

Interactive comment on “Snowfall in the Himalayas: an uncertain future from a little-known past” by E. Viste and A. Sorteberg

Anonymous Referee #1

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Snowfall in the Himalayas Viste and Sorteberg

The authors in this study collate evidence that our present day knowledge of snowfall across the Himalayas is highly uncertain based on a variety of spatially explicit data sources. They extend this to include climate model projections from CMIP5 to make projections of snowfall in the region in the 2080s under climate scenarios RCP2.6 and RCP8.5. Overall, in my opinion the scope and aims of the manuscript are timely and of wide interest to the research community.

The first part of the manuscript focuses on present day snowfall. In my opinion this is a good effort at understanding present day snowfall across the Himalayas and associated uncertainty, which are large. This in itself is a worthy result.

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The second part focuses on projected climate change. This is done using bias corrected climate data from CMIP5 simulations. The first question this raises, is why immediately bias correct? It seems the snowfall product provides an excellent basis for assessing the performance of the climate models at their original coarse resolution and snowfall data is available from CMIP5. A need for bias correction may become clear from this assessment, or this may already be clear to the authors.

Further to this, in the bias correction for future change the authors use the absolute change in temperature and the 'fractional' change in precipitation. Thus implying that in the case of temperature the change is independent of any present day bias. However, in the case of precipitation a model with a high bias now will have a biased high precipitation change. The reasoning for this approach is not clear within the text - however it most likely breaks the physical consistency in the future climate projections, something the authors point to in the use of reanalysis data. I would like to see a plot of the anomaly against present day bias to justify the 'fraction' approach as well an attempt using the 'additive' approach consistent with temperature. I would also like to see the bias correction applied to a different baseline dataset sampling the low end uncertainty in snowfall. It may be that given this variety of approach and sampling of uncertainty leads to a larger uncertainty in future snowfall.

Interactive comment on The Cryosphere Discuss., 9, 441, 2015.

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