

Interactive comment on “Applying artificial precipitations to mitigate the melting of the Muz Tau Glacier, Sawir Mountains” by Feiteng Wang et al.

Feiteng Wang et al.

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General Comments This paper is well written and provides good scientific evidence on the impact of artificial precipitation on glacial mass balance. Although, the experiment setup being novel, requires further context in the paper. Even though the paper provides compelling evidence by quantifying the impact of 2 artificial precipitation events, the 13-day measurement duration is too short to provide sufficient evidence for the hypothesis suggested.

Re: We thank the referee for the valuable comments which are believed to be greatly helpful for improving the quality of the manuscript. The work itself is preliminary and

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needs more data to consolidate the current knowledge in future. We have plan to apply for funding for carrying out more intensive experiments in this glacier and/or other glaciers. We also include these concerns in the revised manuscript.

Specific Comments

1. Given that the premise of the paper is to measure the effect of artificial precipitation, little effort has been taken to distinguish or categorize precipitation events as artificial and natural. There needs to be a control experiment without igniting the smog generators to compare the difference in precipitation quantities. References are also lacking to categorize the precipitation events as "artificial".

Re: Thanks. We added the description including a new figure on how we operated the AgI smoke generators and when the AWS recorded the consequent snowfalls in the revised manuscript. There were significant snowfall amounts recorded by the AWS every single time after we ignited the smoke generators. We could not completely distinguish the artificial snowfalls from the natural one if they were mixed in all these events. However, the co-occurring of the snow falling with the AgI smoke allows us to affirm that we were producing some artificial snowfall. The reply has been integrated into and underlined in the revised manuscript.

2. The albedo decay of the artificial precipitation and the snow quality data is required to claim a long-term glacier mass balance impact. These need to be factored in the hypothesis mechanism. Particularly, the variation in the likelihood of a precipitation event occurring with or without a smog generator needs to be quantified or referenced.

Re: Yes, thanks. These concerns have been added to the relevant context. As we addressed in the aforementioned reply, this is a very preliminary experiment and need further studies to validate our method and theory. However, we include these new ingredients in our revised manuscript.

Technical Corrections

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1. Lines 126 to 137 which describe the AWS instruments can be better presented in the form of a table.

Re: Thanks. We made a new table (Table 1) for the advice.

Interactive comment on The Cryosphere Discuss., <https://doi.org/10.5194/tc-2019-269>, 2019.