Snow Avalanche Warning Services cooperation in Europe: EAWS

Enabling interoperability and standards for snow avalanche services in Europe

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SNOW AVALANCHES IN EUROPE

- Snow avalanches represent the major hazard in Europe's mountain areas during winter.
- Snow avalanches cause about 100 deaths in Europe per year on average
- Awareness of avalanche danger increased as a result of disasters:

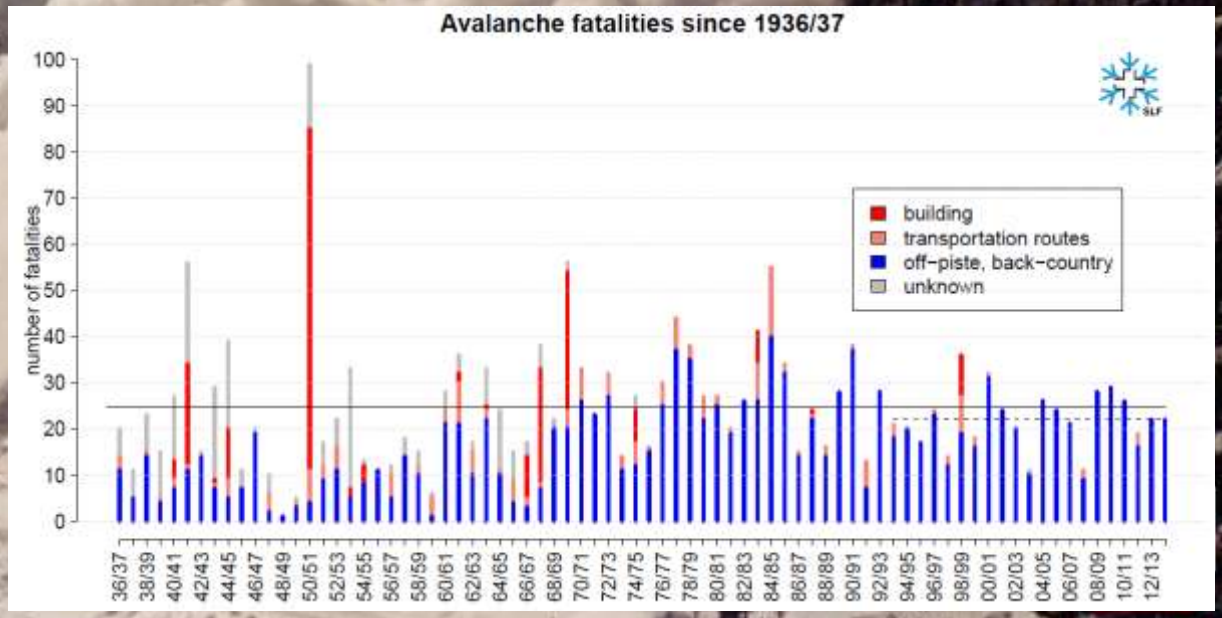
In Switzerland in 1950. In the 70' in ski resorts in France but in special during winter season 1998-1999 in the Alps affecting villages and roads: Galtür (AT) 31 fatalities, Montroc (F) 12 fatalities.

- **Avalanche warning services are Governmental centers responsible for forecasting snow avalanches**

Avalanche accidents are differentiated into 2 categories:

1- accidents in recreational settings, human triggered (95%)

2- accidents in residential, industrial, and transportation settings. spontaneous release.



European Avalanche Warning Services

EAWS: was set up in 1983 with the aim:
- To achieve coordination between avalanche warning services
- To improve cross border cooperation and interoperability

EAWS is a non-government, not for profit organization dedicated to discuss and manage technical and operational snow avalanche forecasting issues for public avalanche safety purposes.

EAWS is composed by the public warning services in Europe (15 countries)

Biannual General Assembly and regular working group meetings.

Wildbad Kreuth / Bayern 1993

EAWS MEETINGS TILL TODAY:

1983	**München (D)**
1985	**Davos (CH)**
1985	**Innsbruck (A)**
1986	**Grenoble (F)**
1991	**Bozen (I)**
1993	**Wildbad Kreuth (D)***
1994	**Davos (CH)**
1995	**Davos (CH)**
1997	**St. Christoph (A)**
1999	**Chamonix (F)**
2001	**Trento (I)**
2003	**München (D)**
2005	**Davos (CH)**
2007	**Starý Smokovec (SK)**
2009	**Innsbruck (A)**
2011	**Grenoble (F)**
2013	**Barcelona (S)***
2015	**Rome (I)**

Barcelona / Catalunya 2013

European Avalanche Warning Services

VISION: coordinate the activities of the Avalanche Warning Services in Europe

MISSION:

