SUPPLYING THE CATALAN PYRENEES (SPAIN) WITH A PUBLIC AVALANCHE WARNING SYSTEM.

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ABSTRACT

Catalonia is a country with an important mountaineering tradition. Moreover, there has been a winter tourism boom over the last 10 years. This phenomenon has caused a surge in mountaineering, with an increase in ski resorts, buildings, roads and other facilities.

In answer to this situation, we have created in 1987 a programme to reduce avalanche risk in the Catalan Pyrenees.

One of the aims of the programme is the establishing of a Public Avalanche Warning System, which requires the setting up of an observers network. We have been running courses to train observers for such a network.

On the other hand, there is the question of public information and education. This is being achieved in different ways:

- Talks to alpine clubs about avalanche risk.
- Design and distribution of a leaflet in the community affected by the avalanche phenomenon (mountain huts, ski resorts, climbing clubs, sport shops), so as to collect information on avalanche activity and location from random observers. This leaflet is proving to be useful for compiling data and for providing information to the public about the project.
- Design of another leaflet about the Risk Scale and the telephone numbers to be contacted for information. It will be handed out in october, 1990.

We are also in touch with Catalan Television and Radio with an aim to broadcasting a weekly bulletin during the winter season.

We hope the Public Avalanche Warning System will be operative by next season.

1. INTRODUCTION.

Catalonia is a country with an important mountaineering tradition, especially in the Catalan Pyrenees (fig. 1). Moreover, there has been a winter tourist boom over the last ten years. This phenomenon has caused a surge in mountaineering, with an increase in ski resorts, buildings, roads and other facilities.

In answer to this situation, the Geological Survey of Catalonia, in cooperation with the Faculty of Geology of the University of Barcelona, has created a programme in 1987 to reduce avalanche risk in the Catalan Pyrenees.

The aim of the programme could be specified by the following points:

- Study of the avalanche phenomenon (at present under way) (C.E.M.A.G.R.E.F., 1983; S.C. COLBECK, 1987; H. PEJOUAN, 1983; R.I. PERLA, 1980; G. SELIGMAN, 1936; UNESCO, 1981).

- Mapping of probable avalanche hazard zones (at present under way) (R. ARMSTRONG & L. ARMSTRONG, 1977; C.E.M.A.G.R.E.F., 1981; M. MARTINELLI Jr., 1974; SERVIZIO DE CALAMITA PUBBLICHE,1986).

- Theoretical studies on maximum runout zones (recently begun)(O. BUSER & H. FRUTIGER, 1980; H.J. KORNER, 1980; K. LIED & S. BAKKEHOID, 1980; M. MARTINELLI Jr., T.E. LANG &A.I.MEARS, 1980; VOELLMY, 1955).

- Creation of a Public Avalanche Warning System (O. BUSER, P. FOHN, H. GUBLER & B. SALM, 1987; O. BUSER, M. BUTLER & W. GOOD, 1987; E.R. LACHAPELLE, 1980; J. LAFEUILLE, 1987; M. QUERVAIN & R. MEISTER, 1987).

In this paper we intend to focus on the task itself as well as methods of information and education of professionals and the public in general, needed for achieving the last point: the creation of a Public Avalanche Warning System.

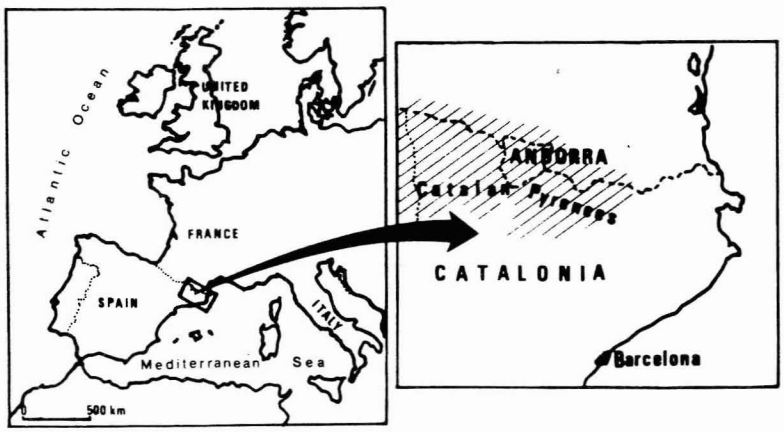


Figure 1. Geographical situation of the Catalan Pyrenees.

