Exhibition Guide: 25 years of avalanche information and prevention in Catalonia (1987-2012)

Providing Avalanche Information and Prevention Services in Catalonia for 25 Years: Knowledge and Prevention

25 anys
Servei d'Allaus
1987-2012

This exhibition celebrates the 25 years of service of avalanche information and prevention in Catalonia with the aim of showing the public the work carried out since season1986-87 in relation to avalanche risk.

It is arranged in 4 thematic sections:

1. **Introduction. Timeline**
2. **Avalanches. Basic concepts**
3. **Avalanches in Catalonia and around the world**
4. **Prevention and protection against avalanche hazards**

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We were joined on this journey by:

Generalitat de Catalunya
Departament d'Interior
Direcció General de Protecció Civil

Servei Meteorològic de Catalunya

Conselh Generau d'Aran

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FGC Ferrocarrils de la Generalitat de Catalunya

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Section 1. Introduction. Timeline

Panels 1 and 2. Providing avalanche information and prevention services in Catalonia for 25 years

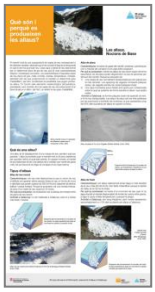
During the 1986-87 season the avalanche information and prevention service was commenced in Catalonia under the project "Avalanche risk study in the Catalan Pyrenees". These two panels highlight the progress made since then with regard the knowledge of the phenomenon and its forecasting in terms of time and location.

Panel 3. Providing avalanche information and prevention services in Catalonia for 25 years

One of the objectives established since the beginning of the service is the sharing of the information gathered. For this reason a series of educational publications have been edited, in addition to interpretative guides. This panel shows some examples.

Section 2. Avalanches. Basic concepts

Panel 4. What are avalanches and what causes them?



An avalanche is the movement of a mass of snow down a slope.
Avalanches can be classified as:

- Loose snow avalanches: these occur after a heavy snowfall.
- Slab avalanches: these form mainly as a result of snow drifting due to the wind.
- Wet avalanches: these tend to occur when the snow layers become saturated with water.

Panel 5. Factors involved in triggering an avalanche

For an avalanche to occur three factors intervene:

- Unstable snowpack.
- Terrain susceptible to the triggering of an avalanche.
- Internal imbalance in the snowpack.

A person moving over the snow is enough to trigger an avalanche.

Panels 6 and 7. How are avalanches measured? What damage do they cause?

The triggering of an avalanche is difficult to observe, but once it has fallen it can be measured. The intensity of the avalanche and the damage it causes are directly related to its size. The European avalanche danger scale classifies them according to their size and the potential damage they could cause.

Large avalanches can destroy entire villages or forests of tens of hectares.

Section 3. Avalanches in Catalonia and around the world

Panel 8. Historic avalanches in Catalonia

Throughout history various catastrophic avalanches have occurred in the Catalan Pyrenees, which have been discovered thanks to research in historic archives, population surveys and tree-ring dating studies. These avalanches mainly affected areas in the western Pyrenees. Examples include the destruction of the village of Gessa (Val d'Aran, 1444) and that of Tavascan (Pallars Sobirà, 1604).

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Panel 9. Historic avalanches in the Pyrenees

Historically, avalanches are phenomena that in certain areas of the Pyrenees have had a significant effect on the daily lives of the people. The first records found in historic archives date back to the Middle Ages.

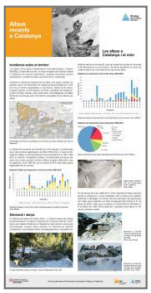
Of particular relevance was the catastrophe of Chèze and Saint Martin (Hautes Pyrenées), where an avalanche destroyed two villages in 1601, killing 107 people.

Panel 10. Avalanches around the world

Since the first great catastrophe known in history, in the year 218 B.C., large avalanches have occurred in mountain ranges across the world, with significant social repercussion.

As a curiosity, during World War I, in the Alps, avalanches were used as a weapon by triggering them artificially with artillery fire, causing thousands of victims.

Panel 11. Recent avalanches in Catalonia



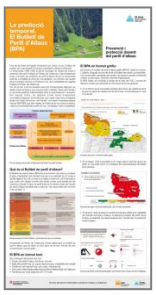
In Catalonia, on average 1 or 2 lives are lost to avalanches each winter mountain sports season. The effect on infrastructures and villages, mainly in the western Pyrenees is also considerable. Over the past 25 years, on two occasions (winters of 1995/96 and 2002/03) houses were destroyed.

