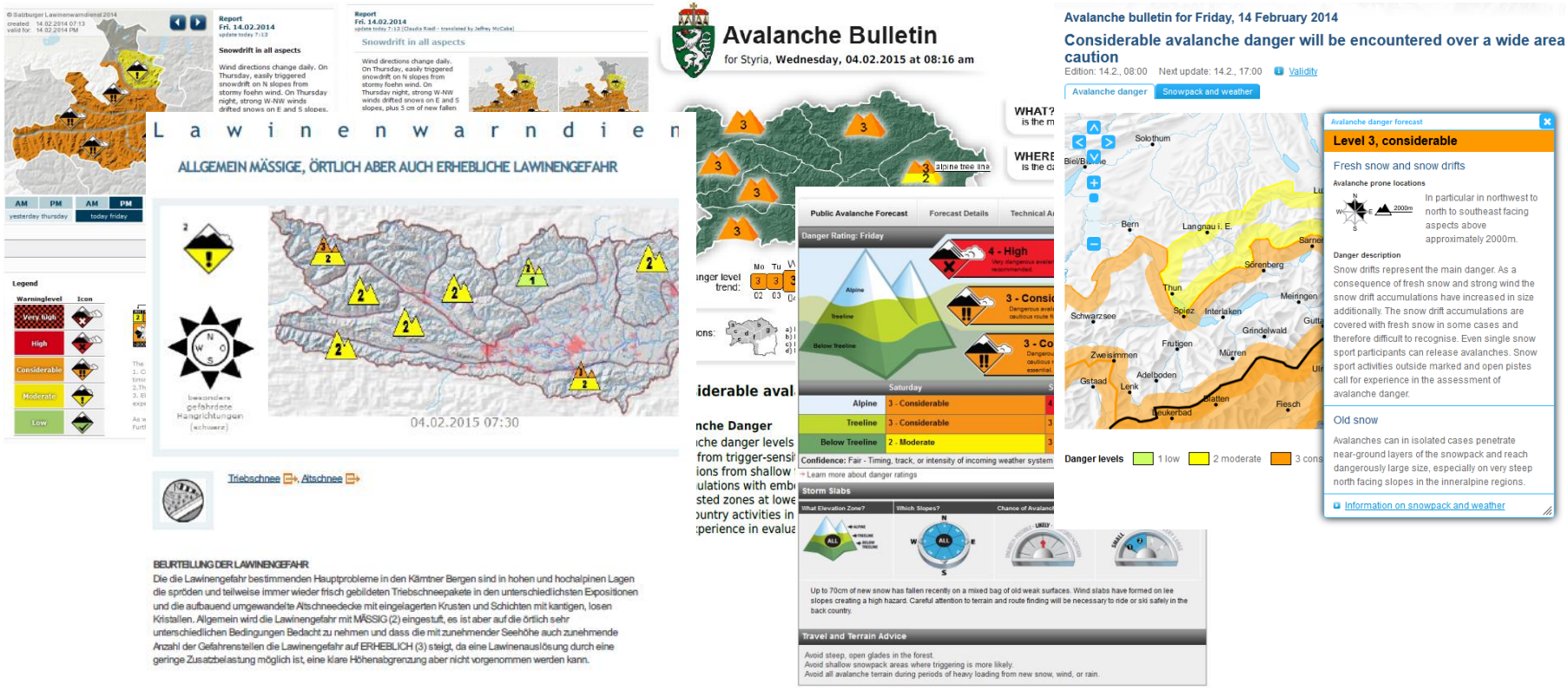
REPUBLIC OF SLOVENIA
MINISTRY OF THE ENVIRONMENT AND SPATIAL PLANNING
SLOVENIAN ENVIRONMENT AGENCY

Redesign of Slovenian Avalanche Bulletin

Vanja Blažica, Janez Jaka Cerar, Aleš Poredoš

What is an avalanche bulletin?

A public warning, issued by the public authority, to warn against avalanche danger and to provide additional information.



Why issue the bulletin?