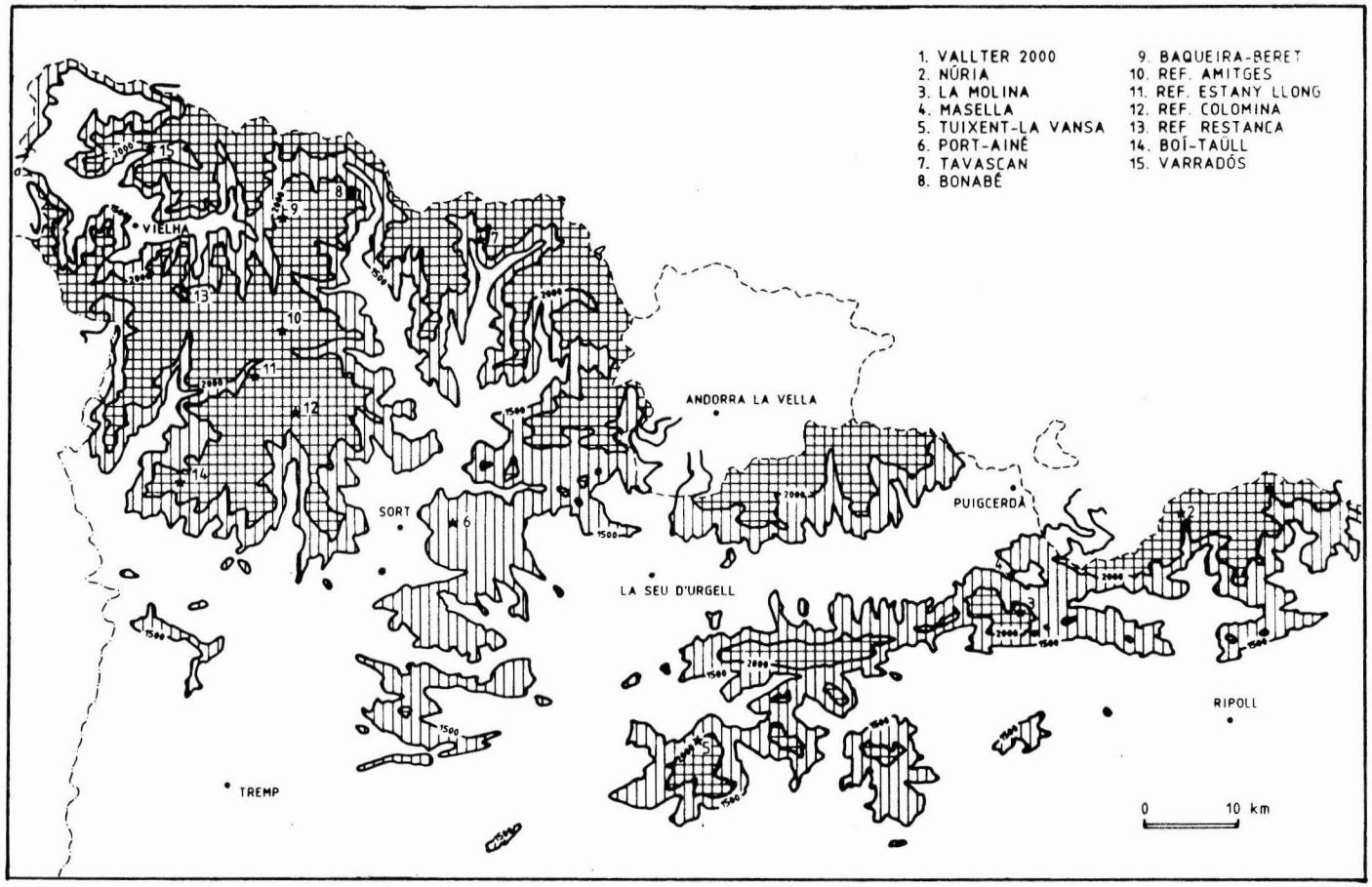


Figure 2. Catalan Pyrenees. Map of the observer network of avalanche, snow and meteorological data.

