TOWARDS A TECHNICAL AND COMMUNICATION SCHEME FOR AVALANCHE SIZE CLASSIFICATION

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ABSTRACT:

The 1981 Avalanche Atlas is a landmark achievement in snow and avalanche science. It provides a unified, multilingual framework for describing and classifying avalanches in terms of genetics and morphology, serving as a reference for researchers, practitioners, and educators in hazard management worldwide. The presented work is embedded in the IACS working group on International Classification of Snow Avalanches, which aims to update the avalanche classification schemes of the Avalanche Atlas based on 40+ years of developments in avalanche research and practice. It serves as a starting point for discussion within the avalanche community, tackling open classification questions starting from an avalanche-size perspective. As a first step, we highlight the potential of, and challenges facing, existing avalanche classification schemes, with particular focus on avalanche size. To unify existing operational size classifications, we propose the concept of avalanche path and event size, directly connecting relative and absolute size. We further present a first technical and communication scheme based on three independent size criteria - dimension size, runout size, and destructive size - and their corresponding quantifiable characteristics, closely related to current operational schemes. The proposed size classification is designed for forward and backward compatibility, providing a continuous technical and consistent communication scheme that can be used along existing operational size classification schemes while maintaining flexibility for future developments. Finally, we open a discussion bridging the gap between avalanche size, genetics, and morphology, proposing a combination between the established Avalanche Atlas with the presented technical size scheme.

KEYWORDS: Avalanche Atlas, Avalanche size, Avalanche classification, Avalanche Dynamics, IACS

1. AVALANCHE CLASSIFICATION AND SIZE SCHEMES

While the 1981 Avalanche Atlas (International Commission on Snow and Ice 1981) established a unified morphological and genetic classification of avalanches, it does not include a size classification. The value of well-designed classification schemes in snow and avalanche science is perhaps best illustrated by the International Classification for Seasonal Snow on the Ground (Fierz et al. 2009), which provides a universally adopted, harmonized system for describing snow grain types and snowpack stratigraphy. It has become an indispensable tool for research, forecasting, and education alike. In the following decades, separate operational avalanche-size scales have instead been developed independently by Canada (CAA 2016), Europe (EAWS 2026), and the USA (AAA 2016), without a harmonized technical basis connecting them.

Despite their independent development, these operational schemes converge on a common structure: each defines five size classes, typically grouped into three broader categories of destructive potential. The European Avalanche Warning Services (EAWS) classification, similarly to the system of the Canadian Avalanche Association (CAA), relates avalanche size to typical dimension, runout, and destructive characteristics (European Avalanche Warning Services 2026; Canadian Avalanche Association 2016). The American Avalanche Association (AAA) relative-size scale complements this classification by expressing avalanche size relative to the largest avalanche that an individual path can produce. In this scheme, avalanche events, ranging from R1, a very small avalanche relative to the path size, to R5, the largest avalanche event size the path can produce (American Avalanche Association 2016). Within these schemes, avalanche size is described based on several distinct criteria - predominantly dimension, runout, and destructiveness — which

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can be treated as independent size types. Each can be expressed qualitatively, through a communication scheme accessible to practitioners and the public, or quantitatively, through a technical scheme suited to research and practice. Unlike existing operational schemes, which assign discrete values or ranges to each size class, the technical scheme proposed here expresses each characteristic as a continuous function of size. This allows to resolve size at any resolution beyond the five discrete classes and providing a principled basis from which discrete, practitioner-facing thresholds can in turn be derived. Together with genetic and morphological classification, size classification forms one of the three pillars of avalanche description; related classifications, such as those for terrain or avalanche problems, can in turn be attributed to one or more of these three pillars.

Although these operational schemes converge on a common five-class structure, the specific characteristics used to define each size class differ between them. For dimension size, the EAWS classification refers primarily to volume, whereas the CAA scheme instead defines size primarily by mass, with deposit volume reported as a secondary, derived quantity. It further remains sometimes unclear whether avalanche dimension refers to release or deposition volume, and how exactly runout, which can be characterized by runout length is defined and measured. This becomes apparent as reported ranges vary considerably between schemes. Despite these differences and ambiguities in the underlying characteristics, the resulting size classes correspond closely in quantitative magnitude and align qualitatively in their communication-scheme descriptions, allowing the schemes to be treated as compatible starting points for a harmonized technical classification.

