The Cryosphere Discuss.,
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The Cryosphere Discussions

Interactive comment on "Osmium isotope and trace elements reveal melting of Chhota Shigri Glacier, western Himalaya, insensitive to anthropogenic emission residues" *by* Sarwar Nizam et al.

Anonymous Referee #2

Received and published: 27 November 2020

First, I am very sorry that this review is so late. Second, I am even more sorry that my review is so negative.

The introduction to the paper is poorly focused. The paper is trying to ascertain the level of anthropogenic pollution in the catchment via an analysis of cryoconite, moraine, coal and diesel exhaust. The conclusion is that there is little evidence of pollution, and I think that this may be because the sampling and methodology may be not fit for purpose. I could be very wrong, but the text does not provide a convincing argument that the sampling and methodology is fit to deliver the aims and objectives of the paper.

First, which pollutants are you most interested in and why have you selected these?

Second, how will you know if these pollutants are above naturally occurring levels on your glacier?

Third, why should cryoconite be polluted relative to the local rock you sample? What assumptions do you make and have you tested any of them?

Fourth, how much variability is there in the pollutant content of coal and diesel? Are your samples representative of the pollutants being deposited on the glacier from these sources?

Fifth, why aren't you using sequential extraction, rather than analysis of whole rocks only, to look for evidence of trace metal pollution. Cryoconite has a large mineral component from melt out debris and local aerosol. Don't you have a problem of signal to background to contend with? Whole rock digestion will bias your results to a comparison of these minerals to the rock samples you collected from the moraine.

Finally, you need to be very clear about why and for what purpose you are using the isotopes you employ. It is unclear from the introduction why do include these data.

Where I am is that I am unsure about the conclusions you reach, given the lack of justification of the methodology and sampling you have undertaken.

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