- **To deepen and reinforce an effective and continuous cooperation between services:**
  - **establishing common codes and common operating methods**
  - **better ways of exchanging data and information in order to enhance the production of avalanche forecasting thus minimizing risk**
  - **providing a better communication and awareness**
- **To ensure an upward revaluation of Avalanche Warning Services' work and their products**
- **To create and sustain the activities of a working group**
- **To hold a European meeting every two years**

EAWS ACHIEVEMENTS

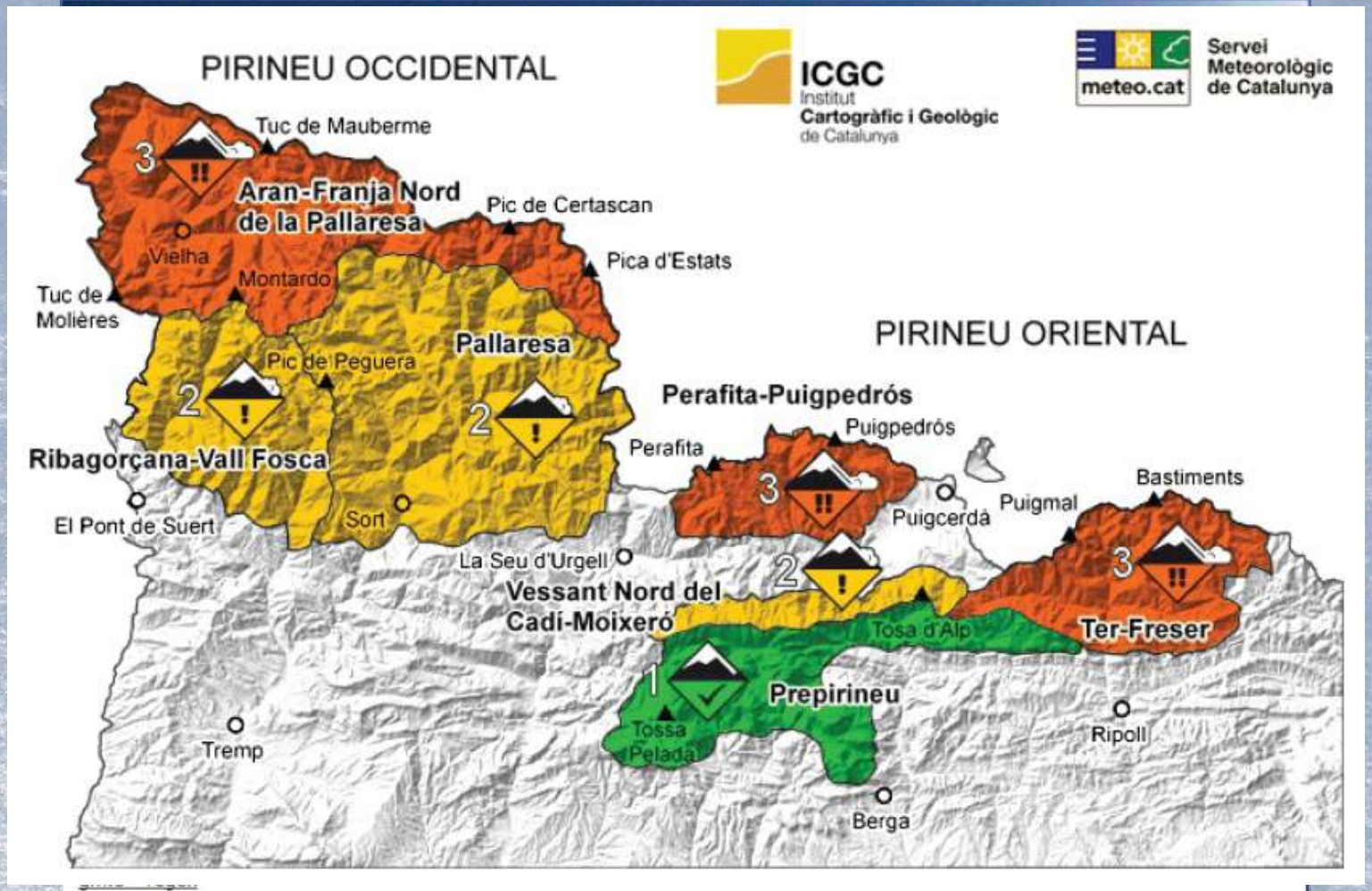
EUROPEAN AVALANCHE DANGER SCALE

Danger level	Icon	Snowpack stability
5 - Very high		The snowpack is poorly bonded and largely unstable in general.
4 - High		The snowpack is poorly bonded on most steep slopes.
3 - Considerable		The snowpack is moderately to poorly bonded on many steep slopes*.
2 - Moderate		The snowpack is only moderately well bonded on some steep slopes*, otherwise well bonded in general.
1 - Low		The snowpack is well bonded and stable in general.

