REVISING THE EUROPEAN AVALANCHE DANGER SCALE: PROCESS, FINAL PROPOSAL, AND IMPLICATIONS FOR PUBLIC COMMUNICATION

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ABSTRACT: The European Avalanche Danger Scale (EADS) is the central framework for communicating regional avalanche danger in Europe. Since its introduction in 1993, the scale has supported harmonized danger levels across warning services and has become a key reference in avalanche education and public warning products. However, operational forecasting workflows have evolved. Modern forecasting workflows increasingly rely on structured decision-support tools, while the EADS is increasingly used as a public communication tool. The European Avalanche Warning Services (EAWS) therefore revised the EADS through a structured process combining scientific literature, analyses of operational EAWS Matrix usage data from 2022 to 2025, an international user survey with more than 17,000 valid responses, and two review rounds among EAWS member services. The revision was guided by three principles: simplicity, accuracy and differentiation. The final proposal separates technical descriptions for forecasters from the public danger scale. It replaces the former stability and likelihood descriptors with user-oriented descriptions of avalanche occurrence and avalanche size, adds advice for backcountry travel, and includes an optional column for public safety authorities. This paper describes the EAWS revision process, presents the final proposal to be voted on at the upcoming General Assembly, and briefly explains the main choices and remaining decisions before implementation.

KEYWORDS: Avalanche danger scale; avalanche hazard; risk communication; avalanche forecasting; EAWS; European Avalanche Warning Services

1. INTRODUCTION

The European Avalanche Danger Scale (EADS; Tab.1; European Avalanche Warning Services 2026) is the most widely recognized element of public avalanche warnings in Europe. It provides a five-level ordinal description of regional avalanche danger, ranging from 1 (low) to 5 (very high), and is used by European warning services to communicate avalanche danger to recreationists, professionals, and public authorities. Since its introduction in 1993, the scale has supported harmonized communication across national and regional warning services and has become a central reference point in avalanche education and public warning products.

The operational context in which the EADS is used has changed substantially. Modern forecasting workflows increasingly rely on structured decision-support tools, including the Conceptual Model of Avalanche Hazard (Statham et al. 2018) and the EAWS Matrix (Müller et al. 2025; Techel et al. 2026). These tools provide a more detailed technical framework for assessing avalanche danger than the original public scale. As a result, the terminology used in operational forecasting has partly diverged from the wording of the EADS. The danger scale now serves primarily as a public communication tool, while the technical assessment of avalanche danger is supported by the EAWS Matrix and associated definitions.

This shift exposed several weaknesses in the existing scale. Many terms were technical, ambiguous, or difficult to interpret, especially for non-specialists. The distinction between adjacent danger levels, especially 2 (moderate) and 3 (considerable), was not communicated clearly. The original scale also combined several concepts in the same column, including triggering likelihood, additional load, natural avalanche activity, and avalanche size. In addition, it provided little direct guidance on what the danger level means for travel

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Table 1: The current European avalanche danger scale (European Avalanche Warning Services 2026). This version is proposed to be replaced by the version presented in this article.

Danger level	Snowpack stability	Likelihood of triggering
5 - very high	The snowpack is poorly bonded and largely unstable in general.	Numerous very large and often extremely large natural avalanches can be expected, even in moderately steep terrain*.
4 - high	The snowpack is poorly bonded on most steep slopes*.	Triggering is likely even by low additional loads** on many steep slopes*. In some cases, numerous large and often very large natural avalanches can be expected.
3 - considerable	The snowpack is moderately to poorly bonded on many steep slopes*.	Triggering is possible even from low additional loads** particularly on the indicated steep slopes*. In certain situations some large, in isolated cases very large natural avalanches are possible.
2 - moderate	The snowpack is only moderately well bonded on some steep slopes*; otherwise well bonded in general.	Triggering is possible primarily from high additional loads**, particularly on the indicated steep slopes*. Very large natural avalanches are unlikely.
1 - low	The snowpack is well bonded and stable in general.	Triggering is generally possible only from high additional loads** in isolated areas of very steep, extreme terrain**. Only small and medium-sized natural avalanches are possible.