2. THE IMPORTANCE OF ADEQUATE INFORMATION ABOUT THE PROJECT.

Avalanches are a more or less unpredictable phenomenon for local inhabitants and backcountry skiers. It thus follows that making our society more aware of the existence of avalanche risk is a priority in our programme.

The spreading of information on an Avalanche Programme takes three different fields into account.

Firstly, we had to consider the ski resort professionals and the mountain refuge guards. Our first steps were contacts and talks with ski resorts managers and mountain guards. We then held two training courses for avalanche, snow and meteorological data observers (January 1988, January 1989). These contacts and courses enabled the gradual establishment of the present observer network (fig. 2).

In the second place, we had to increase awareness of both mountain users and the public in general. Education in this field has two objectives: to prevent counterproductive false alarms when we begin to issue avalanche warning bulletins in the near future (winter 1990-91) and, on the other hand, to give people enough information to making them responsibles for their own behaviour (F. VALLA,1980). We aim to make each person conscious of the degree of risk he/she is willing to take.

In this way we have undertaken the following actions:

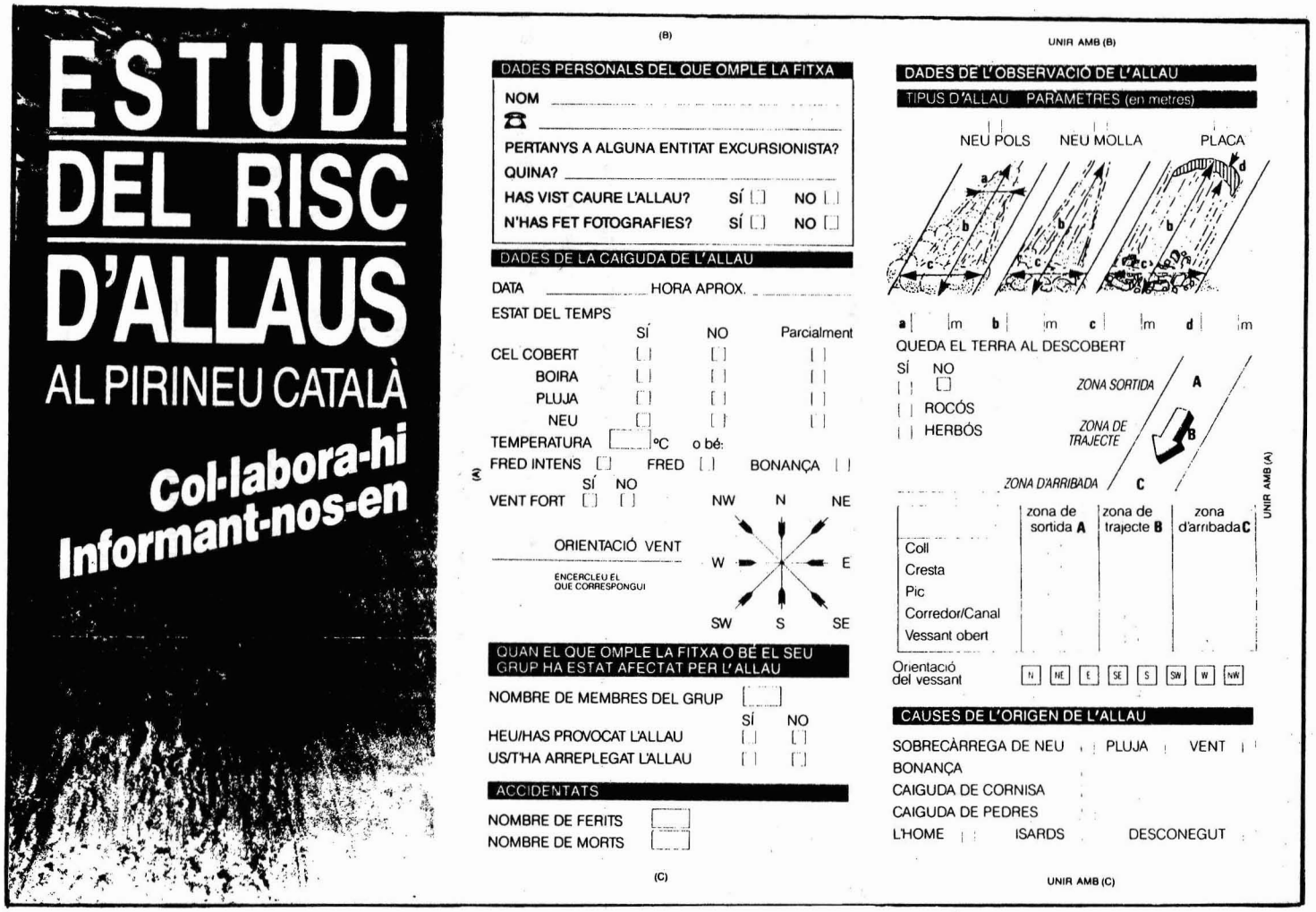
- Training of some Nature School teachers (Nature Schools are centres visited by Primary Schools where children study Nature). Usually children begin to ski during these visits and, at the same time, learn something about the snow. In consequence, future skiers acquire their first knowledge about avalanches.