Avalanche size also provides a common scale linking operational assessment, terrain potential, avalanche simulation, and map representation. Building directly on the size criteria in the proposed scheme, Hesselbach et al. (2026) distinguish between path size, describing the terrain potential of an individual avalanche path, and event size, describing the avalanche size expected under a specific scenario, and apply this distinction within an operational avalanche-scenario-mapping framework. At the regional scale, Spannring et al. (2026) apply the same dimension, runout, and destructive size criteria to automatically derived avalanche thalwegs, enabling systematic comparison of avalanche terrain across different study areas and providing a first plausibilisation of the technical scheme statistically analysing approx. ten thousand avalanche paths. Together, these applications illustrate how a harmonized size classification can serve as a common interface between operational assessment, terrain-based simulation, and regional-scale analysis.

Existing size classification schemes serve as the starting point and reference for the present work, since they reflect the summary of multiple decades of expert knowledge and observation. Table 1 presents a corresponding qualitative communication scheme, aligned with the destructive-potential descriptions used by both the CAA and EAWS classifications.

The remainder of this paper is structured as follows. Section 2. introduces the concept of avalanche path and event size, connecting relative and absolute size and clarifying that avalanche size may differ across the dimension, runout, and destructive size criteria. Section 3. presents a first technical and communication scheme, quantifying these three criteria through continuous, closed-form formulas for the characteristica, and cross-checks the resulting values against existing operational schemes, scientific findings, and established avalanche simulation guidelines. Section 4. opens a discussion bridging avalanche size, genetics, and morphology, relating the proposed technical scheme to the current understanding of avalanche flow regimes. Finally, Section 5. summarizes the presented concepts, identifies remaining open questions, and outlines next steps for the IACS working group.

2. AVALANCHE PATH AND EVENT SIZE

Existing operational schemes are not consistent in whether they describe avalanche size in absolute or relative terms. The AAA classification is explicitly a relative scheme, expressing size relative to the largest avalanche an individual path can produce, whereas the CAA scheme instead refers to rather absolute values, defined independently of any specific path's potential. The EAWS communication scheme, meanwhile, sometimes mixes both perspectives, describing avalanche size in terms that can be read as either absolute or path-relative depending on context. This inconsistency motivates the need for a concept that directly connects absolute and relative avalanche size, allowing the two perspectives to be expressed within a single, coherent framework.

To overcome this we explicitly split avalanche size in event and path size as a helpful tool to connect and communicate relative and absolute avalanche

Table 1: Qualitative communication scheme, describing the destructive potential of each avalanche size class, aligned with the CAA and EAWS classifications (Canadian Avalanche Association 2016; European Avalanche Warning Services 2026).

Size A	***Class***	***Description***
1	Small (Sluff)	Relatively harmless to people; unlikely to bury a person except in unfavourable terrain, such as terrain traps.
2	Medium	Could bury, injure, or kill a person; corresponds to the typical skier-triggered avalanche.
3	Large	Could bury and destroy a car, damage a truck, destroy a small building, or break a few mature trees.
4	Very large	Could destroy a railway car, large truck, several buildings, or a small area of forest.
5	Extremely large	Could devastate the landscape with catastrophic destructive potential.

size. Path size (A^{max}) describes the size potential of an individual avalanche path and is limited by the given, fixed terrain, whereas avalanche event size (A) describes the avalanche size expected under the variable, prevailing scenario and is limited by the assessed situation.

Path and event size are inherently absolute measures, since both can be directly attributed to the size criteria introduced above - dimension size (A_{dim}, A^{max}_{dim}), runout size (A_{run}, A^{max}_{run}), and destructive size (A_{des}, A^{max}_{des}) - and their respective characteristics.

As a first proposal we define absolute event size A and path size A^{max} as the maximum size over all criteria:

$$A = \max\left(A_{dim}, A_{run}, A_{des}\right), \tag{1}$$

$$A^{max} = \max\left(A^{max}_{dim}, A^{max}_{run}, A^{max}_{des}\right). \tag{2}$$

Absolute path size A^{max} is characterized by the fixed terrain features of the avalanche path, including the length, altitude difference, and angle of the origin, transition, and deposition zones, as well as the potential release area. In addition to the criteria defining path size, absolute event size A is further extended towards morphological characteristics specific to the individual avalanche event, such as the prevailing flow type or regime, release mechanism or temperature and concentration characteristics.

