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Reply on RC1

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Author comment on "Baseline data for monitoring geomorphological effects of glacier lake outburst flood: a very-high-resolution image and GIS datasets of the distal part of the Zackenberg River, northeast Greenland" by Aleksandra M. Tomczyk and Marek W. Ewertowski, Earth Syst. Sci. Data Discuss., https://doi.org/10.5194/essd-2021-48-AC1, 2021

Dear Reviewer,

Thank you very much for your positive comments and review. Please, find the response to your comments below:

- **Maybe the authors could add some more discussion on the expected frequency (recurrence intervall) of the high-magnitude low-frequency event presented in this data description paper,**

We added the following information:

The first GLOF at Zackenberg was observed in 1996 and since then floods occurred every year or at the two-year interval (Kroon et al., 2017; Tomczyk and Ewertowski, 2020). The lake, which is the source of GLOF, is located more than 3 km from the current ice margin, so we expect a similar or higher frequency as more water will be melting from glaciers and stored in the lake. Thus, future monitoring is needed to investigate whether the GLOFs will be observed more frequently but with lower discharge magnitude or less often but with higher discharge.

- **and on the quantitative importance of this high-magnitude low-frequency event as compared to low-magnitude high-frequency events in the investigated study site.**

We added the following paragraph:

As the high-magnitude low-frequency events are typically rare and difficult to predict, our understanding of the quantitative aspect of geomorphological changes related to them remains limited compared to the "normal" processes (Tamminga et al., 2015b). These arise particularly from difficulties in collecting high-resolution data before and after these innately unpredictable and rare flood events. However, investigation into the geomorphological response of river morphology to "extreme" events is key to

understanding the evolution of river morphology and being crucial from the standpoint of river modelling and monitoring (Tamminga et al., 2015a; Tamminga et al., 2015b). Moreover, the relationship between the magnitude of the flood and geomorphological effects is not fully understood. For example, in the case of Zackenberg River, immediate (2-days) lateral erosion compared to three-year erosion was spatially very diversified. In some sections, immediate lateral erosion after the 2017 flood reached up to 10 m, whereas the same section was stable between 2014 and 2017, even though higher peak discharges characterised 2015 and 2016 GLOFs than 2017 GLOF (Tomczyk et al., 2020). Further process-based studies are necessary to observe and model links between the magnitude of a flood and the severity of erosion. It is especially important in periglacial landscapes where lateral bank erosion can be responsible for delivering a large quantity of organic matter and widespread changes in ecosystems. especially combined with other weather extreme events (see Christensen et al., 2021)