, education, Pyrenees, risk management

1. INTRODUCTION

On January 16, 2016, it was the day, where most avalanches accidents happened in that winter season in the Aragon River Valley, Huesca, in the central Pyrenees of Spain.

At 8:30 AM two people were surprised by an avalanche that they triggering on an off-piste terrain from Astún Ski Resort. The slope was oriented southeast and a person was semi-buried, had to be rescued by his partner and then transferred to the hospital with clear signs of hypothermia and pain.

Around 11:30 AM in Candanchú Ski Resort, on a ski slope closed by security reasons due to accumulations of snow by wind, several people were affected by an avalanche of D3 size and 200m length, on

a slope of southeast orientation.

Some people were dragged, one person was left half-buried and he could go out alone. Another person was buried in around 16 minutes, being rescued by skiers and snowboarders, who were in the place of the accident. In the final part of the accident, the ski resort ski-patrols participated in the rescue and evacuation of the buried person.

This is the accident analyzed in this article. It is interesting because at that time the author of this article, works as a local avalanche forecaster of that region and was able to gather a lot of information: nivometeo analysis, avalanche hazard reports, snowpack and weather observations, images and videos recorded during the day.

The same day, other avalanches without consequences were recorded in several freeride areas of the two ski resorts in the region and in the eastern slope of Pic de Bénou (2267m) and the western slope of Col de la Espata (2058m), in the Collarada sector.

* *Corresponding author address:*

Jon Apodaka, Arriskeus Natural Hazards & Environmental Consulting, Vitoria-Gasteiz;
tel: (+34) 639 865 773; web: www.arriskeus.com
email: info@arriskeus.com

2. GEOGRAPHIC LOCATION AND CLIMATOLOGY

The ski resort of Candanchú (Figure 1) is located in the Aragonese Pyrenees, next to the Aragón River, 1 km from the Somport Pass, border with France and entrance of the Camino de Santiago in Spain, 27 km north of the city of Jaca and together to the neighboring ski resort of Astún. It was inaugurated in 1928, which makes it the oldest ski resort in Spain.

Candanchú has now become a station with a marked family character, as it has one of the best areas for beginners in the Pyrenees.

Candanchú has a high mountain climate due to its altitude, which ranges from 1500 to 2250 meters. That is why very cold and minimum temperatures are characterized, with usually quite high thermal amplitude.

The precipitations are very abundant, more than 2.000 liters. Mostly they are concentrated in winter, in the form of snow. In Candanchú it is recorded around 180-200 days of precipitation, of which approximately 100-120 are in the form of snow.

Candanchú is therefore a fairly cold area for its altitude and humid, due to its close proximity to the Cantabrian Sea and the geographic North Slope. This fact causes that this is very affected by the fronts of the Northwest, North, Northeast and East, having some oceanic influence. The largest were registered in the fronts of the northwest.

3. NIVOMETEOROLOGICAL CONDITIONS

3.1 *Background*

After some weak snowfall at the beginning of November of 2015, the month will be remembered for a lot of precipitation in the form of rain, accumulating around 334mm in the Somport Pass, at 1640m. On the 21st, people began to enjoy ski-touring in the Astún Valley (1700m) thanks to the artificial snow base of the previous days.

The last month of 2015, December, was dry, sunny and hot for most of his days. There were hardly any snowfalls, and these were concentrated at the beginning and end of the month. The lack of precipitation caused the mountain conditions were difficult and dangerous due to the hard snow, the ice and the amount of rocks that

flared on the surface. In the first two weekends of the month, Aragón registered 4 deaths due to falls and injuries.

In the month of January the precipitations returned to the Pyrenees and especially in the second week. The sunny weekend of the 16-17th of January marked a milestone: around 45cm accumulated in the last 72h, moderate wind, strong northwest direction protagonist during the snowfall, sunny day and many “weekend warriors” on the mountain.

A dangerous cocktail. Result: 2 accidents due to considerable avalanches and several incidents.

3.2 *Weather Type*

The instability of the snowpack is characterized by a synoptic situation of the northwest and the north. This kind of weather occurs when the Azores anticyclone is located further north and the depressions are centered in the North Sea and surroundings. Between both centers of action, the direction of the wind that falls on the Iberian Peninsula oscillates between north and northwest (García et al., 2006). The winds coming from the northwest come from a mass of air driven from the maritime pole, very wet and cold. On the French slope of the Pyrenees, as well as on the northern slope of the Pyrenees (Aran Valley, Northern Andorra ...) and the Cantabrian Mountains, the snowfalls are usually intense and persistent, with moderate winds (20-40 km/h) and strong (40-60 km/h) in most cases, which cause significant accumulations of snow in the leeward, creating important wind slabs.