This terrain-based zonation into origin, transition, and deposition zones (International Commission on Snow and Ice 1981) further provides a direct link to the existing morphological and genetic classification of the Avalanche Atlas: each zone can additionally be classified according to avalanche morphology and genetics, complementing its characterization through absolute path- and event-related measures.

Relative size can be directly derived from the interaction between event size A and path size A^{max}. Where event size reaches path size, the full potential of the path is realized and corresponds to the maximum relative size, R5, regardless of the absolute size involved. Where event size is lower than path size, a correspondingly lower relative size class results. This relationship is summarized in Table 2, which connects relative size R to absolute size A as a function of event and path size:

$$R = 5 - (A^{max} - A), \quad \text{for } A \leq A^{max} \tag{3}$$

with $R = 5$ whenever $A \geq A^{max}$.

Beyond the limit that event size cannot exceed path size, it is important to clarify that avalanche size may differ across the different criteria or characteristics used to describe it - similarly to how snow grains may differ in form, extend or hardness, without either property alone fully describing the snow. An avalanche classified as large in terms of dimension size does not need be equally large in terms of runout or destructive size, and vice versa. Equation 1 defines the avalanche size as maximum across all criteria. This suggestion is a first proposal for the working group discussion, since any single size value is inherently a simplification, requiring a translation from the physically measurable characteristics provided by the technical scheme into a single, communicable size class.

Beyond the direct terrain- and scenario-based limits on path and event size, relative size already implicitly carries some information on occurrence or return period, since larger avalanches relative to a given path's potential are generally associated with lower release frequencies. However, this relationship has not yet been properly quantified, raising the open question of whether avalanche size can be more formally linked to occurrence frequency, for example by relating avalanche size classes to characteristic return periods. A harmonized, quantitative link between relative avalanche size and return period remains a subject for future discussion within the working group. This distinction between path and event size is not purely conceptual but also relevant for operational avalanche mapping or communication between avalanche operations, demonstrating how the present classification can be embedded in practical hazard-assessment workflows.

3. AVALANCHE SIZE CHARACTERISTICS AND CRITERIA

For each of the three size criteria - dimension, runout, and destructiveness - several distinct characteristics can be used to quantify avalanche size. Dimension size can be expressed through affected release, path or deposition area (typical length and width), through respective volume, or mass. Runout size can be characterized by runout length, travel angle, or altitude difference. Destructive size can be expressed through impact pressure, velocity, travel time or thickness and the associated burial potential. Following the categories related to the operational size schemes, Table 3 presents a first quantification for a subset of these characteristics - release and deposition volume, runout length, and impact pressure - relating each to the five avalanche size classes through the corresponding technical formulas.

A central difficulty in developing such a technical scheme is that the resulting values must simultaneously satisfy two, at times competing, requirements: they must remain easily communicable to practitioners, expressed in terms and magnitudes that are intuitive and consistent with established operational schemes, while also being quantified scientifically, for example through a corresponding closed-form formula that can be continuously applied consistently across avalanche paths and events. A particular strength of the presented technical scheme lies in this continuous formulation: rather than assigning a single discrete value per size class, each characteristic is expressed as a function of the continuous size variable A, with the values in Table 3 denoting the lower limit of each corresponding size class. The lower limit of size class 1 can therefore be defined as 0 in both Table 3 and Table 4.

The formulas underlying the technical scheme were derived based on four guiding hypotheses. First, they should be continuous and reproducible, reflecting the inherent relationship between mathematics and natural processes and the possibility of describing one through the other. Second, they should remain compatible with existing operational schemes, since these summarize multiple decades of accumulated avalanche-community knowledge. Third, they should be physically sound, grounded in avalanche dynamics as reflected in computational guidelines and experimental observations. Fourth, they should be internally consistent across the different size criteria - for example, geometric ratios must be compatible with the corresponding process-based mass ratios, as discussed above for release and deposition volume.

Guided by these hypotheses, the specific formulas were obtained through a combination of informed estimation, reverse engineering from known reference values, and iterative trial and error, rather than derived analytically from first principles. The resulting formulas are deliberately formulated to allow individual characteristics to be adapted - for example, by adjusting the deposition-volume or runout-length anchor values at size class 1 - without requiring the entire scheme to be revised. Validating these formulas, and the underlying hypotheses, through systematic observation or modelling approaches remains an important next step.