- Talks in Alpine Clubs, especially during backcountry ski courses.

- Design, edition and distribution of a leaflet (fig. 3) with three objectives: a) to give information about the Avalanche Risk Project; b) to supply elementary information about avalanches; c) to collect information on avalanche activity and location from random observers. These leaflets have been distributed to all the Alpine Clubs, ski resorts and mountain refuges in Catalonia, and also to some mountain rescue grups (professionals and volunteers), and they are proving to be useful.

- Production of a videotape which introduces the Avalanche Risk theme.

As a third point, we have to take into account the Spanish and International Scientist Community, and the technicians and land use planning managers. We can mention the following tasks, carried out at different levels:



ESTUDI DEL RISC D'ALLAUS

AL PIRINEU CATALÀ

Col·labora-hi Informant-nos-en

(B)

DADES PERSONALS DEL QUE OMPLE LA FITXA

NOM .....

☎ .....

PERTANYS A ALGUNA ENTITAT EXCURSIONISTA?

QUINA? .....

HAS VIST CAURE L'ALLAU? SÍ [ ] NO [ ]

N'HAS FET FOTOGRAFIES? SÍ [ ] NO [ ]

DADES DE LA CAIGUDA DE L'ALLAU

DATA ..... HORA APROX. .....

ESTAT DEL TEMPS

	SÍ	NO	Parcialment
CEL COBERT	[ ]	[ ]	[ ]
BOIRA	[ ]	[ ]	[ ]
PLUJA	[ ]	[ ]	[ ]
NEU	[ ]	[ ]	[ ]

TEMPERATURA [ ] °C o bé:

FRED INTENS [ ] FRED [ ] BONANÇA [ ]

	SÍ	NO
VENT FORT	[ ]	[ ]

ORIENTACIÓ VENT

ENCERCLEU EL QUE CORRESPONGUI

NW N NE W E SW S SE

QUAN EL QUE OMPLE LA FITXA O BÉ EL SEU GRUP HA ESTAT AFECTAT PER L'ALLAU

NOMBRE DE MEMBRES DEL GRUP [ ]

