

Interactive comment on “Tracking the impacts of the Aru glacier collapses on downstream lakes” by Yanbin Lei et al.

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Although the manuscript is generally clear and well-organized, here I raise a few issues in hoping to improve the clarity and to target the research objective better.

Response: Thanks very much for the constructive comments and suggestions. We will carefully revise the structure of manuscript according to the comments.

(1) The organization of the Results part should be adjusted to focus on the evaluation of the glacier collapse influences. In Section 4.1, the description of Aru Co, Memar Co, and their hydrological connection can be moved to the part of the Study area.

Response: Thanks for the good suggestion. We will re-organize the structure of the paper. Result part will mainly focus on the evaluation of the glacier collapse influences.

C1

Lake bathymetry and water storage at the two lakes will be moved to study area section. The impact of the meltwater on the seasonal lake level changes of Memar Co will be discussed in section 4.3. Lake level seasonality and the hydraulic connection will be moved to this part.

(2) In Section 4.4, the impact of glacier collapses and meltwater on surface temperature of two downstream lakes were analyzed. From the LST time series, it can be clearly observed that several degrees of temperature difference occurred before and after the collapse. It can be inferred that the LST differences may be revealed in the spatial pattern of MODIS-derived temperature image varying with the distance from the ice mass input place. It is thus suggested to add the maps showing the spatial pattern of LST effect responding to the glacier collapse.

Response: Thanks for the suggestion. We will try add a now map to show the spatial pattern of LST at Aru Co. Aru Co is narrow and long with a length of 27 km and a width of 1.4 to 9 km. To reduce the contamination from land pixels, only lake pixels beyond 1 km from shoreline were extracted. Therefore, there are limited pixels at the surface of Aru Co and there is no valid data in the central part of the lake of Aru Co because it is very narrow. Because the two ice avalanches were closer to the northern Aru Co, lake surface temperature at the southern half and northern half of the lake was extracted to investigate its spatial difference.

(3) The estimation of the collapsed glacier contribution on the lake water storage increase assumes that all of the collapsed ice mass eventually entered the downstream lakes in the form of meltwater supply. However, the glacier melting in other forms, e.g., evaporation, may need to be discussed.

Response: Thanks for the suggestion. In this study, we assume all the meltwater from the collapsed glaciers entered the downstream lakes. We do not consider evaporation or other kinds of water loss are significant because the two glacier collapses are very close to Aru Co and water loss due to evaporation should be very small and negligible.

C2