Beyond this dual requirement, the values of the technical scheme must also be internally consistent across criteria. Release and deposition volume, for instance, must align with one another through the potential entrainment of snow mass along the avalanche path, since deposition volume reflects not only the released volume but also the additional mass entrained during flow. This entrainment, in turn, is related to the proportion, or ratio, of the runout length over which entrainment occurs, which is itself a characteristic of the runout criterion. The technical scheme must therefore account for such cross-criterion dependencies rather than defining each characteristic in isolation.

The proposed values are checked against a synthetic design path, constructed to test the plausibility of the resulting size characteristic relationships in a hypothetical, idealized case. In alignment with the zone definitions of the Avalanche Atlas (International Commission on Snow and Ice 1981), the synthetic path is divided into three zones - origin, transition, and deposition - which, for simplicity, are assumed to share the same width, with the origin and deposition

Table 2: Connecting relative (R) and absolute avalanche size via event (A) and path size (A^{max}), following the relative-size concept (American Avalanche Association 2016), according to Equation 3.

A / A^{max} (R)	***1***	***2***	***3***	***4***	***5***
1	1/1 (R5)	1/2 (R4)	1/3 (R3)	1/4 (R2)	1/5 (R1)
2	-	2/2 (R5)	2/3 (R4)	2/4 (R3)	2/5 (R2)
3	-	-	3/3 (R5)	3/4 (R4)	3/5 (R3)
4	-	-	-	4/4 (R5)	4/5 (R4)
5	-	-	-	-	5/5 (R5)

zones further assumed to share the same length. The analysis shows good agreement, for real avalanche paths and events, the actual characteristic values will differ from this synthetic reference and depend strongly on the underlying terrain and the prevailing avalanche scenario.
Beyond consistency with the synthetic design path, any proposed classification scheme – including the present technical scheme – must ultimately be cross-checked against the state of the art: both against existing operational schemes, reflecting decades of practitioner experience, and against scientific experimental or computational findings. For example, the resulting entrainment values appear consistent with field observations of snow entrainment reported by Sovilla et al. (2006) and related work; similarly, the release-area analysis of Bühler et al. (2018) provides further support for the proposed characteristics of the dimension-size criterion. On the computational side, established velocity estimates such as those of McClung and Gauer (2018) provide a comparable point of reference. Such cross-checking is essential to ensure that the proposed values are not only internally consistent, but also plausible and applicable in practice.
Comparing the proposed technical scheme to the CAA and EAWS communication schemes shows close agreement for several characteristics - however it remains unclear if the schemes relate to lower, medium or upper levels in the size class. The proposed deposition volume (V_D) of 1000, 10000, and 100000 m^3 for sizes 2–4 matches the EAWS reported volumes of 10^3, 10^4, and 10^5 m^3 almost exactly, with the proposed size-5 value of 1000000 m^3 remaining consistent with EAWS's open-ended "$>$100000 m^3" threshold. The proposed destructive pressure values of 20, 50, 200, and 500 kPa for sizes 2–5 are of the same order of magnitude as the CAA typical impact pressures of 10, 100, 500, and 1000 kPa, though the two schemes do not align exactly at each size class.
Larger discrepancies emerge for runout length and release volume. The proposed communication values for runout length of 50, 250, 900, and 2000 m for sizes 2–5 is consistently smaller than the CAA typical path length of 100, 1000, 2000, and 3000 m, and falls at or below the lower end of the EAWS length ranges (50–200 m, several hundred metres, 1–2 km, and $>$2 km, respectively) for sizes 3 and 4 in particular. The proposed release volume (V_O) of 500, 2500, 12500, and 62500 m^3 is likewise consistently smaller than the EAWS and CAA reported volumes at the corresponding size classes; however, this is expected rather than a discrepancy, since V_O isolates the release-stage volume prior to entrainment, whereas the volumes reported by EAWS and CAA correspond more closely to deposition-stage volume. The resulting entrainment ratio, growing from a factor of roughly 2 at size 2 to a factor of 16 at size 5, is consistent with the potential for substantial mass entrainment along longer, larger avalanche paths.