Among natural hazards, avalanches cause most deaths.
Target population:

1) ski-tourers, off-piste skiers, alpinists, mountaineers
2) road maintenance, mountain rescue service, ski resorts

Slovenian Environment Agency (ARSO) issues regular warnings during winter season: **www.meteo.si/pozor/plaz**

Poročilo o snežnih razmerah - LAVINSKI BILTEN

Poročilo obnovljeno: **PETEK 22.1.2016 ob 9h**

zadnja OCENA stopnje NEVARNOSTI

ZMERNA 2

SPLOŠNA STOPNJA NEVARNOSTI:
2. stopnje po evropski petstopenjski lestvici.

TENDENCA RAZMER

PETEK	SOBOTA	NEDELJA
2	2	2

OCENA TVEGANJA

Nevarnost snežnih plazov je v visokogorju nad nadmorsko višino okoli 2200 m zmerna, 2. stopnje, nižje pa majhna, 1. stopnje.

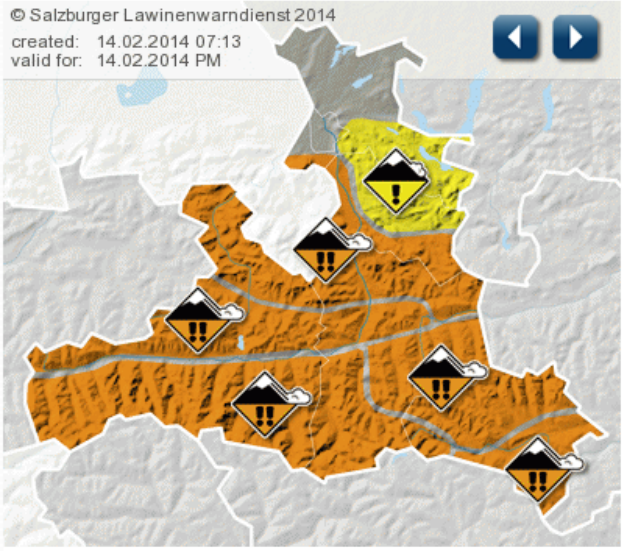
V visokogorju lahko na strmejših pobočjih ter na mestih z napihanim snegom ob večji obremenitvi snežne odeje sprožite snežni plaz, večinoma pa je snežna odeja kar stabilna. Spontanih plazov ne pričakujemo. Nižje je zaradi trde in deloma poledenele površine stare snežne odeje nevarnost zdrsov.

SNEŽNE RAZMERE in TRENUTNO STANJE SNEŽNE ODEJE

Nadaljuje se mrzlo in suho vreme. Snežna odeja se je še naprej preobražala, na vetru izpostavljenih legah je veter prenašal sneg. Zaradi vetra se je krepila tudi površinska skorja.

Višina snežne odeje je zelo neizenačena. Največ snega je v visokogorju Julijcev, do okoli 120 cm. Drugod v visokogorju je snega do okoli 40 cm ali celo manj. Omembe vredna snežna odeja sega do nadmorske višine okoli 800m, a je snega pod okoli 1500 m zelo malo. Sneg je na površini večinoma pokrit s skorjo, ki ponekod nosi človeško težo. V osojah, predvsem v zatišnih legah, pa je še mehak. Precej je napihanega snega, na vetru izpostavljenih legah je sneg precej spihan, ponekod do kopne ali stare, deloma poledenele podlage.

PREDVIDEN RAZVOJ VREMENA



AM	PM	AM	PM	AM	PM
yesterday thursday		today friday		tomorrow saturday	

Report
Fri. 14.02.2014
update today 7:13

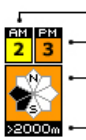
Snowdrift in all aspects

Wind directions change daily. On Thursday, easily triggered snowdrift on N slopes from stormy foehn wind. On Thursday night, strong W-NW winds drifted snows on E and S slopes, plus 5 cm of new fallen snow (in Hohe Tauern max. 25 cm). Breakable crusts everywhere, except in wind-protected, shady terrain where settled powder can still be found.

more ...

Legend

Warninglevel	Icon
Very high	
High	
Considerable	
Moderate	
Low	



Warninglevel Morning
Warninglevel Afternoon
Orientation rose: The most critical slope orientations are marked black
Elevation

The icon represents the following information:
1. Conditions in the morning and afternoon hours (for exact timing see bulletin),
2.The most critical slope orientations are marked black
3. Elevation from where a significant increase in danger is expected (> above, < below).

As with any icon, it can only give preliminary information. Further details can be found in the text part of the bulletin.

