

## ***Interactive comment on “Slight glacier reduction over the northwestern Tibetan Plateau despite significant recent warming” by Y. Wang et al.***

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I have three comments:

1. In the “Introduction” section, the authors missed one important factor that could contribute to the glacier reduction over the Tibetan Plateau, which is the deposition of absorbing aerosols, particularly black carbon. A number of recent studies (He et al., 2014; Liou et al., 2014; Ming et al., 2015; Lee et al., 2016) have shown that black carbon could significantly reduce snow albedo and further causes a positive albedo feedback to accelerate snow melting and glacier reduction over the Tibetan Plateau. Although the aerosol effect is not the focus of this manuscript, it is helpful and necessary to provide readers with a completed picture as a background for glacier reduction over the Tibetan Plateau. Thus, I suggest citing these previous studies and adding

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several sentences to discuss this issue in the Introduction section.

#### References:

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.

Lee, W.-L., K. N. Liou, C. He, H.-C. Liang, T.-C. Wang, Q. Li, Z. Liu, and Q. Yue (2016), Impact of absorbing aerosol deposition on snow albedo reduction over the southern Tibetan plateau based on satellite observations, *Theoretical and Applied Climatology*, 1-10, doi:10.1007/s00704-016-1860-4.

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

Ming J, Wang Y, Du Z, Zhang T, Guo W, Xiao C, et al. (2015) Widespread Albedo Decreasing and Induced Melting of Himalayan Snow and Ice in the Early 21st Century. *PLoS ONE* 10(6): e0126235. doi:10.1371/journal.pone.0126235

2. In the “Data and Methods” section, the authors should discuss the uncertainty associated with the datasets used in this study, particularly satellite datasets, because it is critically important for the analysis and understanding of the results. For example, if the datasets have large uncertainties, the conclusion (e.g., slight glacier reduction) may not be valid and robust. Please add some descriptions on the uncertainty.

3. In the “Discussion” section, the authors mentioned that “Difference in glacier variation at different regions may be related to a larger-scale meteorological or climatic feature, and peculiarities of the regional topography or glacier attributions.” As stated in my first comment, another important factor affecting glacier variation could be black carbon deposition on snow. Please add some discussions on this aspect.

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Interactive comment on The Cryosphere Discuss., doi:10.5194/tc-2016-165, 2016.

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