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Discussions

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Interactive comment on "Lake outbursts of the eastern part of the Larsemann Hills, East Antarctica, through snow and ice dams" by Alina Boronina et al.

Anonymous Referee #1

The manuscript presents the novel interesting data on abrupt water outbursts observed in the eastern part of the Lasermann Hills (East Antarctica) related with lakes blocked by snow/ice dams. It fully confirms the scope of TC journal and has scientific and practical value for understanding GLOF phenomena at the Antarctic Ice Sheet marginal zone and protecting the research stations in the study area. The authors state (lines 9-11) that their aim is to apply "...mathematical modeling methods to shed light on the processes that lead to dam destruction and the outburst of lakes temporarily impounded by natural firn-ice and glacial dams". The model applied allows to estimate flood hydrographs using as input lake bathymetry, water temperature, tunnel length and its entry and exit points elevation. Regretfully, details of the model used are not

given but only a short description with reference to the authors paper published in Russian, that is not enough to allow the reproduction of results. As there are no data on measured hydrographs of outbursts, it is difficult to assess how well the model hydrographs reproduce the reality and how they might shed the light on the processes that lead to dam destruction. The abstract is too general and does not show the major specific findings including key quantitative results, but only states (lines 14-16) that," ... the following characteristics were identified for every outburst: the distribution of the discharges over time, the volume and transmission time of the flood. Moreover, its catastrophic risk and fracture force was assessed". The same is true concerning the Conclusions. The overall presentation is not well structured and clear. The data of observations and measurements are mixed with modelling results in one Section 3 Modelling of the Lake Outbursts. I suggest to give all observational and measurement data in one separate section for all three lakes, and then the modelling section with hydrographs (in one Figure with a,b,c panels) and a summary table with major results of modelling (outburst volumes, duration, maximum discharge). In large, now the manuscript is a kind of raw scientific correspondence with data on bathymetry of lakes and some information on outbursts, rather than a complete scientific article. The manuscript requires a thorough English language and organizational editing.

19-20: the sentence "A part of these water bodies formed as a result of the ponding of tectonic valley depressions and by snowfields as well" is not clear. 24-23: what is amount of snow melting (measured or estimated) in the study area? 54, 106, 126: Meaning of the term "pan" is depression/basin? 94: (Popov et al., 2019, in press) is already published. 115: when and where the water temperature was measured? This type of measurements is not mentioned in the Section 2 Data Acquisition and Processing. 147: Caption of Fig. 6 does not explain two different curves (dashed and solid).