

Interactive comment on “Sodankylä manual snow survey program” by L. Leppänen et al.

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There are currently quite a few initiatives aiming at a better harmonization of snow measurement methods and making data from observation sites available openly, for example the COST Action HarmoSnow (<http://harmosnow.eu>) already mentioned by H. Löwe in his review or the WMO initiative Global Cryosphere Watch (<http://globalcryospherewatch.org>). This paper represents an important contribution with this regard as the FMI Arctic Research Center at Sodankylä plays an active role in both initiatives.

This site provides data from long-term records of basic snow-cover properties, for example snow depth, as well as more recent detailed and regular snow-cover observations (snow profiles). Compared to other sites the latter program presents the particularity of having considered modern measurement methods from the beginning to be used in regular observations. I think this should be stressed even more in the paper.

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Nevertheless, in the spirit of the initiatives mentioned above, I would suggest the authors comply as much as possible with internationally agreed standards (see detailed suggestions below). The International Classification of Seasonal Snow on the Ground (ICSSG) that the authors reference in the paper is such a standard. Indeed, in a 2011 resolution about ICSSG (<http://www.iugg.org/resolutions>), the International Union of Geodesy and Geophysics urges “snow and ice scientists, practitioners, and scientists from related disciplines to adopt these new schemes as standards.” However, if new methods not mentioned yet in ICSSG are used to determine ‘traditional’ snow layer properties, for example grain size, the method should be accurately described (see detailed suggestions below).

Finally, please find below a few detailed suggestions that are intended to improve a valuable paper:

p. 406, line 6: “snow depth (SD)” Following ICSSG, I’d suggest to use the abbreviation ‘HS’ instead of ‘SD’ for snow depth.

p. 406, line 18: “water content” I guess you mean Snow Water Equivalent (SWE).

p. 408, lines 11–19: Here it sounds like both HS and SWE were measured from 1909 on. In Table 1, however, you mention only HS being measured since 1911. Please resolve apparent inconsistency.

p. 411, lines 9–10–25–27: “postprocessed traditional grain size (E and E_{max})” My impression is that this post-processed grain size is not equivalent to the ICSSG definition “The classical grain size E of a snow layer is the average size of its grains”, that is a layer property but not that of single particles. Here I would expect a more precise description of the method used and why you chose to do so.

p. 411, line 13: “bulk SWE” Why bulk? Snow Water Equivalent by definition corresponds to the mass per unit area of the full snow cover.

p. 412, line 14: “it is usually observed” Using the snow fork is one of many methods to determine Liquid Water Content (LWC). Make it clear.

p. 414, line 10: Grain size, according to ICSSG, is a layer property (see above). If you apply it to the whole snowpack, you should explain why and how you do it, for example

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whether you apply a depth average, etc.

Figure 5: It looks like the ordinate (snow depth axis) is up side down here. Isn't it?

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