	SÍ	NO
HEU/HAS PROVOCAT L'ALLAU	[ ]	[ ]
US/T'HA ARREPLEGAT L'ALLAU	[ ]	[ ]

ACCIDENTATS

NOMBRE DE FERITS [ ]

NOMBRE DE MORTS [ ]

(C)

(A)

UNIR AMB (B)

DADES DE L'OBSERVACIÓ DE L'ALLAU

TIPUS D'ALLAU PARÀMETRES (en metres)

NEU POLS NEU MOLLA PLACA

a [ ] m b [ ] m c [ ] m d [ ] m

QUEDA EL TERRA AL DESCOBERT

SÍ [ ] NO [ ]

[ ] ROCÓS

[ ] HERBÓS

ZONA SORTIDA A

ZONA DE TRAJECTE B

ZONA D'ARRIBADA C

	zona de sortida A	zona de trajecte B	zona d'arribada C
Coll			
Cresta			
Pic			
Corredor/Canal			
Vessant obert			

Orientació del vessant [N] [NE] [E] [SE] [S] [SW] [W] [NW]

CAUSES DE L'ORIGEN DE L'ALLAU

SOBRECÀRREGA DE NEU [ ] PLUJA [ ] VENT [ ]

BONANÇA

CAIGUDA DE CORNISA

CAIGUDA DE PEDRES

L'HOME [ ] ISARDS DESCONEGUT [ ]

UNIR AMB (A)

UNIR AMB (C)

Figure 3. Leaflet designed to give information about avalanches and the existence of the Avalanche Programme, so as to collect information on avalanche activity and location from random observers.

- The giving of some lectures on snow stability and avalanches as a natural risk, at the Faculty of Geology of the University of Barcelona. These lectures have been included in the corresponding programmes for the past two years.

- Participation in National and International Symposiums (BOSCH & VILAPLANA, 1988, Andorra; BOSCH, VILAPLANA & FURDADA, 1989, FURDADA, BOSCH & VILAPLANA, 1989, VILAPLANA, BOSCH & FURDADA, 1989, Madrid, Spain; FURDADA, VILAPLANA & BOSCH, 1990, Gijón, Spain; and now Bigfork, Montana, U.S.A.).

- Elaboration of reports for the Catalan Administration (Servei Geològic de Catalunya, Generalitat de Catalunya).

As a concluding remark we want to point out that all these actions entail, directly or indirectly, the collection of information, which is always useful for the Project.

3. THE BRINGING INTO SERVICE OF THE PUBLIC AVALANCHE WARNING SYSTEM.

Our immediate objective is the spreading of a weekly Avalanche Risk Bulletin (even more frequently when snow stability conditions recommend issuing a warning).

3.1. INTERNAL FUNCTIONING.

We want to mention the internal functioning that will make the bringing into service of the Public Avalanche Warning System possible.

The Geological Survey Data Analysis Centre is located in Barcelona, where all the data are received and bulletins are elaborated.

Daily data are transmitted from ski resorts by telephone.

More complex data (stratigraphic snow profiles and ram resistance profiles) are transmitted by telefax. Remarks and possible mistakes in field data transmitted are commented by fax and, if necessary, by telephone directly with the observer. This system enable us to control the quality of the information, and provide good feedback for the observers and for us.

Mountain refuges transmit their data by radio to a collaborator, and this collaborator send them to the Centre by modem.

During the 1989-90 winter season data transmissions were carried out by this method, and we can verify that it works sufficiently well. Moreover, we elaborated some internal bulletins during this test period (we sent them to the observers immediately, also by telefax).

The establishment of an information flow is extremely useful because, on the one hand, it helps to increase the quality of the data observed as well as the observers knowledge. On the other hand, the constant bulletin revision allowed us to consider some factors we had not taken into account, and improve the following bulletin quality and the forecast reliability (K. WILLIAMS, 1980).

3.2. PUBLIC INFORMATION.

The first point to consider is that we intend to spread a kind of information to a public which has never received an Avalanche Risk Bulletin and does not know what an Avalanche Risk Scale is. In this situation, the need for prior education is obvious.