4. AVALANCHE REPORT

Here is the avalanche report of the day of the accident published at 8:00 AM:

Date of issue: January 16, 2016
Valid until: 01/18/2016
Next bulletin: 01/19/2016

24h Forecast. Description of the hazard
CONSIDERABLE (3) for day 16.

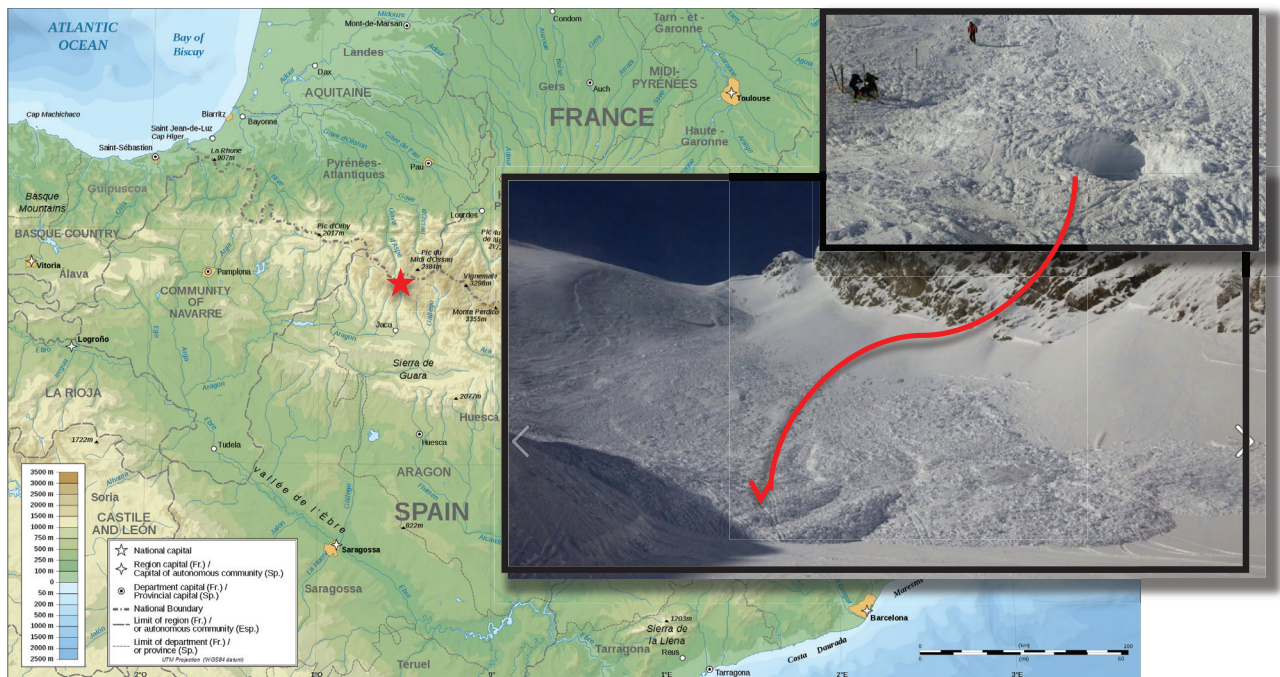


Figure 1: Geographical situation of the Pyrenees and place where the accident occurred (red star), in the Jacetania region, Pyrenees of Aragon, Spain./ Eric Gaba derivative work. Images of the avalanche. You can see the hole after the rescue of more than 2 meters deep.