* The avalanche-prone locations are described in greater detail in the avalanche forecast (elevation, slope aspect, type of terrain): moderately steep terrain: slopes shallower than about 30 degrees; steep slopes: slopes steeper than about 30 degrees; very steep, extreme terrain: particularly adverse terrain related to slope angle (more than about 40 degrees), terrain profile, proximity to ridge, smoothness of underlying ground surface.

** Additional loads: low: individual skier / snowboarder, riding softly, not falling; snowshoer; group with good spacing (minimum 10 m) keeping distances. high: two or more skiers / snowboarders etc. without good spacing (or without intervals); snow-machine; explosives. natural: without human influence.

decisions, although such guidance has become an important part of modern public avalanche communication. These issues motivated EAWS to revise the EADS with the explicit goal of strengthening its role as a clear, simple, and user-oriented communication tool. The revision follows a similar direction as the update conducted by the North American avalanche community in 2010, which resulted in the North American Public Avalanche Danger Scale (NAPADS) (Statham et al. 2010). However, the revised EADS also had to reflect European forecasting practice, multilingual communication, and the need for consistency with the EAWS Matrix.

This paper describes the process of updating the EADS within EAWS and presents the final proposal submitted for approval. We summarize the evidence base, describe the two feedback rounds among EAWS member services, present the main changes to the danger scale, and briefly explain the reasoning behind the choices made by the working group.

2. BACKGROUND AND MOTIVATION

The original EADS was designed to support both forecasting and public communication. It described danger levels using concepts such as snowpack stability, triggering likelihood, avalanche activity, and expected avalanche size. These concepts remain central to avalanche forecasting, but their interpretation now benefits from a more detailed technical framework.

The EAWS Matrix formalizes the relationship between snowpack stability, the spatial frequency of instability, avalanche size, and the resulting regional danger level (Müller et al. 2025; Techel et al. 2026). Analyses of avalanche occurrence and danger levels show that avalanche danger cannot be reduced to a single component. Rather, it reflects the combined effect of snowpack stability, the frequency of avalanche-prone locations, and avalanche size (Schweizer et al. 2020; Techel et al. 2020). This is consistent with the Conceptual Model of Avalanche Hazard, which separates the probability of avalanche occurrence from expected avalanche size as a proxy for destructive potential (Statham et al. 2018).

For public communication, however, technical accuracy alone is not sufficient. Users must be able to easily understand and correctly rank the levels according to their severity, identify the practical meaning of the danger level for terrain use, and recognize how conditions differ from one level to the next. The working group therefore considered the revised scale a communication product rather than a complete technical definition of all forecasting situations. The scale describes typical scenarios for each danger level and cannot cover all possible combinations of snowpack stability, avalanche problems, weather, terrain, and exposure.

3. METHODS

3.1. Revision principles

The revision of the European avalanche danger scale was guided by three principles:

1. **Simplicity**: the danger scale should provide a concise description of avalanche danger, be understandable for non-expert users, and be useful for communication and teaching.
2. **Accuracy**: the danger scale should describe typical scenarios for each danger level in a way that is consistent with the current understanding of avalanche danger among European avalanche warning services.
3. **Differentiation**: adjacent danger levels should be clearly distinguishable, especially where user decisions change substantially.

These principles were used to evaluate proposed wording changes, resolve conflicting feedback and decide when to prioritize public readability over technical correctness or completeness.