The tension between practitioner-validated thresholds and quantitatively derived values is corroborated in a related regional scale simulation analysis. Spannring et al. (2026) use the proposed avalanche size criteria to classify the path size A^{max} for approximately ten thousand avalanches, offering a broad cross-check of the proposed runout and destructiveness relationships against a large, terrain-based dataset. Underlying this analysis, the Avalanche Modelling Atlas (Adams et al. 2024, AMA) provides an open geodatabase infrastructure linking avalanche path and event data, directly connecting each recorded event to its avalanche path through morphologically determined origin, transit, and deposition points.
The inconsistency between model-based parametrization and size classification is not unique to the present scheme: operational avalanche simulation guidelines, such as the friction parametrization (μ-ξ) used in RAMMS (Christen et al. 2010), or the distinct parameter sets applied for different avalanche sizes in AvaFrame (Oesterle et al. 2022), each require an in-depth, model-specific parametrization that is generally not directly consistent with any size classification scheme. However, the demon-

Table 3: Technical scheme: avalanche size characteristics and their quantitative mathematical formulation for a continuous avalanche event size (A), where integer values denote the lower limit of the respective size class A, further referring to the rounded values of the communication scheme Table 4, described in the textual description proposed in Table 1. Note that for the runout length $s(5) = 2000\,m$.

Criterion	***Characteristic***	***Formula***
Dimension	Rel. volume [m^3]	$V_O(A) = 20 \cdot 5^A$
	Dep. volume [m^3]	$V_D(A) = 10 \cdot 10^A$
Runout	Length [m]	$s(A) = s(A-1) \cdot \left(\frac{3}{2}\right)^{7-A}$
Destructiveness	Pressure [kPa]	$P(A) = 10^{0.5A+0.25}$

strated success and accuracy of these guidelines in practical application indicates that they meaningfully reflect the expert knowledge required to derive them. Combining this accumulated model knowledge with continuous characteristics for the different size criteria introduced here offers a promising basis for reproducing such guideline parametrizations with an acceptable level of accuracy, suggesting that the proposed technical scheme is compatible with, rather than at odds with, established simulation practice.

The comparison of the technical scheme with existing operational schemes indicates that while several proposed characteristics align closely, the runout length in particular warrants further refinement to more closely match established, practitioner-validated values. This underscores the importance of the cross-checking discussed above, and highlights the runout formula as a specific target for revision in future iterations of the technical scheme.

Similarly, the technical scheme as presented remains incomplete with respect to the full range of characteristics introduced earlier in this section. Beyond release and deposition volume, runout length, and impact pressure, additional characteristics remain to be quantified for each criterion: dimension size could further be expressed through release and deposition mass, or through release area (typical length times width); runout size through travel angle and altitude difference; and destructiveness through velocity, flow thickness or burial potential, and travel time. Extending the technical scheme to cover these additional characteristics, and ensuring their consistency with the criteria already quantified, remains an open task for future work.

4. AVALANCHE SIZE, GENETICS AND MORPHOLOGY

While the previous sections focus on avalanche size as an independent classification axis, avalanche size cannot be fully understood in isolation from the avalanche's genetic and morphological classification. The 1981 Avalanche Atlas classifies avalanches according to their genetics, describing the release conditions, and their morphology, describing the observable avalanche properties. Providing a unified framework describing an avalanche event with respect to size, genetics and morphology the gap between avalanche size, genetics, and morphology requires relating the quantified size criteria introduced above to the flow regime governing avalanche propagation.

A general classification is characterized by flow criteria, including characteristics like density, particle size, temperature, and liquid water content. The classical morphologic classification of the avalanche Atlas distinguishes between movement by powder, flow avalanche or mixed type as criterion. However, the current understanding of avalanche flow regime categories is much more nuanced, ranging from cold powder, cold dense, cold- or warm-transitional regimes to warm dense to slush flows Koehler et al. (2018). These categories reflect the different snow conditions, relations to avalanche problems as well as the possible transition for each regime, ranging from dry, low-density cold-powder flow to wet, high-density warm-slush flow.

The connection between avalanche size, genetics and morphology is not merely descriptive: the flow regime assigned to a given avalanche problem can directly influence the parameterization used when simulating or estimating avalanches of a given size, since avalanches of the same dimension size but different flow regimes may exhibit substantially different runout and destructive potential. Establishing a robust, quantitative link between avalanche size and flow regime is there-

Table 4: Communication scheme: rounded avalanche size quantification of size classes, aligned with the qualitative scheme in Table 1 and the continuous, mathematical formulation in Table 3. Listed absolute values are rounded for communication purposes and denote the lower limit of each continuous size class; size class 1 therefore can be defined with 0 as lower limit.

