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Earth System Science Data Discussions

Interactive comment on "A meteorological and blowing snow dataset (2000–2016) from a high-altitude alpine site (Col du Lac Blanc, France, 2720 m a.s.l.)" *by* Gilbert Guyomarc'h et al.

Anonymous Referee #2

Received and published: 18 July 2018

The paper describes the meteorological and blowing snow dataset collected at Col du Lac Blanc (2720 m a.s.l.) in the French Alps. This data consists of wind speed and direction, air temperature, snow depth, blowing snow fluxes and occurrence periods, spanning the period from 2000/2001 until 2015/2016. The data is complemented with local atmospheric reanalysis from SAFRAN, and a digital terrain model with 20 cm resolution. All data are now available for the public, the dog's are given.

The paper is a very welcome contribution for the ESSD Special Issue: Hydrometeorological data from mountain and alpine research catchments, and for the scientific community of snow scientists. However, I recommend some improvements prior to

final publication.

General aspects:

- my major concern is that in the way it is presented, the comparison of the database of blowing snow occurrence and the SPC is not meaningful (2.3.1, 2.3.2 and 2.3.3). Both data sources make use of more or less empirical thresholds to classify a period as blowing snow occurrence, or to count the percentage of time during which particles are detected by the SPC, respectively. There is no better or worse of the two methods, they are only different and, due to the threshold values chosen, provide different results. Why do you choose thresholds in a way that the results become such different? The possibilities for improvement that I see here are (i) just present the two datasets "as is" without comparison, (ii) explicitely justify the choice of all thresholds, and explain the difference in the results, (iii) calibrate one method with the other, or (iv) leave the empirical database out und just provide a reference. In any case, always distinguish clearly physical processes from empirical estimates. Finally, it is not clear who the original author of the database methodology is, Guyomarc'h and Merindol (1998) or Vionnet et al. (2013)?

- my second major concern is a thorough discussion of the (very important) scale effects of blowing snow, and which ones are observed at Col du Lac Blanc. This should be an original paragraph in the introduction

- the fact that the data collection continues and new measurements will follow and be made available should be mentioned in the beginning of the paper, not at the end (in section 4)

- in figure 1 (the maps) the color scheme/contour lines should be improved: certain altitudes should be associated with a contour line, not with a color. The latter should be associated with an altitudinal range. In this map figure, the typeface and size should be harmonized. In the legend, "Automatic stations" should be "Automatic weather stations", or simply "AWS"

- Table 3 is more confusing than helpful; is there not better way of presenting these numbers?

- the reference section is full of type inconsistencies and mistakes. This entire section needs complete revision (should have been checked prior to submission)

- the use of lowercase and uppercase letters needs revision in the entire manuscript

Details:

- line 20: "Snow Particle Counter“ in uppercase: why? Is this the name of the device? I would recommend "snow particle counter (SPC)“, and use "SPC“ only in the following text

- line 21/22: give the date when resolution changes

- line 28: avoid references in the abstract

- line 33: insert "atmospheric“ between "concurrent“ and "snowfall“

- line 51: "SPC“

- line 72: insert "weather“ between "automatic“ and "stations“

- line 90: better "a“ instead of "the“ ("detailed view“)

- Table 1: remove the dot after "direction“

- Table 2: remove the dots in the units, insert space in "4.8m“

- line 133: the availability of the AWS Muzelle data given here does not match the one given in table 2

- line 1390: remove dot in "m.s-1“

- line 142: insert dot after "process“

- line 145: replace "Sect.“

- line 162: better remove "but its power consumption is higher“ - this is another issue of no relevance here

- entire section 2.2.4: make clear if the SAFRAN data presented here origins in an "analysis“, or in a "re-analysis“, and use the correct term then everywhere

- line 181: "SPC“

- line 183. insert "snow“ between "blowing“ and "occurrence“

- line 184: replace "of the period“ with "in the period“, and add at the end of the sentence where the sensor was established. Replace "consists in“ with "consists of“

- line 186: replace "was“ with "is“, make "event“ plural ("events“)

- line 188: better "relies“ instead of "relied“, and "requires“ instead of "required“

- line 189: replace "datasets“ with "meteorological occurrences“

- line 191: better formulate "Periods of ground snow transport with concurrent snowfall are identified first“

- line 196: do you mean a logarithmic law? If yes, write the entire word and avoid abbreviations

- line 204: how did you choose the threshold of 4 hours? The results depend on it!

- line 207: does this correspond to the sum of the two columns in a winter season? Indicate this in the text. Avoid to write "blowing snow occurred“ in the context of the empirical method with the threshold, since the process of blowing snow probably occurred much more often! (i.e., write something like "blowing snow periods were classified . . .“)

- line 209: why only "are similar“, should these estimations not be the same as in Vionnet et al. (2013)? What is different, and why?

- line 214: better write "Data from SPC devices“

- line 215: "SPC“

- line 216: insert "a“ between "on“ and "photodiode“

- line 216/217: better make two sentences out of the one

- line 226: "SPC“

- line 227: delete "and risked burying the sensors“

- line 228: better of "the“ SPC

- line 229: delete "being made“. Better write full words, i.e. "That is why“

- line 235: insert "the“ between "approximate“ and "averaged“

- line 338: correctly align the minus in the formula

- line 244: delete "case of“, add "speed“ (?) after "wind“

- line 248: delete the "s“ at the end of "particles“ (-> singular)

- line 258: better "the mean horizontal fluxes“

- line 261: "the“ SPC data

- line 263: "The“ SPC

- line 265: "in“ the period

- line 266: "the“ SPC

- line 266: . . . able to "identify trace“ precipitation . . . ? Please clarify!

- Figure 4: add unit to y-axis and format typesetting properly. In the figure caption, better write "during“ the period, and "delivered by the SPC“. . .

- line 279: this "calls“ for

- line 281: better "That is why“

- line 282: "applied for the raw data“, with "a particle flux smaller . . .“ (singular)

- line 283: "Then a similar data processing. . .“, and: why "similar“, and not "the same“. Explain the difference, if it exists!

- line 284: "a“ direction threshold. Delete "parameters“

- line 285: "with different thresholds“

- line 293: "to the SPC“

- line 295: "blowing snow occurrence“

- line 309: site "for the last six snow seasons“

- line 334: better "of“ the different stations

- line 341: "The data of the winters. . .“

- line 350: "SPC“

- line 358: delete comma

- line 359: better "who“ instead of "which“

Good luck, a very nice peace of work!

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