3.2. Evidence base

The working group combined four sources of evidence. First, the group reviewed scientific literature on avalanche danger, snowpack stability, the frequency distribution of stability, avalanche size and risk communication (e.g. Schweizer et al. 2020; Techel et al. 2020; Schweizer et al. 2023). Second, the group used operational EAWS Matrix data from 26 warning services over three forecasting seasons (Techel et al. 2026). These data informed the typical combinations of stability, frequency, avalanche size and assigned danger level resulting in a technical description of the avalanche danger levels (Tab. 2). It documents typical scenarios derived from three years of EAWS Matrix use, but it has no formal or operational status as part of the updated scale. Third, EAWS conducted an international user survey testing alternative phrasings in several European languages (Ebert et al. 2026). After cleaning, the survey contained more than 17,000 valid responses. Fourth, EAWS member countries were invited to submit consolidated, evidence-based feedback through a common review template.

3.3. Review process

At the EAWS General Assembly in Seggau, Austria, in June 2025, the working group *Matrix and Scale* presented an updated draft of the EADS. The General Assembly accepted this draft as the basis for a formal revision process, but not as a new EAWS standard, yet. Member countries were then invited to provide consolidated, evidence-based feedback using a common template with instructions to identify concrete issues, propose solutions and provide one consolidated response per country.

Nine of 18 member countries submitted feedback in the first review round. All comments were entered in a revision log, including assigned priorities and thematic tags, to ensure a structured and transparent evaluation process. The revision group met in Innsbruck, Austria, in May 2026 to review the collected feedback and revise the scale.

The revised version was circulated to EAWS members on 9 June 2026, followed by a second review round ending on 26 June 2026. Eleven of 18 member countries submitted feedback in the second round. The working group reviewed this feedback and revised the danger scale again in meetings in July and August 2026, before submitting the final proposal (Tab.3) to the Technical Advisory Board for approval to proceed to a vote at the Extraordinary General Assembly in October 2026.

4. RESULTS: MAIN CHANGES TO THE DANGER SCALE

4.1. Danger levels, signal words, colors and icons

The mandate for the working group stated that the five danger levels should be retained. Numerical values provide a clear ordering and are embedded in European avalanche education and warning practice. However, the naming and visual representation of danger level 5 remained controversial. There was broad support for a clearer distinction of danger level 5 from danger level 4 through a dedicated color, pictogram and signal word. The current standard is the signal word ”very high” and

Table 2: The technical description derived from three years of Matrix usage data from 26 warning services (Techel et al. 2026).

Danger level	Technical description
5	Natural avalanches occur on many slopes. Avalanches can be very large or extremely large.
4	Natural avalanches can occur on many slopes. Avalanches can very easily be triggered by people in many locations. Avalanches can be large or very large.
3	Avalanches can easily or very easily be triggered by people in some or even many locations. Natural avalanches can occur on some slopes, although natural avalanches are often absent. Avalanches can be medium-sized or large.
2	Avalanches can easily be triggered by people in a few or some locations. Natural avalanches are typically absent, though at most a few slopes may produce natural avalanches. Avalanches can be medium-sized.
1	There are at most a few locations where avalanches can easily be triggered by people. Typically, there are no natural avalanches. Avalanches are generally small but can be medium-sized.

the color ”dark red”. The NAPADS uses ”extreme” and ”black” (Statham et al. 2010). A change to ”extreme” emphasizes that the transition from level 4 to 5 is large and non-linear and that the highest level should be clearly separated from level 4. An opposing argument is that ”extreme” is used in other hazard warning systems related to rarer or more catastrophic situations than some events currently classified as avalanche danger level 5. Because no clear consensus emerged, the signal word and color for danger level 5 will be decided in separate votes at the Extraordinary General Assembly.