		Dimension		*Runout*	*Destructiveness*
Size A	***Class***	***Rel. volume [m***^{3}***]***	***Dep. volume [m***^{3}***]***	***Length [m]***	***Pressure [kPa]***
1	Small (Sluff)	0	0	0	0
2	Medium	500	1 000	50	20
3	Large	2 500	10 000	250	50
4	Very large	12 500	100 000	900	200
5	Extremely large	62 500	1 000 000	2 000	500

fore a prerequisite for a technical size scheme that is not only internally consistent, but also physically grounded in the genetic and morphological classification of the Avalanche Atlas.

This discussion represents a starting point to open the task of fully bridging avalanche size, genetics, and morphology within a single, harmonized framework.

5. CONCLUSION AND OUTLOOK

This paper presented a first step toward a harmonized, technical scheme for avalanche size and flow regime classification, embedded in the IACS working group on the International Classification of Snow Avalanches. We reviewed the potential and challenges of existing operational avalanche-size classification schemes, highlighting both their convergence on a common five-class structure and the inconsistencies that remain between them. Building on this review, we introduced path and event size as a simple, unifying concept connecting relative and absolute avalanche size, expressed through the ratio A/A^{max}. We then proposed a first technical and communication scheme, quantifying dimension, runout, and destructiveness through corresponding formulas, cross-checked against a synthetic design path and, where possible, against existing operational schemes and scientific findings. Finally, we outlined how avalanche size relates to genetics and morphology, connecting the proposed technical scheme to the current understanding of avalanche flow regimes and to the well-established framework of the Avalanche Atlas.

Taken together, these steps illustrate both the feasibility and the remaining open questions of a harmonized avalanche classification linking size, genetics and morphological characteristics. Observations remain key to grounding any proposed scheme in real avalanche behavior, and continued plausibility checks, whether through experimental or computational approaches, will be essential to validate and refine the proposed values.

A further open question concerns the communication of avalanche size itself: the event- and path-size concept introduced here already renders the separate communication of relative size largely redundant, since relative size can be derived directly from the interaction of event and path size (Equation 3). However, it remains difficult to identify a single communication scheme that simultaneously captures the three size criteria - dimension, runout, and destructive size - together with the event- and path-related nature of avalanche size.

Further open questions or tasks include: The path- and event-size concept introduced here forms one part of a broader dual-structured framework distinguishing permanent, path-related attributes from event-specific characteristics, which still requires full integration across the size, genetic, and morphological classifications. Similarly, refining morphological classification for flow regimes, including a comprehensive representation of transitional flow regimes, remains an open task. On the genetic side, expanding the classification to connect more explicitly with recognized avalanche problem types, and relating both genetic and morphological classification to the prevailing snow or avalanche climate, are identified as key open questions by the working group; a consistent, internationally accepted definition of avalanche and snow climate zones in particular remains to be established. Beyond the size and flow-regime classification presented here, a complete update of the Avalanche Atlas will also need to consider how other applied classification schemes relate to and complement the genetic and morphological classification, such as avalanche problems in relation to avalanche genetics, or avalanche terrain classifications, such as the Avalanche Terrain Exposure Scale (ATES) Statham and Campbell (2025), in relation to avalanche morphology and size. Integrating these applied schemes into a coherent overall framework remains an important open task for the working group.

As a main goal, the IACS working group aims to develop a standardized avalanche documentation template that integrates the updated size, genetic, and morphological avalanche classification into a single, consistent record, similar in spirit to the profile-based documentation established for snow stratigraphy within the International Classification for Seasonal Snow on the Ground (Fierz et al. 2009). Such an avalanche profiler would build on the dual-structured, path- and event-related documentation framework outlined by the working group, providing a systematic, field-based tool for recording avalanche characteristics consistently across events and study areas. The presented work is intended as a starting point rather than a final, all-encompassing classification scheme. We explicitly invite the international avalanche community to engage in this discussion, to challenge and refine the proposed concepts, and to contribute toward a modernized, harmonized International Classification of Avalanches that can serve researchers, practitioners, and educators alike. The framework will potentially support hazard and risk management practice, fostering standardized and accessible exchange of avalanche information. A modernized, harmonized International Classification of Avalanches will allow researchers, practitioners, and educators worldwide to work with a coherent, scientifically robust, and widely accepted system — strengthening safety, research quality, and cross-border cooperation in mountain regions.

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