EAWS ACHIEVEMENTS

www.avalanches.org

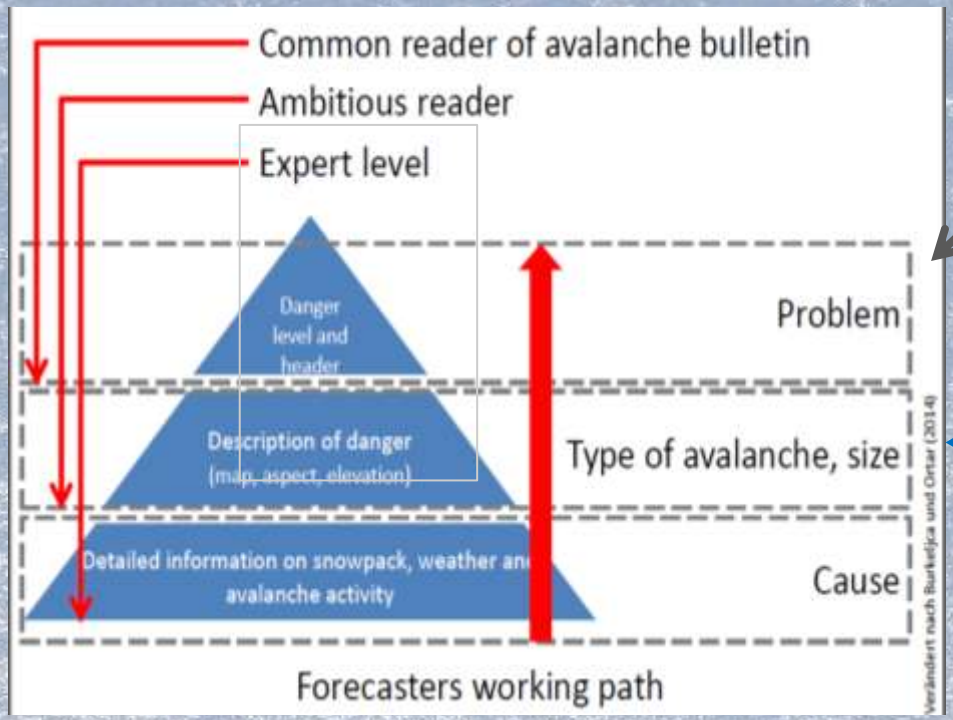
Access to all avalanche reports in Europe

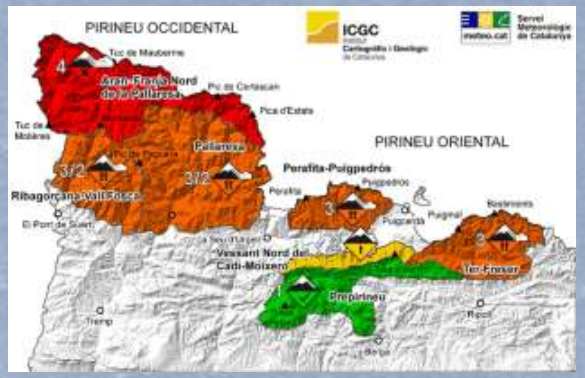


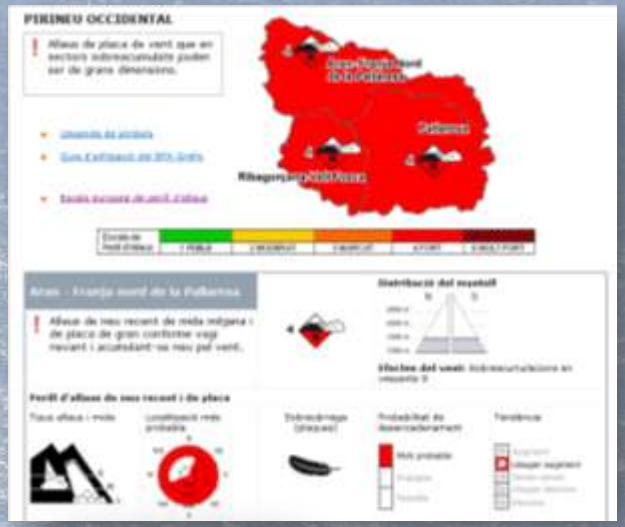
HARMONIZING AVALANCHE REPORTS

Hierarchical information in Avalanche reports

- **1st level**: most important, easy to keep (danger rating)
- **2nd level:** what, where, how,
- **3rd level**: avalanche assessment, snowpack , weather & trend (text),







