

Supplement of The Cryosphere, 14, 737–750, 2020  
<https://doi.org/10.5194/tc-14-737-2020-supplement>  
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*Supplement of*

## **On the relation between avalanche occurrence and avalanche danger level**

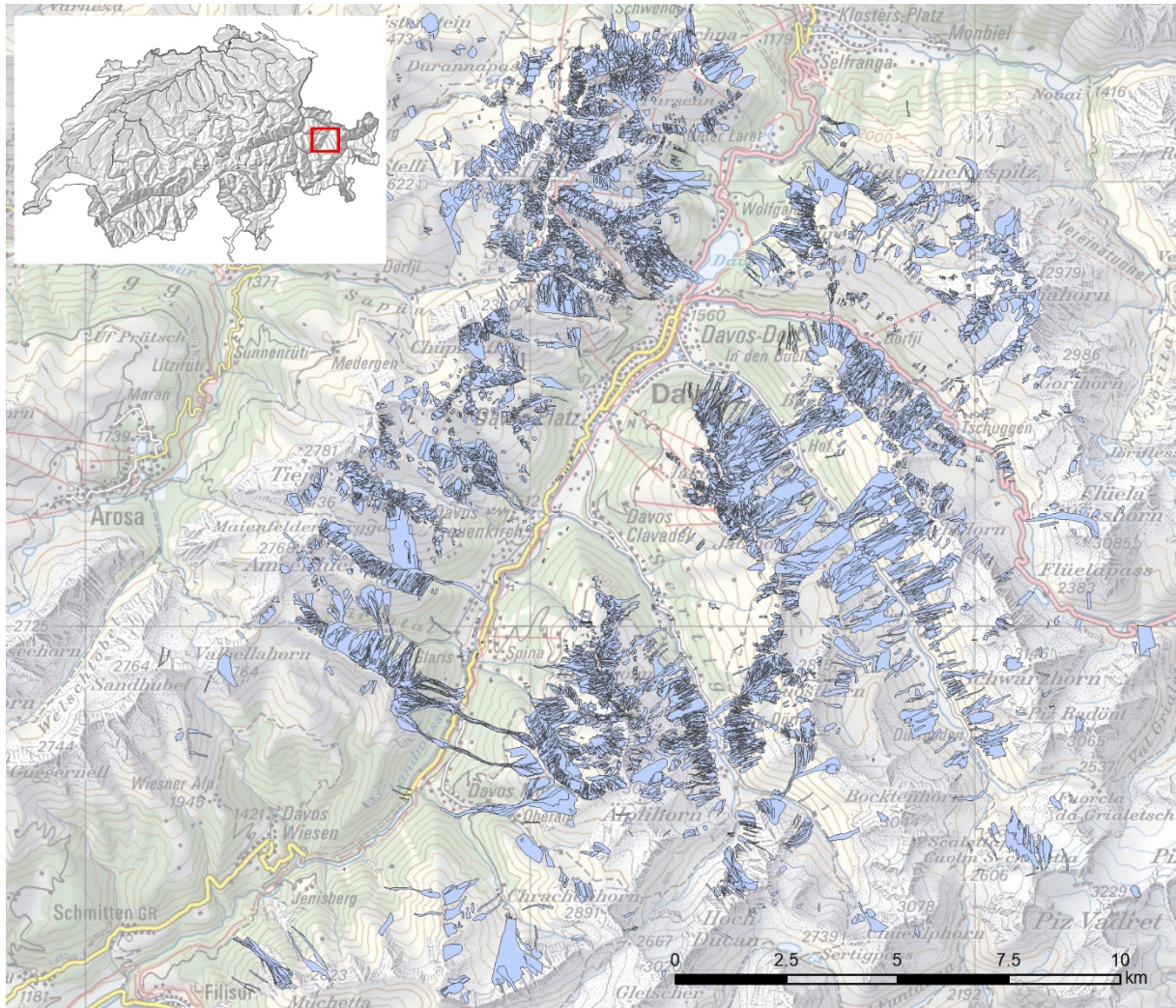
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## 1. Study area

The study area with the mapped avalanches is shown in Figure S1.



**Figure S1: Study area around Davos (Eastern Swiss Alps, see inset) with all mapped avalanches ( $N = 13\,918$ ) observed during the winters 1998–1999 to 2018–2019.**

## 2. Correction procedure

In the following we describe the correction procedure and provide a table showing all the changes (Table S1).

The procedure and the criteria are as follows:

1. We evaluated all days with danger levels 4–*High* or 5–*Very High* and a value of the AAI  $\leq 1$  (“zero or unusually low”).
2. We evaluated all days with danger level 3–*Considerable* and a value of the AAI  $> 13.6$  (after the first correction step), which was the median AAI for the days with danger level 4–*High* or 5–*Very High*.
3. We evaluated all days with danger level 2–*Moderate* and a value of the AAI  $> 1$ , which was the median AAI for the days with danger level 3–*Considerable*.
4. We evaluated all days with danger level 1–*Low* and value of the AAI  $> 1$ .

**Table S1: Frequency of danger levels before and after corrections. Also given are the changes per danger level.**

Danger level	Number of days before corrections	Change of danger level					Number of days after corrections
		-2	-1	0	+1	+2	
1–Low	306	-	-	303	1	2	303
2–Moderate	1809	-	0	1765	32	12	1766
3–Considerable	1367	0	0	1310	57	-	1366
4–High	47	0	21	24	2	-	94
5–Very High	4	1	1	2	-	-	4

### 3. Avalanche size distribution per danger level

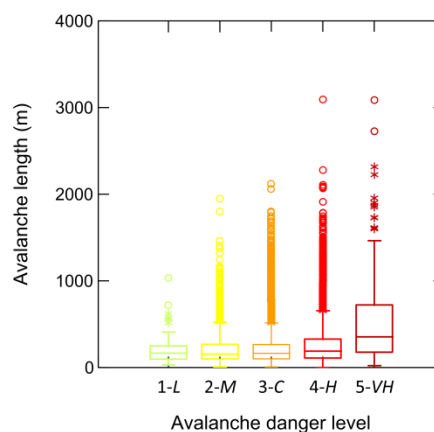
The distribution of avalanche sizes per danger level was statistically compared with a pairwise Mann–Whitney *U*-test. The resulting *p*-values are given in Table S2.

**Table S2: Statistical test results for pairwise comparison of avalanche size distributions between the danger levels: *p*-values are shown obtained with Mann–Whitney *U*-Test.**

	1–Low	2–Moderate	3–Considerable	4–High	5–Very High
1–Low	1	0.568	0.442	0.047	<0.001
2–Moderate	-	1	0.392	<0.001	<0.001
3–Considerable	-	-	1	<0.001	<0.001
4–High	-	-	-	1	<0.001
5–Very High	-	-	-	-	1

### 4. Avalanche length

The distribution of avalanche length is shown in Figure S2 for each of the five danger levels.



**Figure S2: Avalanche length per avalanche danger level. Boxes span the interquartile range from first to third quartiles with a horizontal line showing the median. Whiskers show the range of observed values that fall within 1.5 times the interquartile range above the third and below the first quartiles. Asterisks and open circles refer to outliers and far outliers beyond the fences (N=13 745).**