Interactive comment on "Concentrations and source regions of light absorbing particles in snow/ice in northern Pakistan and their impact on snow albedo"

by Chaman Gul. C et al.

Short comment by Cenlin HE

a) I have a minor comment related to the snow albedo calculations including aerosol contamination. The authors used the SNICAR model to calculate snow albedo contaminated by aerosols. If I understand correctly, the authors assumed external mixing of snow and aerosols as well as spherical snow grains. I suggest that the authors explicitly state their assumptions here.

b) Besides, a number of recent studies (e.g., Flanner et al., 2012; Liou et al., 2014; Dang et al., 2016; He et al., 2014, 2017) have shown that both snow grain shape (nonspherical vs. spherical) and aerosol-snow internal mixing play important roles in snow albedo calculations. Particularly, non-spherical snow grains reduces snow albedo reductions caused by light-absorbing aerosols compared with spherical snow grains, while aerosol-snow internal mixing significantly enhances snow albedo reductions compared with external mixing. It will be helpful if the authors could include these recent studies and add some discussions on this aspect.

Response:

a) Thank for a minor but valuable comment on our manuscript. Yes we explicitly stated the assumptions in the revised manuscript (line number 138, 464-475).

b) The mentioned references are really interested, indicating role of snow grain shape and mixing of aerosol with snow. Thank you to provide us the related references and we have added some discussion on the basis of these references and cited all the provided references.

Thank you