USING STANDARD TOOLS TO ASSESS SNOW STABILITY: BAVARIAN MATRIX OF DANGER LEVEL

Bavarian matrix distinguish:

- spontaneous release

- Non spontaneous

(human triggered- additional load)

Bavarian Matrix (auxiliary matrix for preparing the avalanche bulletin)

Distribution of hazards sites	Probability of avalanche release: generally only with high additional loads	particularly with high additional loads (possibly also with low additional loads)	already with low additional loads possible	with low additional loads probable	OR	spontaneous release of small-sized avalanches possible	spontaneous release of medium-sized, in some cases large-sized avalanches possible	spontaneous release of many medium-sized, in several cases large-sized avalanches probable	spontaneous release of numerous large-sized, often large-sized avalanches probable
single hazard sites (specifiable in the AR*)	1	2	2	2		1	2		
hazard sites on some steep slopes (specifiable in the AR*)	2	2	3	3		2	3	3	
hazard sites on many/most steep slopes (specifiable in the AR*)	2	2	3	4		2	3	4	4
hazard sites on many/most steep slopes (not definable in the AR**)	2	3	4	4		3	4	4	5
hazard sites also in moderately steep slopes				5			4	5	5

Effective 2011-09-01

AR=avalanche report

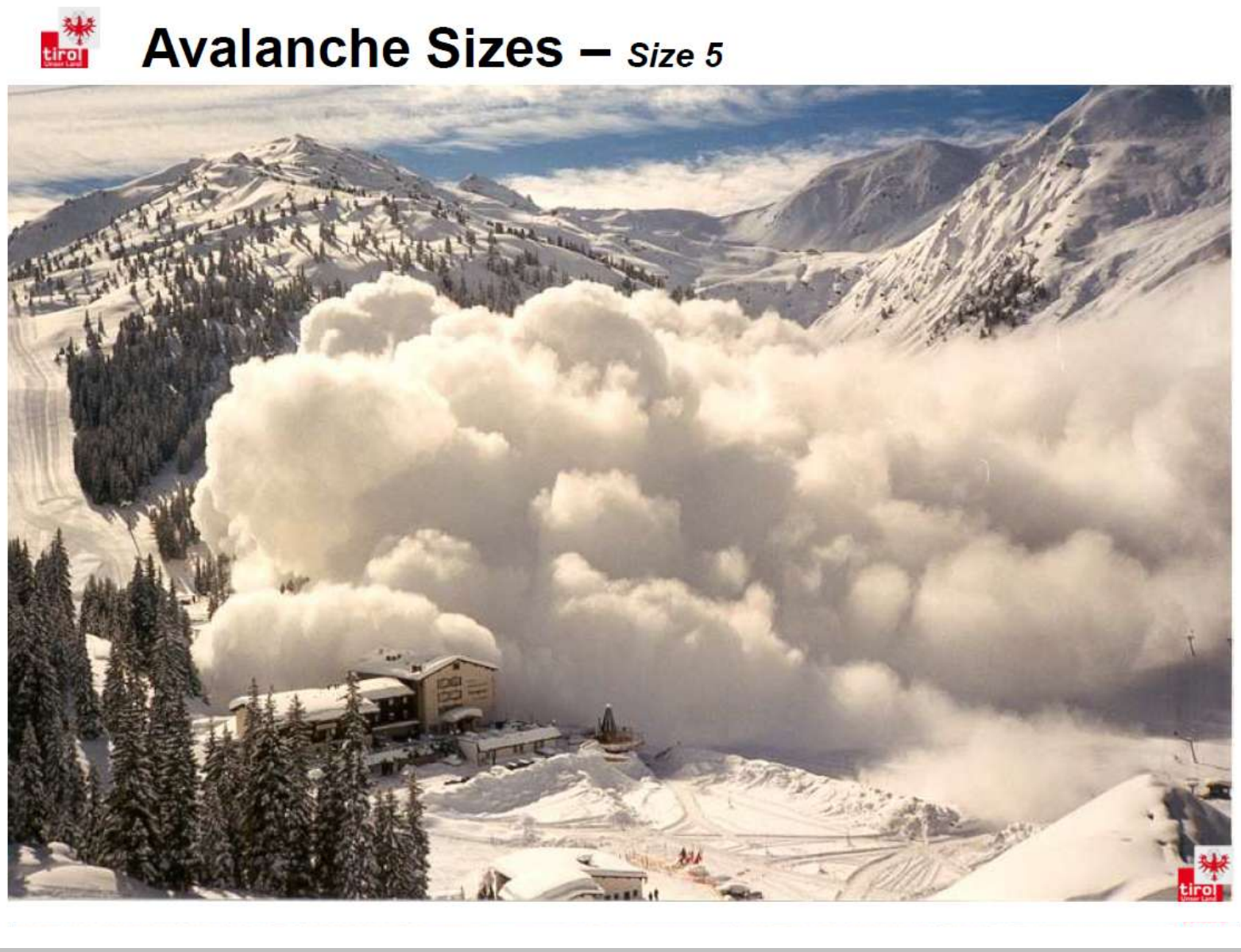
* specifiable with respect to altitude, exposition and/or relief