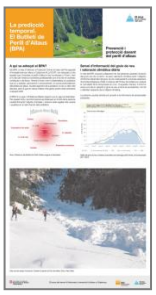
Panel 12. Avalanche accidents in Catalonia during mountain activities

In Catalonia the majority of accidents are due to winter leisure activities in the mountains, with backcountry skiing causing the most accidents. The type of avalanche that causes the most incidents are slabs.

Section 4. Prevention and protection against avalanche hazards

Panels 13 and 14. Forecasting in terms of time: the Avalanche Danger Bulletin





One of the main lines of action to reduce the risk of avalanches is to assess the risk on a day-to-day basis. The Avalanche Danger Bulletin is a document that provides knowledge as to the stability of the snowpack and the level of avalanche danger during the winter season. The European avalanche danger scale, consisting of five levels (from 1 to 5), is used to measure the danger given in the Bullentins.

Panel 15. Local forecasting

Local prediction assesses the stability of the snow on the scale of a specific slope in order to prevent harm to people or property. Through the continuous assessment of the stability of the snow, prevention measures can be adopted.

Panel 16. Snow Observation Network (NIVOBS)

IGC's operational model for predicting avalanches is based on the analysis of snow data obtained in the field. The Snow Observation Network is formed by people who, on a daily and weekly basis, gather data on the weather and the structure of the snowpack, using stability tests and stratigraphic profiles. The analyses of these data allow the stability of the snowpack to be assessed.

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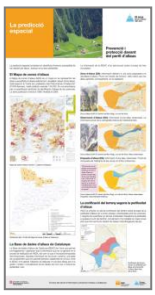
Panel 17. Network of snow observation stations in Catalonia

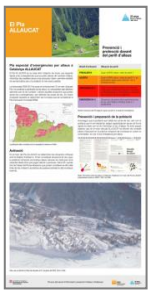
In 1997 a network of automatic snow observation stations began to be established with the purpose of discovering the status and evolution of the snowpack and the meteorological evolution in the high mountain areas in real time. Currently 14 stations have been placed at between 2200 and 2600 metres above sea level, which continuously provide data.

Panel 18. Forecasting in terms of location



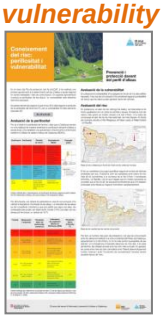
This consists of identifying terrain susceptible to avalanches and assessing the danger. The entire Catalan Pyrenees has been mapped and the information is stored on the Avalanche Database of Catalonia (BDAC). The dividing of the terrain in zones allows the existing danger to be described for those population centres where susceptibility has been detected.

Panel 19. The ALLAUCAT Plan



This is the civil protection plan created with the aim of rapidly responding to the consequences that could derive from avalanche activity, to minimise the possible damage to people and property and to allow basic services to be re-established for the population as soon as possible. 38 towns requiring a Municipal Action Plan (PAM) have been identified.

Panel 20. Risk awareness: danger and vulnerability



As part of the ALLAUCAT Plan, an initial approximation has been made to determine the avalanche risk on a regional scale for inhabited areas and means of communication in the Catalan Pyrenees. The risk has been calculated based on the danger of avalanches and the vulnerability of the different elements exposed. In Catalonia the risk of avalanches is concentrated in the western Pyrenees and, particularly, the Val d'Aran.

Panels 21 and 22. Prevention and protection from avalanche hazards

There are different strategies that can be adopted to protect from avalanches, according to the possibilities of the area, economic resources and the element we wish to protect. Defences can be permanent (based on protection using fixed constructions) or temporary (based on actions according to local assessment), active (acting against the factors that favour the triggering of an avalanche) or passive (modifying the path of the avalanche).

Panel 23. Self-protection in mountain activities

The majority of avalanche victims in the Pyrenees are people who practise mountain sports. To reduce the avalanche risk during any type of activity people must be well aware of the dangers to which they are exposed. It is essential to be trained and informed as well as to carry and know how to correctly use suitable safety materials (Avalanche Beacon, shovel and probe).

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