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Interactive comment on “Point observations of liquid water content in natural snow – investigating methodical, spatial and temporal aspects” by F. Techel and C. Pielmeier

Anonymous Referee #1

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The paper addresses the problems with making objective field measurements of snow wetness. The study seems well conceived and contributes to our knowledge on the topic. Regarding the the general structure and content of the paper my assessment is as follows:

1. Does the paper address relevant scientific questions within the scope of TC? Yes 2. Does the paper present novel concepts, ideas, tools, or data? Yes (data) 3. Are substantial conclusions reached? Yes 4. Are the scientific methods and assumptions valid and clearly outlined? Mostly, yes 5. Are the results sufficient to support the interpretations and conclusions? Partly, yes 6. Is the description of experiments and calculations

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sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)? Yes 7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution? Yes 8. Does the title clearly reflect the contents of the paper? Yes 9. Does the abstract provide a concise and complete summary? Yes 10. Is the overall presentation well structured and clear? Mostly, yes 11. Is the language fluent and precise? Mostly, yes 12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? Yes 13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? No 14. Are the number and quality of references appropriate? Yes.

Specific comments and suggestions for clarifications/corrections::

1970:18 the sentence "Wet snow metamorphism is faster when the water content is higher" may be a bit too general if you include a completely water saturated snowpack, i.e slush.

1972: The Sommer instrument could have been mentioned here (Sommer Mess-Systemtechnik. 2010. Snow Pack Analyser (SPA) zur Bestimmung des Schneeswasseräquivalents und des Flüssigwasseranteils)

1987:11 "a basic classification can facilitate the description of the snowpack wetness, in particular for practical purposes." Here it could be specified more which practical purposes the authors have in mind.

1980:2 "The wetness in layers consisting of coarse melt-freeze particles (MF, snow class MF, Fierz et al., 2009) is more frequently falsely estimated(33% of cases) than in layers consisting of fine precipitation particles and snow which has undergone low-temperature gradient metamorphism (LTG, snow classes PP,DF,RG, 13%) or coarse medium to high temperature gradient metamorphosed grains(TG,snow classes FC, DH, 13%). Neither hardness nor grain size seem to influence the correct estimation of the water content."

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-The last sentence here ("..nor grain size..") seems to contradict some of what is stated in the previous sentence about layers of "coarse melt-freeze particles" being more frequently falsely estimated than "fine precipitation particles".

1980:21 "The results indicate that in particular grain shape (and size) and layer hardness may unconscientiously influence even experienced observers when estimating the liquid water content."

-"unconscientiously" should probably be changed to "unconsciously".

Page 1987:5 "With continued water infiltration the snowpack will be fully wet and homogenize."

-"homogenize" should probably be changed to "homogenous".

1981:17 "These measurements show that there is considerable uncertainty due to spatially heterogeneous water distribution in the initial part of the melt-phase. Even if we are considering just the six observations, where overall snowpack wetness decreased during the day, this represents almost 20% of the measurements."

-here it seems that a clarification could be made regarding to what the uncertainty refers to (distribution?)

Interactive comment on The Cryosphere Discuss., 4, 1967, 2010.

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