

Interactive comment on “Spectral albedo measurements over snow-covered slopes: theory and slope effect corrections” by Ghislain Picard et al.

Anonymous Referee #2

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General assessment ===

In this manuscript, Picard et al. describe various correction procedures for broadband and spectral albedo measurements performed over sloping surfaces. Out of many possible assumptions and simplifications, they opt for a theoretical treatment differentiated by surface conditions of the horizontal far-field (dark or snow-covered) and location of the observation platform (mid-slope or near the top of the slope). This yields a matrix of 4 possible correction procedures.

Several practical recipes are provided for slope corrections, depending on the available information (e.g. slope parameters, time series, etc.)

C1

The combination of rigorous theoretical approach and practical applicability makes this a very useful and accessible text for anyone involved in observations of (spectral) albedo in sloping terrain.

I recommend publication of this article in The Cryosphere following only textual improvements detailed below.

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P1L4 properties -> processes

P1L8 appointment -> partitioning

P1L20 barely invisible -> barely visible or almost invisible

P2L5 such as -> such that

P2L7: an -> the

P2L20: I understand that this is a sensitive remark, but Pirazzini (2004) is an appropriate example of a publication where slope effects are mistakenly interpreted as a diurnal change of snow properties, so this could be cited here.

P2L25 insert comma after "Similarly"

P2L30 Suggest "Such an accuracy cannot be achieved in practice, because the measurement"

P3L11: algea -> algae

P4L3: I understand what you want to say here, but as it is formulated, it is not correct. Suggest "and to this end, analytical formulations using simplifying assumptions are preferred at the cost of model complexity."

P5 and further: I would like you to make sure that you mean to write \dot{E} instead of E' (similarly with $\dot{\theta}$ instead of θ')

C2

P6L2: titled -> tilted

P6L11: an horizontal -> a horizontal

P6L11 and L13: cover -> surface type

P7L15: slightly slopes -> small slopes or gentle slopes

P7L20: perhaps this is a good place to reiterate once more the meaning of the abbreviations: D and S for dark and snow, and M and T for mid-slope and top measurements.

P8L19: moderately -> moderate

P12L25: Suggest "The slope effect is largest under direct illumination, which occurs most in the near-infrared domain under clear-sky conditions."

P13L7: superficial -> near-surface (also P16L9)

P14L1: slopes -> slope

P14L19: at last -> lastly

P14L33: perhaps this is a good place to insert the possibility of drone-derived DEMs of small areas in order to compute surface slope in a non-invasive way.

P16L13: variable -> mixed

P18L20: systematically -> systematical

Figure 3: suggest to discriminate more between blue and gray

Interactive comment on The Cryosphere Discuss., <https://doi.org/10.5194/tc-2019-267>, 2020.