

## Review 5 (Martin Lüthi):

**R5.C1:** A large lake forming on a temperate glacier is a quite unusual occurrence. Usually, in temperate ice, channels and cracks do not heal (refreeze) easily, and once a channel has been enlarged it will likely persist for an extended period of time, especially at the low ice thicknesses of ca 100 m. Could it be, from similarity with Tete Rousse etc, that also this glacier features cold ice, at least in some areas?

**A:** This is a good point. Although the absence of distributed ice temperature observations at Bonne Pierre prevents us from being definitive, there are a number of reasons why we think it is temperate. These include: the glacier's low altitude, the proglacial stream observed at the glacier portal, the annual drainage of the lake through a subglacial drainage network, and the ubiquitous presence of scatters in GPR- radargrams (which likely prove the presence of liquid water).

The question of the annual closure of the supraglacial lake in a temperate glacier is indeed puzzling. We interpreted this similarly to an ice-marginal lake in a temperate glacier: the lake drains when the ice dam floats, likely due to water pressure locally reaching the ice overburden pressure.

That said, the IGE group in Grenoble is planning borehole temperature measurements in 2026 to investigate the possible presence of cold ice. For now, without in situ data, we decided to focus on hydraulic barriers and not thermal barriers.

**R5.C2:** It would be interesting to assess how the supraglacial lake changes the hydraulic potential landscape. Ponding lake water could easily create an upstream dam/barrier (in the potential) within which a subglacial lake could form. Drainage of the surface lake would then simultaneously lead to a change of the potential barrier, and let the subglacial lake drain.

**A:** Yes, this is exact. We indeed already computed the subglacial hydraulic head with the presence of a supraglacial lake of 100'000 m<sup>3</sup> (see Discussion, subsection "On the possibility of a WPOF at Glacier de Bonne Pierre in June 2024"). However, we did not observe a new water pocket upstream the lake. We added in the text: "*Note that, given the bedrock and surface topography, the presence of this supraglacial lake does not produce an additional water pocket impounded by a hydraulic barrier upstream.*"

**R5.C3:** If I understand correctly, large parts of the glacier were mapped with Lidar twice in 2024. Did you look at the differences of the DEMs? Are there any traces of subglacial collapse features, or lowering of the surface that cannot be explained with a melt model?

**A:** We indeed looked at these differences (not shown in the paper), but we did not identify any melt anomalies. This is what motivated us to write in the Discussion: "*In particular, the absence of surface deformation features - such as concentric crevasses following water pocket drainage (Gagliardini et al, 2011; Vincent et al, 2012) - does not support rapid emptying of a large water pocket, although it cannot entirely rule it out.*"

**R5.C4:** It would be interesting and instructive to show the river discharge curves, as well as results from the hydraulic modeling.

**A:** Thanks for the suggestion. For the hydrological analysis, we now refer to the companion study which describes the overall flood event and which is now a preprint in NHES:

Filhol et al., 2026: “Compound Drivers and Spatial Connectivity led to the Devastating Debris Flood in the Village of La Bérarde, June 2024, French Alps <https://doi.org/10.5194/egusphere-2026-971>).

In the section “The June 2024 La Bérarde flood” we wrote: “*The event is described in detail in a companion study that quantifies the hydrological and geomorphological drivers of the flood and the role of sediment connectivity between the source area and the village (Filhol et al., 2026)*”. We thus decided to not explicitly show these data.

**R5.C5:** The conclusions should be considerably shortened, and just highlight the essential new conclusions. Now it reads like an extended abstract. Be to the point, and highlight the essence of the paper, the conclusions!

**A:** Thanks for this feedback. We shortened the conclusion, while keeping the main outcomes of the paper (see changes in the highlighted PDF attached to our response).

**Minor:** minor comments are directly implemented in the revised text. Below are the most important changes:

-We changed  $10^5$  to  $10^3$  in Figure 5.

-we applied consistency for the orthograph of “water-pocket volume(s) and height(s)”.

-Figures 2,3,4 have been improved: thanks for suggestions. Caption of Fig.5 is now shorter.