** The hazard sites are too numerous or too diffusely distributed to be specifiable with respect to altitude, exposition and/or relief.

Annotation:

This auxiliary matrix was adopted be the European Avalanche Warning Centers during their meeting in Davos in 2005. It provides the working basics for the genertation of the avalanche bulletins. The white fileds are not finally discussed yet.

USING SAME AVALANCHE SIZE SCALE: According to potential damage and runout length



DEFINING STANDARD TYPICAL AVALANCHE-SITUATIONS

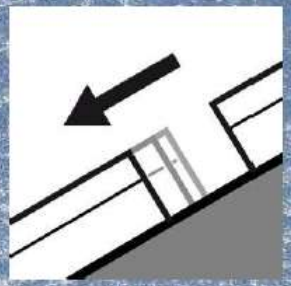
5 avalanche problems **1 favourable situation**

New snow

Drifting snow

Wet snow

Old snow



Gliding snow

Favourable sit.

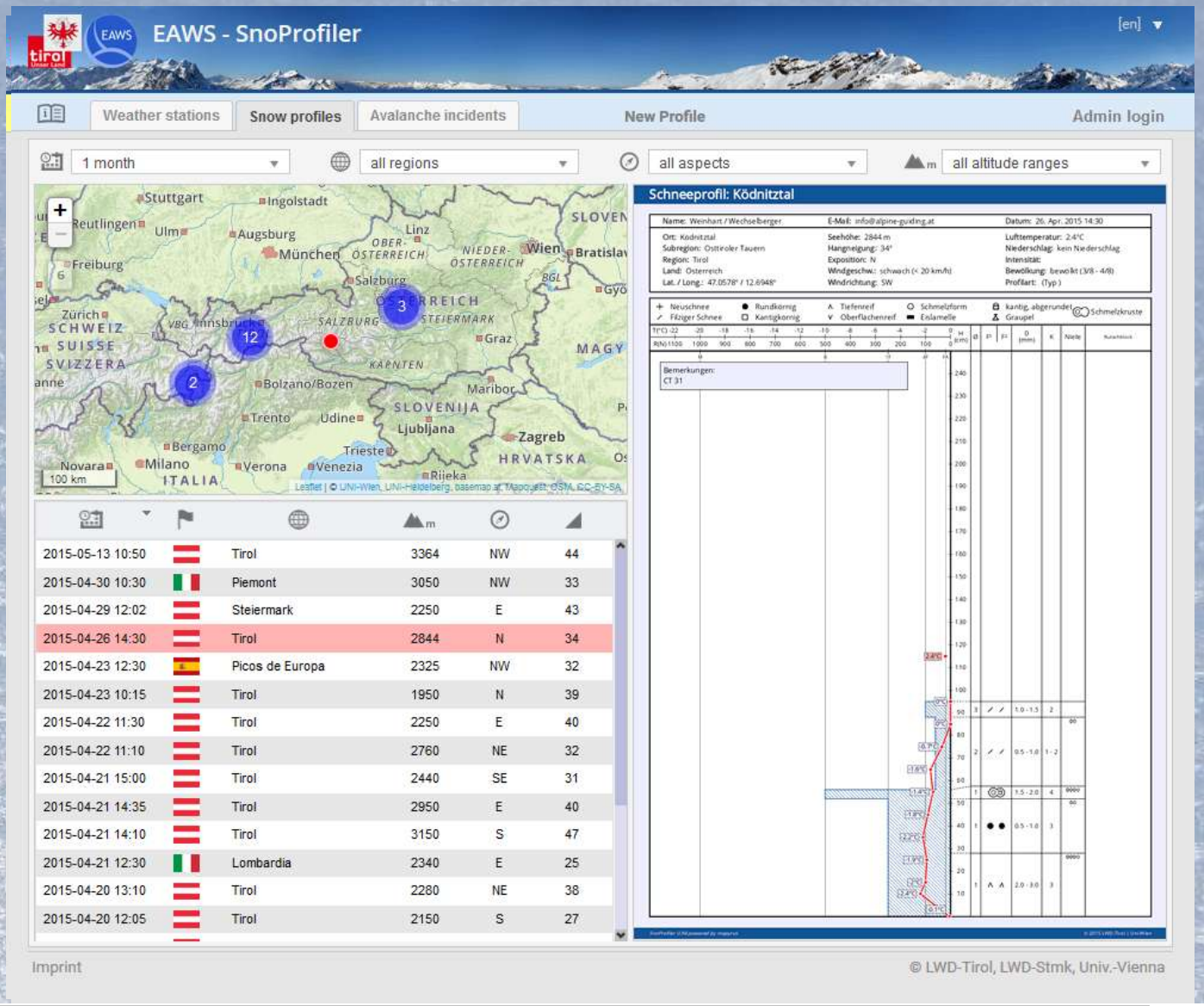
ALLOWING ON LINE TOOLS - SnoProfiler

Using IACS standards

International Association of Cryospheric Sciences

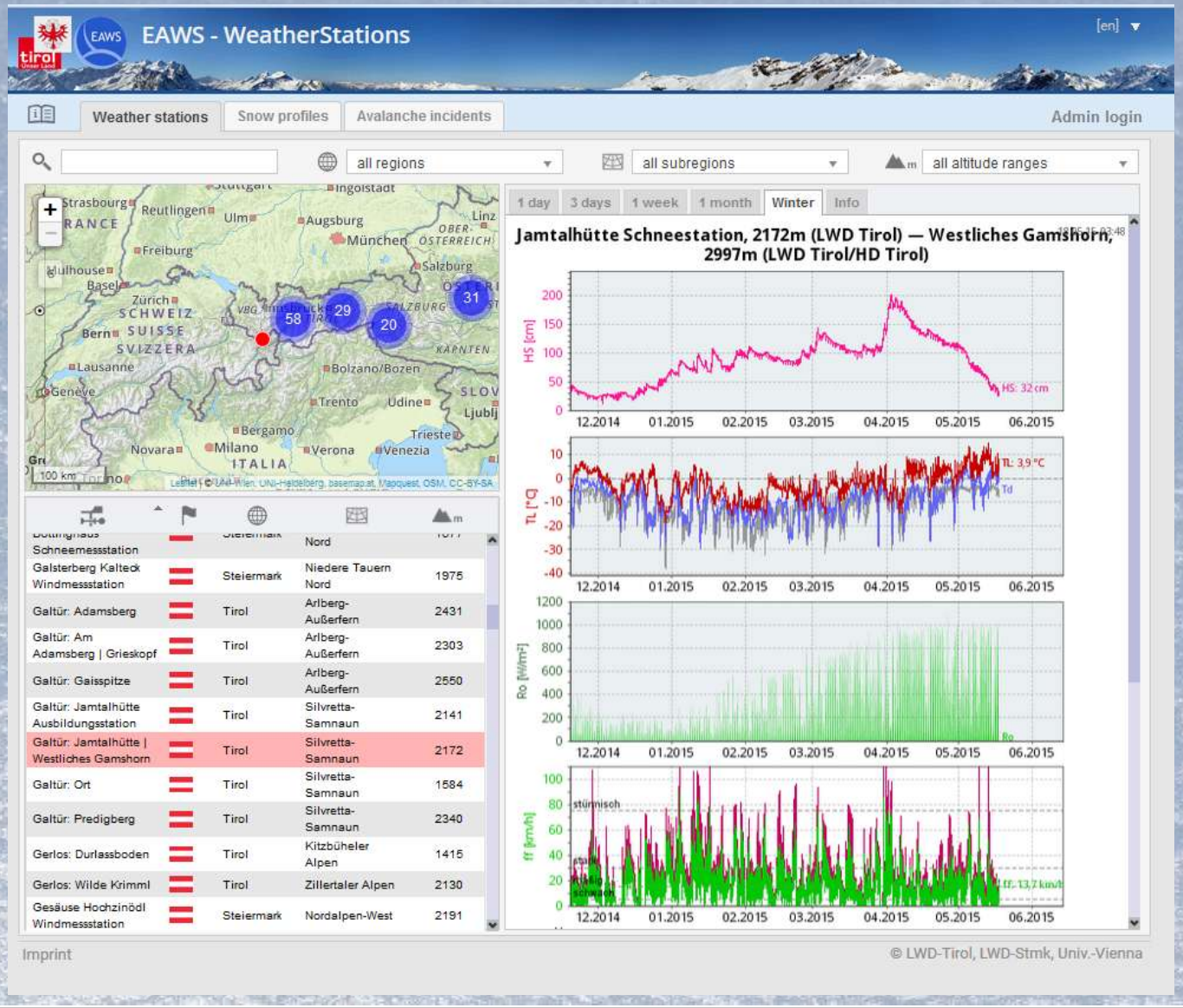
International Classification seasonal snow on the ground

