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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Relating weak layer and slab properties to snow slope stability" *by* J. Schweizer and B. Reuter

Anonymous Referee #1

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General comments: The manuscript describes a newly developed stability index derived from SMP-measurements. It combines weak layer strength (micro-structural strength) with a rough measure of the additional stress. The authors figured out that the index was positively correlated with the results of compression tests (performed concurrently with the SMP-measurements) and that it discriminated well between point stabilities rated as either 'poor' or 'fair' and those rated as 'good'. Although some problems could not be solved (e.g the corresponding variations in point stability to slope stability) it seems that the index is able to emulate some of the complex interactions between slab and weak layer properties. The paper contains the first relating quantitative investigation in this field and is an important contribution for a better understanding of snow stability; it can be accepted with minor revisions.

Specific comments and technical corrections:

page 4688, on line 2 the authors refer to the SABRE penetrometer; it would be nice to cite the corresponding paper from Mackenzie (2002).

page 4690, equation (1: the unit of energy is Nm; in this sense the first term (Fu*umax) is correct, but the second term (Fu2/2K) yields Nm2.

page 4691, line 4: ea is indicated with 0.036 Nm, while ea in Fig. 2 is denoted with 0.0036 Nm; the authors should check the correct value.

page 4691, equation (4): does $\Delta\sigma$ correspond to $\Delta\sigma$g (as indicated on line 19 of the previous page)?

page 4691, line 21 -24: the authors should specify the relation between the new index and the classical index (a table with the corresponding values would be worthwhile).

page 4694, line 11: delete the last 'in' at the end of the line.

Table 1: does this table result from the authors investigations or is it a citation? (according to my state of information the common CT scores are: easy: CT 1- 10; moderate: CT11-CT20; hard: CT21-CT30). It would be worthwhile to explain the abbreviations for the fracture character: SP. . .sudden planar, SC. . .sudden collapse, RP. . .resistant planar, PC. . .progressive compression, B. . .non-planar break.

Table 3: The caption should include a short legend that IQR means 'interquartile range' and QVC means 'quartile coefficient of variation'.

Figure 1: The second sentence of the caption should read as follows: 'K denotes the elastic modulus (after Wright, 2012)'

Figure 2: ea is indicated here with 0.0036 Nm, while ea in the text (page 4691, line 4) is denoted with 0.036 Nm; the authors should check the correct value. The dashed lines in Figure 2 are hardly to read.

Figure 3: How does the stability index on the y-axis relate to the classical index (see my previous remark)?

Figure 4: How does the stability index on the y-axis relate to the classical index (see my previous remark)? The second sentence of the caption should read as follows: 'Dashed line indicates the split value (212) for the classification. . .'

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 2, 4685, 2014.