4.2. Avalanche occurrence

The column *Snowpack stability* (Tab.1) was replaced by *Avalanche occurrence* (Fig.3) because the revised scale is intended primarily for public communication. While snowpack stability remains central to forecasting and to the EAWS Matrix, it is a technical concept that many users cannot easily observe or interpret. The revised column translates this information into a more practical description of where avalanches can be triggered by people and where natural avalanches may occur. At DL1–3, the focus is on human triggering, with a reminder that natural avalanches may occur under certain conditions. At DL4 and DL5, natural avalanches are mentioned first to emphasize that they represent a typical threat under these conditions. The wording distinguishes between *locations* for human triggering and *slopes* for natural avalanches. This reflects the different spatial scales of a triggering point and a slope-scale natural release. In addition, likelihood terms such as *possible* or *likely* were replaced by wording that describes the frequency of locations where avalanches can be triggered. While the current danger scale distinguishes between high and low additional loads at danger levels 2 and 3, the phrase *easily triggered* is now used at both levels. This emphasizes that DL2 and DL3 are primarily differentiated by a higher frequency of triggering locations and to a lesser extent, by an increase in trigger sensitivity (Techel et al. 2020). This choice is consistent with typical Matrix situations at DL2 and with feedback from member services (Techel et al. 2026). At DL1, the revised wording indicates that avalanches are still possible, but only in rare circumstances. The term *typically* was added to avoid an overly absolute statement about natural avalanches, particularly for wet-snow and glide-snow situations.

4.3. Avalanche size

Small and medium-sized avalanches can occur at all danger levels and are often the most common avalanche sizes. What typically changes with increasing danger level is the largest avalanche size in the distribution of observed avalanches and, therefore, the potential consequences (Schweizer et al. 2020; Techel et al. 2020). To reflect this progression, the revised *Avalanche size* column (Tab. 3) describes avalanche sizes that can reasonably occur at each danger level, without implying that these sizes are expected in every situation. The wording describes physical avalanche size and observable destructive potential rather than repeatedly referring to fatal consequences that can occur at all levels. The user survey (Ebert et al. 2026) strongly supported the use of size signal words (*small*, *medium-sized*, *large*, *very large*, and *extremely large*). Alternatives using explicit size classes were ranked more accurately than wording based mainly on consequences. Avalanche size is a relatively weak discriminator between the lower danger levels 1 to 3, where differences are primarily related to the frequency of avalanche-prone locations. Nevertheless, expected avalanche size and the associated consequences of triggering an avalanche are readily communicated among European avalanche forecasters. Avalanche size becomes more decisive when differentiating danger levels 3 to 5 (Techel et al. 2020; Schweizer et al. 2020). The updated danger scale therefore introduces a clear escalation in the largest expected avalanche size across the danger levels, while keeping the wording concise and accessible for public communication.

4.4. Advice for backcountry travel

The revised scale introduces *Advice for backcountry travel* (Tab. 3), similar to the NAPADS. This column summarizes key accident-prevention considerations typically relevant at each danger level. Given the diversity of risk-management practices across Europe, the advice is intentionally general. More specific guidance is provided in the daily avalanche forecast.

At DL5, the advice is deliberately restrictive and clear. For the other danger levels, the wording avoids regulation-like language and instead provides instructive guidance for both trip planning and on-site decision making. This reflects the prescriptiveness dilemma in voluntary risk communication: expert guidance can strengthen users' decision-making capacity, but overly strong recommendations may be interpreted as implicit rules or as defining what constitutes reasonable behavior (Ebert 2026). An earlier draft used the phrase "Travel in avalanche terrain is not recommended" at DL4, similar to the North American scale. However, this wording was not well received by several professional user groups, including mountain guide associations, as it could be interpreted as an implicit regulation. The revised wording at DL4, "Travel options are minimal. Significant restraint required, even in runout zones", therefore describes the typical limitations and required mindset at DL4 without prescribing a direct prohibition. Also at DL2 and DL3, the advice focuses on terrain management. At DL3, the wording emphasizes cautious route selection and conservative decision making, reflecting the need for larger safety margins and more restrictive terrain choices. At DL2, users are prompted to identify and evaluate avalanche-prone terrain and choose terrain accordingly. The proposed phrase "Exercise caution in high-consequence terrain" at DL1, highlights that avalanche accidents cannot be ruled out even at DL1, especially where terrain features may increase burial depth or the likelihood of trauma. *High-consequence terrain* is a technical term and will be defined in supporting material. Adding examples or further explanation directly in the scale would have made the advice at the lowest danger level disproportionately long.