Report
Fri. 14.02.2014
update today 7:13 (Claudia Riedl - translated by Jeffrey McCabe)

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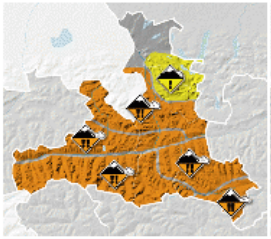
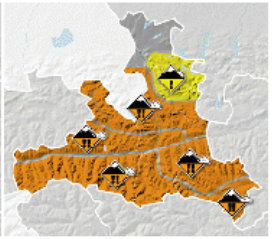

Morning


Afternoon

Avalanche Danger
Avalanche danger above 1800-2000 m is CONSIDERABLE, due to older and fresh snowdrift accumulations. Most danger zones are on NW to E to S facing steep slopes, in gullies and bowls in all aspects. In Tauern and Nockberge, snowdrift also distant from ridgelines. Frequency of avalanche prone locations increases with ascending altitude. The drifted masses are shallow (except in gullies and bowls), but can be easily triggered. Between 1600-2000 m the danger level is MODERATE; but in extremely steep terrain, slab avalanches can be released by minimum additional loading.
Isolated loose sluffs, small-sized loosely packed and slab avalanches can be released in steep, sunny, craggy terrain. Isolated full depth snowslides possible.

Snow Layering
Recent winds have done a thorough job: utterly windblown ridges and crests often lie right next to deeply drifted masses. At high and highest altitudes there is often a breakable crust. Only in wind-protected zones is powder snow still to be found (sinking depth about 30 cm), which rapidly becomes moist on sunny slopes in particular. The shallow old snowpack is very stable except on high alpine shady slopes where faceted crystals lurk between embedded hard crusts. Between the ground and the snowpack, depth hoar is often evident, encouraging snowslides on steep, grassy slopes.

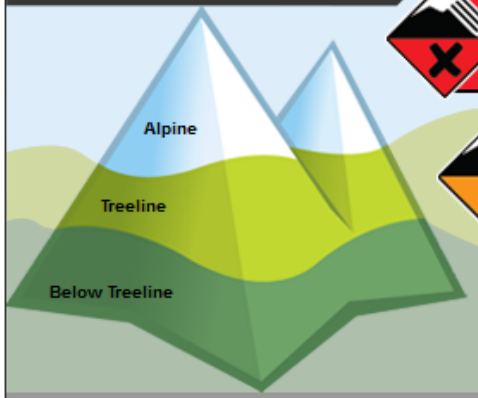
Alpine Weather Forecast (ZAMG Salzburg)
Today, Friday, residual nocturnal cloud will swiftly disperse, snowfall come to an end. Widespread sunshine by midday. This afternoon, dense cloudbanks will again move in. Brisk northwesterly winds will taper off rapidly, at light velocity over midday, this evening southerly foehn wind will arise. Temperatures: at 2000m -8 in the early morning rising to -2 degrees this evening; at 3000m -14 rising to -7 degrees.

Tomorrow, Saturday, it will be sunny. Thin cloud will pass through intermittently above summit level. In the Nockberge and southern Niedere Tauern, morning fogbanks can persist. Southerly winds will be brisk to stormy. Temperatures still higher, at 2000m: +6 degrees in the north, -1 in the south; at 3000m 0 degrees

Short Term Development
Mild temperatures will settle the snowpack up to high altitudes on Saturday. Above 2000m the snowdrift will remain precarious, especially on north facing slopes.

Public Avalanche Forecast | Forecast Details | Technical Analysis

Danger Rating: Friday



4 - High
Very dangerous avalanche conditions. Travel in avalanche terrain not recommended.

3 - Considerable
Dangerous avalanche conditions. Careful snowpack evaluation, cautious route finding and conservative decision making essential.

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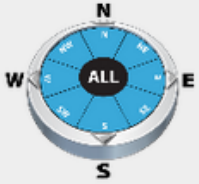
Dangerous avalanche conditions. Careful snowpack evaluation, cautious route finding and conservative decision making essential.

	Saturday	Sunday
Alpine	3 - Considerable	4 - High
Treeline	3 - Considerable	3 - Considerable
Below Treeline	2 - Moderate	3 - Considerable

Confidence: Fair - Timing, track, or intensity of incoming weather system is uncertain

→ Learn more about danger ratings

Storm Slabs

What Elevation Zone?	Which Slopes?	Chance of Avalanches?	Expected Size?
			