Snow Grain Photo Library

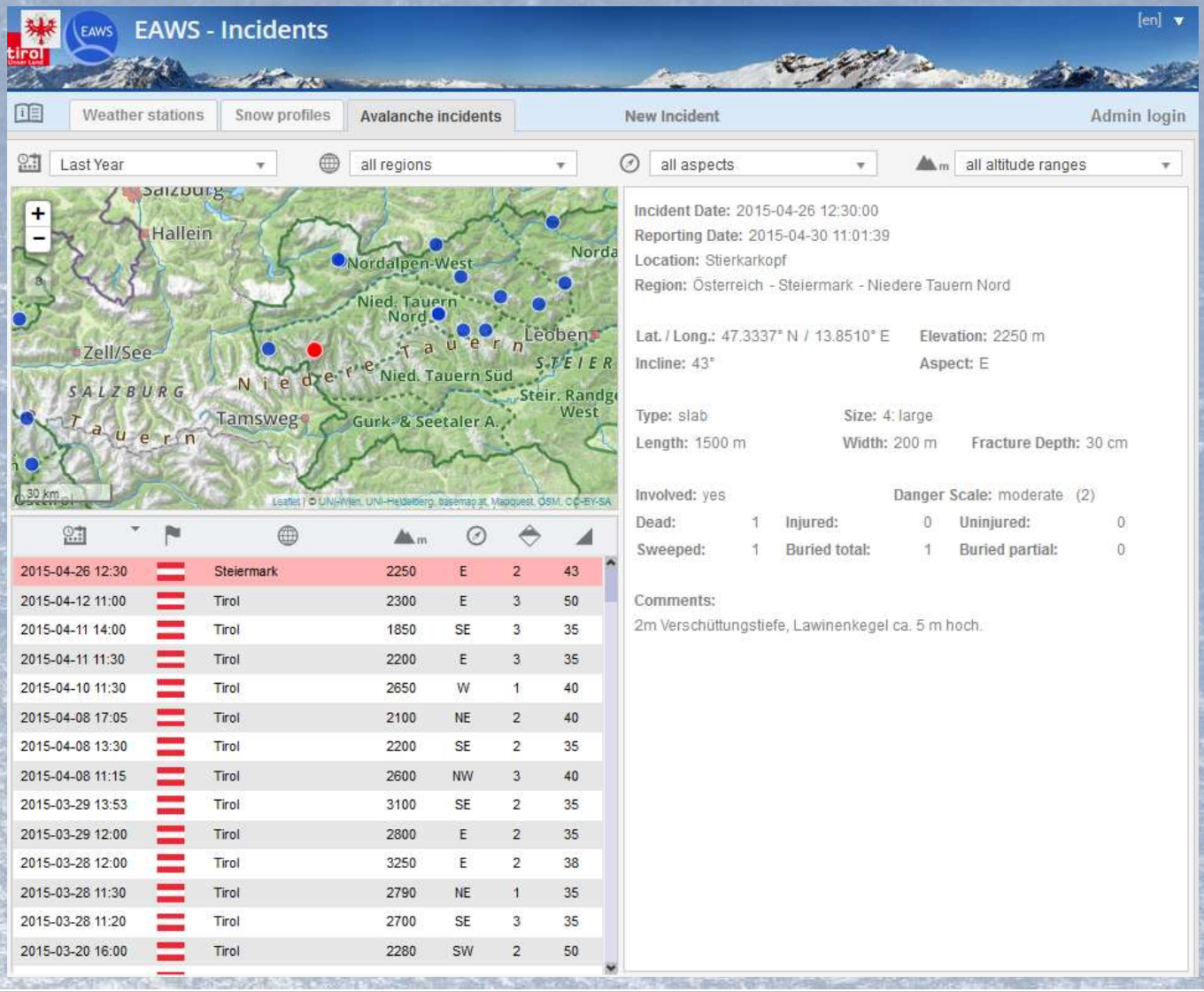


2015-05-13 10:50		Tirol	3364	NW	44
2015-04-30 10:30		Piemont	3050	NW	33
2015-04-29 12:02		Steiermark	2250	E	43
2015-04-26 14:30		Tirol	2844	N	34
2015-04-23 12:30		Picos de Europa	2325	NW	32
2015-04-23 10:15		Tirol	1950	N	39
2015-04-22 11:30		Tirol	2250	E	40
2015-04-22 11:10		Tirol	2760	NE	32
2015-04-21 15:00		Tirol	2440	SE	31
2015-04-21 14:35		Tirol	2950	E	40
2015-04-21 14:10		Tirol	3150	S	47
2015-04-21 12:30		Lombardia	2340	E	25
2015-04-20 13:10		Tirol	2280	NE	38
2015-04-20 12:05		Tirol	2150	S	27