We thus began to carry out the actions mentioned in chapter 2 and, at present, we are working on the following tasks:

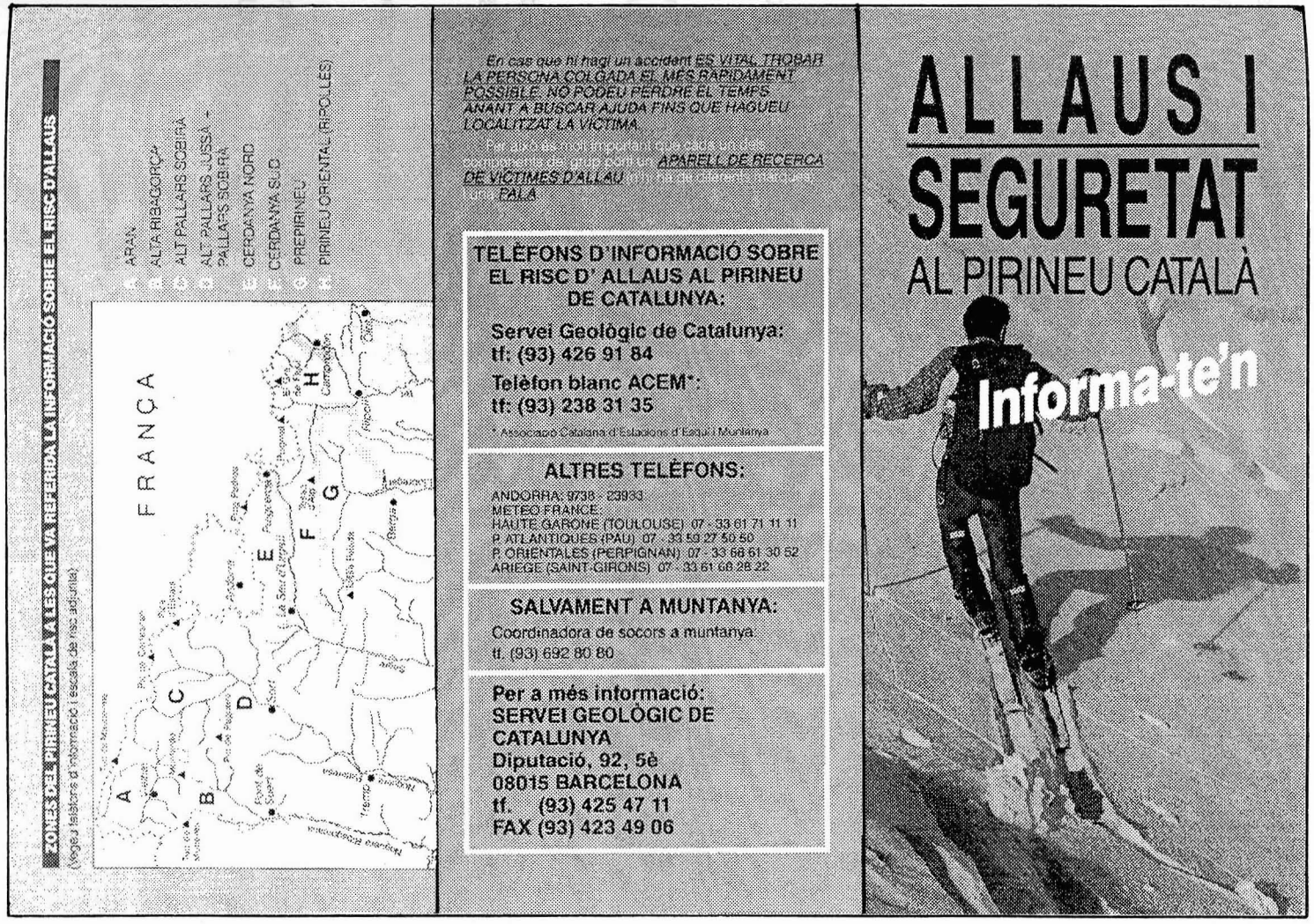
The design and edition of a new leaflet (fig. 4) that contains the Avalanche Risk Scale (obviously, we have adopted the French scale: the Spanish-French border divides the Pyrenees, and we do not want to confuse the users of the services with two scales with different degrees); the leaflet also contains telephones to be contacted for information about avalanche risk, the Mountain Rescue Coordinator's telephone, and some safety advice for backcountry skiers.