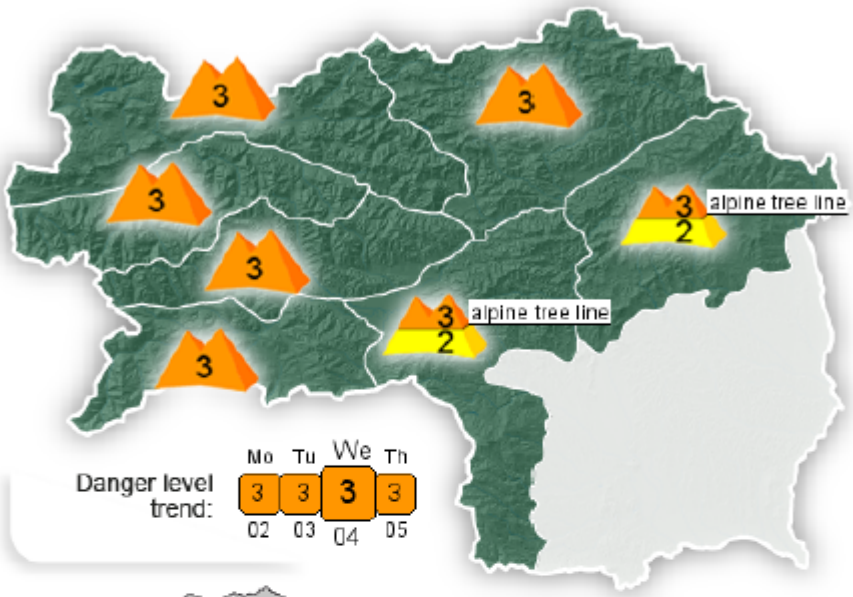
Up to 70cm of new snow has fallen recently on a mixed bag of old weak surfaces. Wind slabs have formed on lee slopes creating a high hazard. Careful attention to terrain and route finding will be necessary to ride or ski safely in the back country.

Travel and Terrain Advice

Avoid steep, open glades in the forest.
Avoid shallow snowpack areas where triggering is more likely.
Avoid all avalanche terrain during periods of heavy loading from new snow, wind, or rain.

Avalanche Bulletin

for Styria, **Wednesday, 04.02.2015 at 08:16 am**



Regions:

a) Northern Alps, West
b) Northern Alps, East
c) Niedere Tauern, North
d) Niedere Tauern, South
e) Gurk and Seetal Alps
f) Styrian Border Range, West
g) Styrian Border Range, East

WHAT? is the major danger — Old snow - weak layer inside old snowpack

WHERE? is the danger — particularly endangered slope aspects (in black)

WHEN? does the danger occur — Problem will persist all day long

WHICH? kind of avalanche is likely — Predominantly slab avalanches

HOW? can they be triggered — Predominantly caused by minimum additional loading

WHY? did this danger arise — Bed surface at transition line to old snowpack

Considerable avalanche danger - problematic old and new snowdrift

Avalanche Danger

Avalanche danger levels in Styria persist at “considerable” levels over widespread areas. The major peril stems from trigger-sensitive, hard-to-assess and now blanketed old snow in northern aspects. Particularly transitions from shallow to deep snow and entry points to gullies and bowls are critical. Older snowdrift accumulations with embedded melt-freeze crusts and depth hoar are also threats above the treeline (and unforested zones at lower altitudes). Slab avalanches can release even by minimum additional loading. Backcountry activities in outlying terrain continue to require heightened caution, a prudent route selection and experience in evaluating the hazards from spot to spot.

Snow Layering

Redesign process

- Review work of others
- Estimate our capacities
- Create needed icons
- Design several versions of bulletin
- User testing
- Create near-final version
- Create database, GUI
- Start test period
- …

Lavinski bilten

Lavinski

sreda, 16. dec.

KAJ?

napihan sneg

KJE

vsa pobo

Lavinski

sreda, 16. dec.