VISUALIZATION TOOLS: Snow & weather automatic stations



REPORTING AVALANCHE INCIDENTS: Fatal accidents from all over Europe



2015-04-26 12:30	Steiermark	2250	E	2	43
2015-04-12 11:00	Tirol	2300	E	3	50
2015-04-11 14:00	Tirol	1850	SE	3	35
2015-04-11 11:30	Tirol	2200	E	3	35
2015-04-10 11:30	Tirol	2650	W	1	40
2015-04-08 17:05	Tirol	2100	NE	2	40
2015-04-08 13:30	Tirol	2200	SE	2	35
2015-04-08 11:15	Tirol	2600	NW	3	40
2015-03-29 13:53	Tirol	3100	SE	2	35
2015-03-29 12:00	Tirol	2800	E	2	35
2015-03-28 12:00	Tirol	3250	E	2	38
2015-03-28 11:30	Tirol	2790	NE	1	35
2015-03-28 11:20	Tirol	2700	SE	3	35
2015-03-20 16:00	Tirol	2280	SW	2	50

USING COMMON TERMINOLOGY: EAWS Glossary, terms and definitions

European Avalanche Warning Services

Glossary[en] Glossar[de] Glossaire[fr] Glossario[it] Glosario[es] Glosario[ca] Slovník[sk] Glossaire[ro]

Additional load

Low additional load

- individual skier/snowboarder, riding softly, not falling
- group with good spacing (minimum 10 m) keeping distances
- snowshoer

High additional load

- two or more skiers/snowboarders etc. without good spacing (or without intervals)
- snow machine
- explosives
- occasionally single hiker / climber

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Altitudes

Area within certain altitude ranges (accuracy ± 100 m)

- high alpine regions: over 3000 m above sea level
- high altitude: 2000 to 3000 m above sea level
- intermediate altitude: 1000 to 2000 m above sea level
- low altitude: below 1000 m above sea level

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Amount of fresh fallen snow

NEW MEDIA: SnowSafe app

SnowSafe
for Android™

Mobile Avalanche Information Mountains

A truly helpful Android™ and iPhone™ application for ev
mountains. Perfect for freeriders, snowboarders, skiers
helps you better understand and evaluate the avalanch
avalanche bulletin updates of the governmental avalanc

FEATURES

Regions Overview

The maps overview gives you a good idea of the general situation in your area of interest. The phone's GPS function shows you to which avalanche jurisdiction your current location relates.

Avalanche information in your pants pocket

With SnowSafe you can make better-informed decisions while in the mountains. SnowSafe provides you with the official avalanche information at your fingertips. The application automatically fetches avalanche report bulletins and updates from the official avalanche warning services of the regional governments. Information is presented using concise and easy to understand internationally recognised warning symbols.

For advance users and Freeride experts

Advanced users will appreciate the full avalanche bulletin which includes all detailed and official information. It is presented in an easy-to-read to empower your judgement, even on the go. For even more information, SnowSafe presents direct links to the hotlines and websites of the respective government agencies. SnowSafe synchronizes the avalanche bulletins automatically as soon as network conditions permit and stores the information on your phone.

Inclinometer

Experts know that the inclination of a line has important impact on avalanche risk. SnowSafe's built-in inclinometer allows you to measure any line's inclination in order to make better-informed risk decisions.

THE XML STANDARD OF THE EAWS: CAAML

CAAML (Canadian Avalanche Association Markup Language) is a standard for the electronic representation of information pertinent to avalanche safety operations. Adopted from 2009 by EAWS

By building on existing Internet standards, CAAML expresses avalanche related information in a way that can easily be shared over World Wide Web.

CONCLUSSIONS

1- EAWS provides advantages for forecasters: ensures precise comparisons with neighboring regions, facilitates international exchange of experiences, assures a continuous process of evolution for the forecasting techniques.

2- EAWS provides advantages for users: Website to find all the snow avalanche forecasts with the same danger level scale; provides international standard of quality for the forecasting products; common glossary with long-lasting definitions; provide wide ranging of information and publications.

3- The more advantages for professionals/forecasters derived in more accurate infos, more accessible from different media and easy to keep in mind so The more advantages for users with the aim of saving lifes in the mountains by means of forecasting and warning.

THANK YOU FOR YOUR ATTENTION !