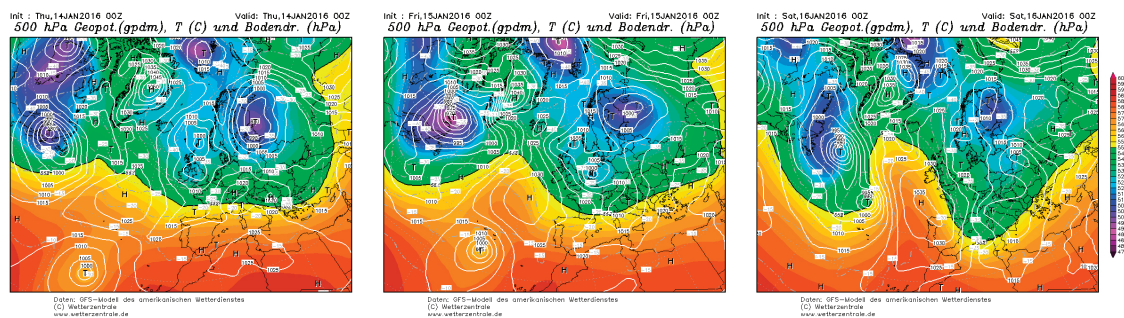


Figure 2: Surface maps (lines) and 500 hPa (colors) of the days 14, 15 and 16 at 00h. / GFS Modell Wetterzentrale.

On many slopes the snowpack is between moderate and weakly stabilized. Today the two problems of avalanches are wind-drifted snow and recent snow. The wind has created important slabs to leeward, preferably in orientations, SE, S and E. These slabs may have dimensions greater than 50cm and are likely to be triggered by the passage of a skier. All areas to leeward can hide imperceptible wind slabs. In turn, recent snow avalanches can be produced in all orientations and above those 2200m preferably. In the last few hours, small avalanche activity has been observed. It is possible to find a ski slope with continuity from 1400m. The last precipitation has occurred even at the bottom of the valley.

Recommendations

The problem of avalanche can be finding in any slope with snow deep. Observe the snow cohesive that breaks or it's wrong attached to the snow old. The cracks

around the skis are a typical indication. Avoid terrain traps and steep slopes until the snow is stabilized. Descend little by little avoiding being captured by the sluffs that are caused while skiing. Medium and High Mountain is complicated, avoid the terrain complex and a lot of attention in the challenging terrain.

Avalanche Problems (Figure 3):

Problem 1: Wind-drifted snow

Due to the strong winds the distribution of the snow is very heterogeneous and has caused an important transport of snow, erosion on the ridges and hills and the creation of slabs to leeward of peaks and ridges. The ruptures can occur in areas of significant slope near hills and range.

Problem 2: Recent snow

There will be avalanches of recent snow, in general of small size, naturally above 2200m, on slopes with more than 35°. The cohesion between the old layers and the recent snow is very low in the present. These avalanches are likely to occur in all orientations.

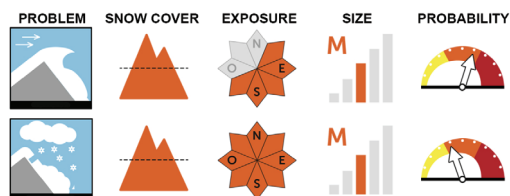


Figure 3: Graphic representation of avalanche problems for the day of the accident. Extracted from the avalanche Advisory of A Lurte, on January 16, 2016.

Meteo 24h

Very cloudy or cloudy day, with a tendency to open wide clearings during the day. Weak snow at least, which can be locally moderate near the border with France, and less frequent the further south. The temperatures, the thermal descent will be accentuated.

Generalized frosts, strong at numerous points and daytime temperatures below zero degrees. Wind of the northern component, strong in medium and high levels, with very strong winds on ridges, hills and exposed slopes.

5. CHARACTERISTICS OF AVALANCHE

160116_CANDANCHÚ (HUESCA)

- Date: 01/16/2016
- Hour: 11:30 AM
- Place: Quebrantahuesos (closed slope, black level)
- Locality/region/country: Aísa, Huesca, Aragón, Spain
- Activity: Freeride
- Dragged: 2
- Partially buried / not critical: 1
- Buried: 1
- Dead: 0
- Injured: 1
- Uninjured: 1
- Coordinates departure area:
42° 46'21.50 "N; 0° 33'19.51" W

- Altitude area of departure: 2.200m
- Orientation departure area: E
- Inclination starting zone: 30-45°
- Avalanche Danger Rating: 3 (A Lurte, Local Forecast Office)
- Snow 72 h: 45cm
- Snow 24 h: 30cm
- Wind 24 h: Strong (42-70km/h)
- Present wind: Moderate (21-40 km/h) - Strong (42-70 km/h)
- Type of head: snow dry-linear output (wind slab)
- Incline: <100m
- Length: 200m
- Width fracture: 50-125m
- Fracture thickness: 20-100cm
- Press extract: Two people were able to be rescued in the ski resort of Candanchú as a result of an avalanche that occurred outside the skiing area around twelve thirty midday.
- Comments: Ski-touring skiers and skiers/snowboarders present at the ski resort rescue the buried person (1m) after around 16'.
- Uncertainty information: No
- Source: Avalanche Forecaster

6. ANALYSIS OF THE ACCIDENT AND RESCUE

Early in the morning, the sky was opening, leaving a cold sunny morning and the snow conditions after the more accumulated 30 cm in the last 24 hours were exceptional for the practice of winter sports, especially skiing or snowboarding.

