

„Moraine-dammed lake failures in the patagonia and assessment of outburst susceptibility in the Baker Basin“

General comments:

P. Iribarren Anacona et al. presented interesting study dealing with the topic of outburst floods from moraine-dammed lakes in the Baker basin of Patagonia and assessment of outburst susceptibility. From my point of view, this topic is highly actual in the frame of climate change and glacier retreat and surely fits into the scope of NHESS. Generally, paper is understandable, well-structured and language is clear. Text is accompanied by five tables and fourteen illustrative figures. List of references contains 75 records.

My specific comments (see below) are connected especially to the selection and use of outburst susceptibility factors used for assessment of susceptibility to outburst flood. I need authors to explain why they have chosen those factors and clarify their relation to the triggers and mechanisms of outburst floods recorded in this region. I also miss deeper verification of assessment scheme (prove of its ability to distinguish between lakes with different susceptibility to outburst flood). Therefore, I recommend **moderate revision** before publication.

Specific comments:

P4771L12: McKillop and Clague, 2007; please, check through the whole text

P4772L8: Emmer and Vilímek, 2013 in NHESS is review article already published, not for review

P4772L19: From my point of view, lake area (or volume) is not a factor influencing susceptibility of the lake to outburst flood; larger lakes are maybe more hazardous (larger volume of potential flood), but they are not generally more susceptible to outbursts; please explain to which trigger and mechanism of lake outburst is lake area related ??

P4772L22: hydrostatic pressure is not related to the lake area, but to the height of water column (lake depth); hydrostatic pressure affecting the same dams of lake with small area and large lake is equal

P4773L11: “lakes that are expected to grow are more hazardous” – please, explain why ??; from my point of view, growing moraine-dammed lakes are more susceptible to failure, because they are in direct contact with retreating glacier (calving and floating of dead ice), which is overlapping characteristic 2.3.2 Glacier-lake contact; why not to use lake area change rather than slope of glacier terminus indicating lake area change ?? Again, please explain relation of this characteristic to the possible trigger and mechanism of outburst flood.

P4773L17: steep outlets are associated with high dams ?? how ?? please, explain

P4773L20: yes, but it is essential to consider distance (or slope) between lake and glacier (glacier far away from the lake can not caused GLOF even if its slope is steep)

P4774L2: also vegetated slopes can fail; I see significant difference between stability of exposed

solid bedrock slopes and non-cohesive moraine slopes; is this distinguished in presented work somehow ?? I recommend to consider this; from my point of view, this is much more important, than distinguishing between vegetated and unvegetated slopes

P4775L24: Is the use of term “Mass movements“ proper in this section ?? From my point of view, also ice avalanches are a type of mass movements, but this section is focused on slope movement of rocks, right ??

P4778L24: “Drained lakes were dammed by both, steep moraine arcs and relatively flat ground moraines.“ This is casting doubt on considering dam outlet slope as the characteristic with the highest weight (Tab. 4)

P4779L27: All types of mass movements including ice avalanches ?? I suppose, that evidence of ice avalanche can not be visible relatively short time after the event

P4781L2: Are those outburst floods included in analysis of 16 previous GLOFs ??

P4871L4: Section numbering ??

P4781L7: This sentence seems to be rather a discussion than result

P4781L10: Discussion ?? This makes your results seem questionable

P4782L19: Hydrostatic pressure is not connected to the lake growth (change of volume or area), but depth; from my point of view, lake growth itself cannot be considered as a trigger / mechanism of outburst flood; please, reformulate or avoid

P4783L1: I'm not sure about the use of the term “potential energy“ in this context; please, reformulate or avoid

P4783L8: This is interesting point which would deserved more detailed elaboration (kind of verification of outburst susceptibility assessment procedure)

P4783L10: This statement makes use of dam outlet steepness for smaller lakes as the most weighted characteristic questionable

P4783L14: What is meant by “potential freeboard“ ?? In my understanding, dam freeboard = 0 m in case of lakes with surface outflow

P4783L15: Likelihood of dam overtopping is directly related also to the dam freeboard

P4784L7: I do not recommend to relate lake area with dam failure

I'm looking forward to see the next version of the manuscript. In case of any questions, please contact me at emmera@natur.cuni.cz

Yours sincerely

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