4.5. Advice for public safety authorities (optional)

In contrast to the North American Public Avalanche Danger Scale, which primarily addresses backcountry recreationists, the EADS is also used by public safety authorities in several European countries. Avalanche danger levels may inform decisions related to roads, settlements, infrastructure, ski areas, and emergency preparedness. A second advice column was therefore developed for public safety authorities. The column is proposed as optional because national practices, legal responsibilities, and existing emergency procedures differ across Europe. Revisions were discussed with the Common Alerting Protocol (CAP) Working Group. The wording focuses on whether evacuations, access restrictions, or other safety measures may be required at a given danger level.

The main purpose of this column is to support authorities in interpreting the EADS in situations where avalanche danger may affect settlements, roads, infrastructure, or other exposed assets. It also facilitates the use of the danger scale in public warning systems and CAP-based communication. At DL4 and DL5, the wording reminds authorities that evacuations, access restrictions, or similar safety measures may be required and that existing emergency plans should be consulted. At DL5, the wording also acknowledges the possibility of unprecedented impacts, reflecting the uncertainty associated with rare and severe avalanche situations. At lower danger levels, such measures are generally not expected, although safety measures may still be required at DL3 in specific exposed situations.

4.6. Final proposal and voting

The final proposal submitted to the Extraordinary General Assembly (Tab. 3) consists of *Avalanche occurrence*, *Avalanche size* and *Advice for backcountry travel* as mandatory elements of the danger scale. *Advice for public safety authorities* is proposed as an optional column that may be adopted according to national needs, legal frameworks and communication practices.

The current EADS remains the valid EAWS standard unless a revised version is approved. A proposal requires a two-thirds majority to replace the present standard.

If the revised scale is accepted, final graphical layout, supporting documentation and guidance material for implementation, communication and education will be developed and presented to the Ordinary General Assembly in Zakopane in 2027. Translations will be the responsibility of the respective member countries and must be coordinated among countries sharing the same language. Operational implementation by member countries is therefore expected prior to the 2027/28 winter season at the earliest.

5. DISCUSSION

5.1. *Balancing simplicity, accuracy and differentiation*

The central challenge in revising the EADS was balancing scientific and operational accuracy with public readability. The technical description derived from EAWS Matrix use is more precise than the public danger scale, but it is also more complex (Tab. 2). Conversely, a public communication tool must be short, memorable, and translatable. The revised scale therefore prioritizes a concise description of typical situations rather than a complete definition of every possible forecast scenario.

The English wording was intentionally kept simple to facilitate translation while preserving the intended meaning. This compromise is particularly visible in the *Avalanche occurrence* column. Matrix data show overlapping frequency distributions between adjacent danger levels. A fully accurate representation would require terms such as ”few to some” or ”some to many”, but these reduce readability and do not clearly differentiate between levels. The working group therefore retained simpler descriptors while making the most important distinctions explicit.

The user survey highlighted the challenges of multilingual risk communication (Ebert et al. 2026). It highlighted that minor wording changes can, in some cases, have significant effect on user risk perception. But also that differences between languages were, in particular for the *Avalanche occurrence* column, greater than smaller variation of the wording. These findings emphasize that translations should aim to preserve the intended interpretation of danger levels rather than strict word-for-word equivalence. At the same time, different wording across languages may raise concerns about technical consistency between warning services.

Likelihood terms, such as those used in the NAPADS, have been shown to be challenging in risk communication (Thumlert et al. 2020; Thumlert et al. 2024; Ebert et al. 2025). Terms describing the chance of triggering an avalanche, or of being affected by a natural avalanche, do not always match users’ intuitive interpretation of likelihood and may therefore be misleading. The revised EADS deliberately avoids such likelihood terminology. Instead, it communicates increasing avalanche likelihood through an increasing frequency of triggering locations and slopes where natural avalanches may occur.

