

Response to Interactive comment on “In situ continuous visible and near-infrared spectroscopy of an alpine snowpack” by Marie Dumont et al.

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Authors responses are enlighten in blue. Proposed changes in the manuscript are reported in bold.

The authors measured snow spectral albedo in the visible/NIR range at an alpine site and highlighted the effects of snow specific surface area, impurity content, presence of liquid water, and slope on variations of spectral snow albedo. I have a short comment. In addition to the factors mentioned by the authors, recent studies also showed that snow grain shape and how impurities mixed with snow grains are two critical factors in determining snow albedo (e.g., Liou et al., 2014; He et al., 2014). I suggest including these references and adding some discussions on this aspect, which would be very interesting.

References:

Liou, K. N., Takano, Y., He, C., Yang, P., Leung, L. R., Gu, Y., and Lee, W. L.: Stochastic parameterization for light absorption by internally mixed BC/dust in snow grains for application to climate models, *J. Geophys. Res.-Atmos.*, 119, 7616-7632, doi:10.1002/2014jd021665, 2014.

He, C., Li, Q. B., Liou, K. N., Takano, Y., Gu, Y., Qi, L., Mao, Y. H., and Leung, L. R.: Black carbon radiative forcing over the Tibetan Plateau, *Geophys. Res. Lett.*, 41, 7806-7813, doi:10.1002/2014gl062191, 2014.

The authors are grateful for this interesting comment. The authors agree that grain shape and location of impurities with respect to the ice matrix are critical factors in determining snow albedo. In this study, B shape factor was set to constant in agreement with results shown in Libois et al., 2014 and impurities are assumed to be outside of the ice matrix.

These assumptions are discussed in the introduction of the manuscript (page 2, line 11 for grain shape and page 2, line 18 for the location of impurities). We have now added the two above-mentioned references in the manuscript introduction.

A sentence on these limitations has also been added in the last section of the manuscript (page 14, line 3).

“The influence of surface roughness, incident and reflected radiations **and of the location of the impurities with respect to the ice matrix** deserves future work.”