It was the first "epic day" of the season. In the Pyrenees rarely are more than 5 days during a season with sunny days, with powder snow (> 30cm) and on the weekend.

Throughout the morning there were many people who went to make classic routes of ski-touring in the region or freeride in the adjoining areas of the two ski resorts.

In one of them, in Candanchú, lovers of freeride began little by little to slide through virgin terrain, starting with simple terrain and progressing as the descents were repeated.

After 2 hours of the opening of the upper chairlift, people began to challenge the complex terrain, breaking barriers of

warning, which the ski-patrollers had marked out the uncontrolled areas.

Several groups began to descend by a slope closed to the public and suddenly, a large slab avalanche with an important spread is triggered by the passage of some skiers in the upper zone. One person was half buried at first and another was completely buried.

Problems and errors in avalanche rescue are often attributed to "chaos" of rescue, (Atkins, 2011). Many of these errors are visible in this rescue, which fortunately had no fatal consequences. The errors must be analyzed and studied by the community of snow lovers in avalanche rescue courses with the intention that in the near future scenes like these will not happen again. Many of these errors are reflected in the video clearly and representing the reality.

Some of the classic errors that occur in rescues of avalanches (Atkins, 2011):

Organization

- No rescue plan
- Leadership problems
- Improperly trained
- Inadequate physical condition
- Groupthink

Information

- Poor communications
- Inaccurate information
- Not re-evaluating after new information
- Mobile phones ...

Tactics

- Inadequate immediate search
- Lack of proficiency with beacons & RECCO
- Not using available resources (e.g. dogs & RECCO)
- Not carrying beacons, shovels, RECCO, saws, etc.
- Not searching the right area

Attitudes

- Abilities are greater than capabilities
- Hasty generalization – dead body
- Reluctant to adopt new technologies

7. DISCUSSION AND CONCLUSIONS

In this article, information previous to the accident has been presented (meteorology, avalanche advisory ...). Visualize the video,

discuss with your friends about the rescue and get your own conclusions.

The starts of the season are difficult, the emotions, motivations and thirst after many months without enjoying the snow can make us to take decisions that are not elaborated with fatal consequences.

Bad habits, heuristic traps and overconfidence remain one of the main causes of accidents.

We are not as bad as some may think, nor as good as others may think. Never forget, practice the rescue!

8. ADDITIONAL INFORMATION

You can watch the infographic and rescue video of the accident in the following link <http://www.arriskeus.com/freeridevsfreedead> It is a confidential video with restricted copyrights that only can be seen in rescue training avalanches. The **password** to access this educational training material is: **jonsnowisstillalive**

From my humble perspective as a young researcher and mountaineer, these types of videos allow me to learn a lot. I encourage you to continue sharing the analysis of accidents and rescues. I hope someday this type of accidents are not taboo in Spain and can be visualized to create a more aware and educated society.

AKNOWLEDGEMENT

Thanks to the observer network for all the information provided. Especially, to all the people who participated in that chaotic rescue and who finally thanks to perseverance and luck, could save the life of that young skier.

REFERENCES

- Apodaka, J.(2016) Informe Nivometeorológico invierno 2015/2016 Valle de Canfranc. A Lurte, Centro Pirenaico de Referencia para la Gestión de Riesgos de montaña. Canfranc-Estación. 25p.
- Atkins, D. (2011) Butterflies and Avalanches: Common Errors in Avalanche Rescue. Ikar-Cisa. 47 p.
- Carles Garcia, C. Vilar, F. (2006) La montaña. Manual de meteorología. Editorial Alpina. 175 p. ISBN: 84-8090-254-X
- Reanalysis archives [WWW Document], URL <http://www.wetterzentrale.de/es/reanalysis.php?map=1&model=avn&var=1&jaar=2018&maand=02&dag=15&uur=0000&h=0&tr=1440&nmaps=64-mapref> (accessed 8.18.18).