PROBLEM ŠT. 1

KAJ?

napihan sneg

KJE

JZ-J-JV pobo

PROBLEM ŠT. 2

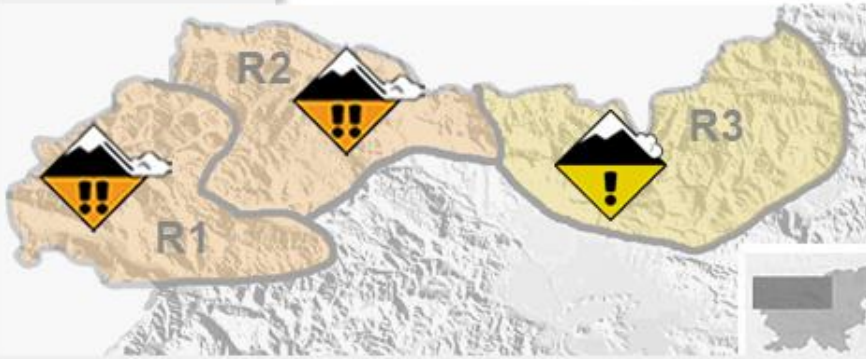
KAJ?

šibka plast

KJE

vs pobo

sreda, 16. dec. | četrtek, 17. dec. | petek, 18. de



	R1	R2	R3
KAJ?	napihan sneg	napihan sneg	napihan sneg
KJE?	vsa pobočja	vsa pobočja	vsa pobočja
NAD?	gozdna meja	gozdna meja	...
KDAJ?	AM↗PM popoldne	AM↗PM popoldne	AM—PM enako

User testing

- Performed by E7 IJS
- 9 participants, from novices to experienced users
- Main objectives:
  - Which version of the bulletin is most suitable
  - Naming of the icons and their order
  - The expected interaction with the bulletin
  - Importance of textual part of the bulletin
  - Other findings and comments

Results of user testing

- Good acceptance of all versions (V3 preferred)
- The danger - warning is not stressed enough
- For experienced users, the textual part is more important than graphical – for novices it is the other way around
- Order of icons: problem first, then type of avalanche, then the others
- Legend is missing
- Naming of regions should be full
- More information on weather conditions and forecast
- The tendency of danger for upcoming days is not clearly presented
- Icons in combination with text are easily understood

Lavinski bilten

sreda, 16. dec. | četrtek, 17. dec. | petek, 18. dec.

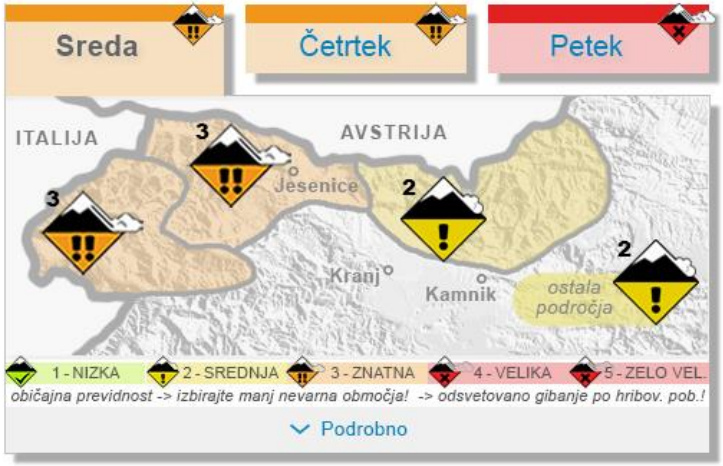
	R1	R2	R3
KAJ?	napihan sneg	napihan sneg	napihan sneg
KJE?	vsa pobočja	vsa pobočja	vsa pobočja
NAD?	gozdna meja	gozdna meja	...
KDAJ?	AM↗PM popoldne slabše	AM↗PM popoldne slabše	AM—PM enako čez dan
TIP?	krožasti plazovi	krožasti plazovi	krožasti plazovi

meteo.si

Nevarnost snežnih plazov

Datum izdaje: sreda, 16.12.2016, 8:00; naslednja izdaja: sobota, 19. 12. 2016

Celotna Slovenija



Opis stanja in napoved *(na dan 16. 12. 2016)*

PODATKI O SNEŽNI ODEJI

Podrobno

SPLOŠNA STOPNJA NEVARNOSTI

3. stopnja po Evropski petstopenjski lestvici - ZNATNA. Zaradi napihanega snega, zametov in šibkih plasti v stari snežni odeji.

OCENA TVEGANJA