

Interactive comment on “How much can we save? Impact of different emission scenarios on future snow cover in the Alps” by Christoph Marty et al.

C. He

cenlinhe@atmos.ucla.edu

Received and published: 1 November 2016

The authors assessed the future projection of snow depth in the Alps by accounting for future temperature and precipitation change under different emission scenarios. The results are interesting and can advance our understanding in the impact of climate change on mountain snow. Here, I have a short comment. Several recent studies (e.g., Painter et al., 2013; Liou et al., 2014; Lee et al., 2016) found that deposition of light-absorbing aerosols (mainly black carbon and dust) substantially decreases snow albedo, which further reduces snow depth and cover. However, this factor has not been considered by the authors in the future projection, which could play an important role. It would be helpful if the authors could include some discussions on these recent findings and the uncertainty due to this aerosol-snow effect in the projection of snow depth.

Printer-friendly version

Discussion paper



References:

Lee, W.-L., K. N. Liou, C. He, H.-C. Liang, T.-C. Wang, Q. Li, Z. Liu, and Q. Yue: 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, 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, doi:10.1002/2014jd021665, 2014.

Painter, T. H., M. G. Flanner, G. Kaser, B. Marzeion, R. A. VanCuren, and W. Abdalati, End of the Little Ice Age in the Alps forced by industrial black carbon, *Proc. Natl. Acad. Sci. U.S.A.*, 110(38), 15,216–15,221, doi:10.1073/pnas.1302570110, 2013

[Interactive comment on The Cryosphere Discuss.](#), doi:10.5194/tc-2016-230, 2016.

[Printer-friendly version](#)[Discussion paper](#)