Anonymous Referee #3

The work is well prepared and presented. I recommend accepting it after minor technical corrections.

R: We are very grateful for the referee's positive comments. The followings are our point-by-point responses to the comments. Our responses start with "R:".

1. Figure 1. There are some colour blocks in the figure 1. I don't know the purpose of these blocks. Could the author clarify them?

R: We have added the caption of the color blocks in revised Figure 1.
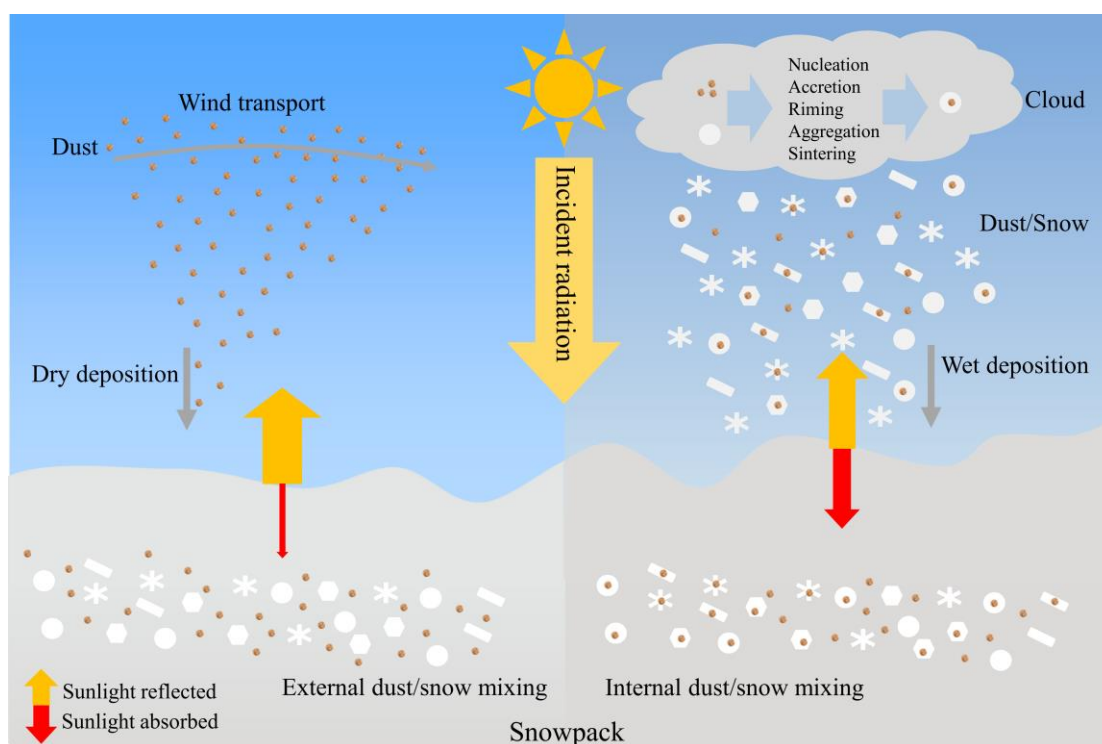
Figure 1. Schematic of dust mixing with snow grains internally. Dust tends to mix externally with snow grains through dry deposition and/or below cloud scavenging, while dust–snow internal mixtures can be produced by nucleation, accretion, riming, aggregation, and sintering during aerosol–cloud–precipitation processes known as wet deposition. Arrows represent how the absorption (red) and reflection (yellow) of incoming sunlight changes with dust–snow mixing state.

2. The Discussion section is too short to be independent. To well balance the structure, I suggest merging this section into conclusion and form a new Discussion and Conclusion section. Otherwise, the authors need to expand it.

R: We fully agreed with the referee's comments. We have reconstructed the discussion section and highlighted the novelty of this study compared with other studies (Liou et al., 2014; He et al., 2019). Meanwhile, we also carefully evaluated the accuracy of our results by comparison to more rigorous calculations found in He et al. (2019). More details can be found in p. 19, lines 1-12.

3. Ming et al. (2016) in figure 9 and 10 were not involving any content in northern Tibetan Plateau but only Tienshan Mountains. Please check it throughout the manuscript and correct accordingly.

R: We have corrected the inaccurate description and cited another related study by Li et al. (2016).

References:

He, C., Liou, K.-N., Takano, Y., Chen, F., and Barlage, M.: Enhanced Snow Absorption and Albedo Reduction by Dust-Snow Internal Mixing: Modeling and Parameterization, J Adv Model Earth Sy, n/a, 10.1029/2019ms001737, 2019.

Li, Y., Chen, J., Kang, S., Li, C., Qu, B., Tripathee, L., Yan, F., Zhang, Y., Guo, J., Gul, C., and Qin, X.: Impacts of black carbon and mineral dust on radiative forcing and glacier melting during summer in the Qilian Mountains, northeastern Tibetan Plateau, The Cryosphere Discuss., 2016, 1-14, 10.5194/tc-2016-32, 2016.

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, 10.1002/2014jd021665, 2014.