This leaflet is going to be distributed to all the climbing clubs, ski resorts, mountain refuges, and the shops specialized in mountain and ski equipment. Moreover, it is going to be available, together with additional information, in Nivalia (a ski and snow trade exhibition) in November.

The bulletin will then be given by a special telephone service.

On the other hand, we are in touch with the mass media (press, radio and Catalan TV), and we are going to carry out an information campaign about what an Avalanche Risk Bulletin and a Risk Scale are before going on to issue the bulletin.

We are going to call for a press conference, and to date, a sports newspaper is interested in publishing the weekly bulletin.



ZONES DEL PIRINEU CATALÀ A LES QUE VA REFERIDA LA INFORMACIÓ SOBRE EL RISC D'ALLAUS

(Vegeu telèfons d'informació i escala de risc adjunta)

A APAN
B ALTA RIBAGORÇA
C ALT PALLARS SOBIRÀ
D ALT PALLARS JUSSÀ + PALLARS SOBIRÀ
E CERDANYA NORD
F CERDANYA SUD
G PREPIRINEU
H PIRINEU ORIENTAL (RIPOLLÈS)

FRANÇA

En cas que hi hagi un accident ES VITAL TROBAR LA PERSONA COLGADA EL MÉS RÀPIDAMENT POSSIBLE. NO PODEU PERDRE EL TEMPS ANANT A BUSCAR AJUDA FINS QUE HAGUEU LOCALITZAT LA VÍCTIMA.

En aquest sentit es molt important que cada vegada que es mogui per la neu porteu un APARELL DE RECERCA DE VÍCTIMES D'ALLAUD i un pala plegable per fer-ho. PALA

TELÈFONS D'INFORMACIÓ SOBRE EL RISC D' ALLAUS AL PIRINEU DE CATALUNYA:

Servei Geològic de Catalunya:
tf: (93) 426 91 84

Telèfon blanc ACEM*:
tf: (93) 238 31 35

* Associació Catalana d'Estacions d'Esquí i Muntanya

ALTRES TELÈFONS:

ANDORRA: 9738 - 23933
METEO FRANCE:
HAUTE GARONE (TOULOUSE) 07 - 33 61 71 11 11
P. ATLANTIQUES (PAU) 07 - 33 59 27 50 50
P. ORIENTALES (PERPIGNAN) 07 - 33 68 61 30 52
ARIEGE (SAINT-GIRONS) 07 - 33 61 66 26 22

SALVAMENT A MUNTANYA:

Coordinadora de socors a muntanya:
tf. (93) 692 80 80

Per a més informació:
SERVEI GEOLÒGIC DE CATALUNYA
Diputació, 92, 5è
08015 BARCELONA
tf. (93) 425 47 11
FAX (93) 423 49 06

ALLAUS I SEGURETAT AL PIRINEU CATALÀ

Informa-te'n

Figure 4. Leaflet about the Risk Scale and the telephone numbers to be contacted for information. It also contains some elementary safety advice for backcountry skiers.

TV3 (the Catalan Television channel) has a programme specialized in skiing, and one programme is going to be devoted to this theme. We are also discussing the possibility of broadcasting the bulletin to complement the meteorological forecast.

Finally, there is a specialized skiing programme on the radio, sponsored by the Catalan Ski Resort Association (ACEM), and after talks with this association, the bulletin is going to be included in the radio programme.

It is therefore to be expected that the spreading of the Avalanche Risk Bulletin will be fully effective by the next winter season.

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