5.2. *Addition of advice and user guidance*

The addition of travel advice marks an important change compared with the original EADS. Until now, the danger scale has mainly described avalanche danger, whereas users often seek guidance on what a given danger level means for their decisions. Including advice brings the EADS closer to public warning practice and aligns it more closely with the NAPADS (Statham et al. 2010). More importantly, it supports greater consistency among EAWS services. Several services already included travel advice in their regional avalanche warning products, while others did not. Where such advice existed, wording and level of detail varied between services. Including a common *Advice for backcountry travel* column therefore provides a shared European baseline for communicating the practical implications of each danger level. At the same time, the advice must remain general, because route choice, exposure, skill, group size, avalanche problem, and terrain all influence risk and cannot be addressed in a few short sentences. The proposed advice should therefore be understood as a bridge between the danger level and the full avalanche forecast, not as a substitute for either. The danger scale supports communication and education, while the detailed forecast provides the situation-specific context needed for decision-making.

6. CONCLUSIONS

The revision of the European Avalanche Danger Scale responds to a changing operational context in which technical forecasting tools and public communication needs have diverged. The revised scale strengthens the EADS as a user-oriented communication tool while maintaining consistency with the EAWS Matrix and current scientific understanding of avalanche danger.

The main changes are: (1) separating technical descriptions from the public scale, (2) replacing the often misunderstood distinction between high and low additional loads with wording that emphasizes the frequency of triggering locations and slopes where natural avalanches may occur, (3) separating avalanche occurrence from avalanche size with explicit avalanche size signal words and observable destructive potential, (4) adding general advice for backcountry travel, and (5) providing optional advice for public safety authorities.

The process combined operational data, scientific literature, user survey results, and structured feedback from EAWS member services. The revised EADS is necessarily a compromise. It cannot describe every avalanche situation, nor can it replace the detailed avalanche forecast. Its value lies in providing a simple, accurate, and differentiated framework for communicating regional avalanche danger across Europe. This version represents the final proposal of the working group and is subject to approval by the EAWS General Assembly. If approved, remaining work should focus on translation, supporting documentation, harmonized education material, and evaluation of how users interpret and apply the revised scale in practice.

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Table 3: Proposed updated European Avalanche Danger Scale. The signal word and color for danger level 5 will be decided in separate votes. The table therefore presents both signal-word and color options.

Danger level	Avalanche occurrence	Avalanche size	Advice for backcountry travel	Advice for public safety authorities
5 - Very High / Extreme Dark Red / Black	Natural and human-triggered avalanches are widely expected.	Avalanches can become extremely large: they can devastate infrastructure and parts of settlements.	Avoid all avalanche terrain. Follow instructions given by authorities.	Evacuations, access restrictions or other safety measures are often required; consult your emergency plans and be aware that unprecedented impact may occur.
4 - High	Natural avalanches can occur on many slopes. Avalanches can very easily be triggered in many locations.	Avalanches can become very large: they can cross flat terrain and endanger exposed infrastructure and buildings.	Travel options are minimal. Significant restraint required, even in runout zones.	Evacuations, access restrictions or other safety measures are sometimes required; consult your emergency plans.
3 - Considerable	Avalanches can easily be triggered in some locations. Under certain conditions, natural avalanches can occur on some slopes.	Avalanches can become large: they can bury people, break trees, and occasionally endanger exposed infrastructure such as roads.	Cautious route-selection and conservative decision-making are essential.	Safety measures may be required.
2 - Moderate	Avalanches can easily be triggered in a few locations. Under certain conditions, natural avalanches can occur on a few slopes.	Avalanches can become medium-sized: they can bury people.	Identify and evaluate avalanche–prone terrain. Choose terrain accordingly.	Generally, safety measures are not required.
1 - Low	Avalanches can only be triggered in rare circumstances. Natural avalanches are typically not expected.	Avalanches are typically small: they can be harmful in high-consequence terrain.	Exercise caution in high-consequence terrain.	Safety measures are not required.