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Comment on nhess-2021-281

Christian Beck (Referee)

Referee comment on "Magnitude and source area estimations of severe prehistoric earthquakes in the western Austrian Alps" by Patrick Oswald et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2021-281-RC2>, 2021

The manuscript submitted by P. Oswald and co-author is very well written and organized, and, thus, easy to understand and analyze. It represents a comprehensive investigation regarding a discipline which strongly developed during the last decades: paleoseismology based on sedimentary records (here intra-mountane lakes). The here-presented work is an actual paleoseismology one, including all necessary tools from sedimentological observations, to pure geophysical/ seismological approaches, all parameters discussed with up-to-date statistical approaches. Illustrations are of good quality and referencing is totally relevant to the subject. I hereafter just underline few difficulties faced in the presented investigations.

The concerned area belongs to a complex collision zone with different units themselves having undergone polyphasic tectonics, metamorphism, and granitic magmatism. Thus it represents a set of active faults, often representing re-activation of older ruptures, and of different lithologies. This leads to a difficulty to assess seismic wave attenuation, and size and geometry of an epicentral area (and subsequently the use of the later one in a direct or reverse sense).

Extrapolating the sedimentary records back in time, down to Late Glacial, is off course, precious to extend the paleoseismic archive. Nevertheless, in several alpine lakes where complete coring (down to morainic or pro-glacial complex) could be achieved, a specific pile of very high sedimentation rate (true "varves") has been detected, representing specific depositional process. Thus, a time-equivalence different from the Holocen one, and different behaviour with respect to neighbouring seismicity ?

The defined Scenario B (about 4.1 ky BP) appears as rather strong. Could it be correlated with the strongest reworking event observed in farther lakes (like Annecy ?); thus a very large vent ?