Reviewer 1

The manuscript "*The influence of lakes and reservoirs on flood peaks at hourly vs. daily timescale in Switzerland*" (i) analyzes the effect of water bodies (i.e., reservoirs and lakes) on flood peak at both hourly and daily timescale (i.e., the ratio daily/subdaily) in Switzerland, (ii) identifies parameters/catchment features that exhibit a significant effect on the D/H ratio, and (iii) concludes, if I correctly interpret the main message, that the ratio is particularly high (i.e., tends to one, hence daily and subdaily flood peak tends to converge) when the contributing water body area exceeds about 60% of the catchment area. Hence, if only the catchment area is considered to assess the ratio D/H, which is usually 0.8 for catchments larger than 5000 km2, there is a risk of underestimating this ratio in smaller basins that are strongly influenced by water bodies (at least for the small return periods considered here).

Overall, I find the general idea of assessing the water bodies effect on the daily/subdaily ratio quite interesting. In my view, the study suggests that for gauges highly influenced by waterbodies, flood frequency analysis on daily peak flows could, in some cases, provide a reasonable approximation of instantaneous peak flows (IPFs), even in relatively small catchments.

However, I have some concerns regarding the framework setting, the general writing, and, most importantly, the discussion and interpretation of the findings.

In particular, I think that the framework setting, especially the inclusion of different catchment descriptors in the random forest model, is not sufficiently discussed from a physical perspective. A deeper interpretation of the results would be necessary. Catchment area and contributing area remain the main parameters discussed, although two additional descriptors are included in the model (biogeographical region and geological permeability). Their role is not clearly interpreted in the discussion, and they seem to disappear from the narrative once the model results are presented.

In addition, I believe there is room for improvement in the writing, which is sometimes repetitive and slightly dense.

Finally, I do not find that the results and conclusions are fully clarified in terms of their implications. For example, it is not entirely clear what is meant by "large-sample analyses", which could refer to several different methodological frameworks (e.g., regional flood frequency analysis, IPF estimation, attribution studies). I recommend that the authors be more explicit and precise about the practical message and utility of their findings.

Overall, I recommend publication of the paper, since the topic is highly relevant and I appreciate the general idea, but only after a **major revision**, where I would expect improvements in the clarity of the text and a deeper interpretation of the findings, especially regarding the role of the selected catchment descriptors and the implications for large-sample studies

Reply: *Thank you very much for your constructive review and acknowledging the value of our work. Based on your comments, we have made the following major adjustments: (1) improved the framing of our work by aligning research questions, results, and conclusions; (2) included all of the predictors of the random forest model in the discussion; (3) carefully edited the text to improve the reading flow; and (4) clarified the practical implications of our work with respect to flood estimation.*

Below, I provide specific comments and technical corrections.

(lines 3 to 6): Could you please rephrase this sentence (especially points (1) and (2))? Since you refer to "approaches", the points would be clearer if presented as "(1) by comparing upstream and downstream gauges over four local case studies, and (2) …";

Reply: *Thank you for highlighting the need to rephrase this sentence. We rewrote it in the following way: 'Water bodies such as lakes and reservoirs can play a crucial role in reducing flood peaks, at both daily and hourly time resolution. While previous research has relied on large-samples of catchments to estimate the differences between IPF and daily mean flows, it remains unassessed how the effect of standing water bodies influences the ratio between daily mean and instantaneous flow peaks downstream of water bodies, that is to which degree the attenuation effect of reservoirs on flood peaks is scale dependent. In this study we aim to address this research gap by asking how water bodies influence the ratio between IPF and daily mean flows and therefore the attenuation effect on daily vs. instantaneous peak flows. To address this question, we follow two approaches that complement and reinforce each other: a case study approach that strengthens process understanding and a large-sample analysis that allows us to draw generalizable conclusions.'*

(line 6): I suggest using "hourly peak discharge" instead of "hourly flows", which would be more precise;

Reply: *We replaced 'hourly flows' by 'peak discharge' in line 6 and throughout the manuscript.*

(lines 10 to 12): What exactly do you mean by "… that it should be considered in large-sample analyses using suitable metrics"? The term "large-sample analysis" is quite general. It would be useful to specify which type of large-sample study is concerned and how your results would concretely affect such analyses;

Reply: *We clarified that the term 'large-sample' is used in contrast to case studies for which detailed information on water body influence may be available: 'This suggests that water body influence should also be considered in large-sample studies that go beyond case studies for which the exact influence may be known and quantified using suitable metrics such as the fraction of the total catchment above the water body.' We furthermore clarified the implications of our results: 'This implies that daily flood peaks* *are a good proxy for hourly peaks in regulated catchments, especially in strongly regulated ones, as compared to natural ones.'*

(Line 17): "However, information on IPFs is often not available and IPFs can differ substantially from daily flows." I think this is essentially the core motivation of the study and should be emphasized more strongly, also by highlighting that subdaily data are often less available than daily data;
Reply: *This statement is indeed crucial for the motivation of this study and we emphasized it even more by rewriting the first part of the introduction: 'Floods can develop rapidly at sub-daily time scales if they are triggered by intense convective storms, especially in small catchments (e.g., Blöschl, 2022). Therefore, information on maximum flows occurring at a sub-daily time scale, so called instantaneous peak flows (IPFs), is crucial for the design of flood protection infrastructure. Still, floods are often described using daily data because sub-daily data are less frequently available than daily data. Because information on IPFs is often not available, considerable research efforts have been put into estimating IPFs from more commonly available daily flow data (e.g., Fuller, 1914; Ding et al., 2015, 2016; Ding and Haberlandt, 2017; Ellis and Gray, 1966; Bartens et al., 2024; Fill and Steiner, 2003). Such estimates are derived by relating the ratio between daily mean flows and IPFs, which is referred to as the peak ratio, to catchment characteristics that are also available in ungauged basins (Ding et al., 2015).'*

(line 31): Consider "varying depending on reservoir characteristics" instead of "between reservoirs";
Reply: *We rephrased the sentence as suggested.*

(line 67): "(2) to which degree can the consideration of water bodies improve the analysis of flood flows in large-sample analyses"
Could you clarify this research question? How exactly do you expect your analysis of the daily/subdaily peak ratio under water body influence to improve large-sample analyses? Which specific aspect of large-sample flood studies would benefit from this? This point should be clarified (also in lines 73–74);
Reply: *Thank you for highlighting this inconsistency in the framing of the paper. We removed this research question to improve the alignment of questions, results, and conclusions.*

(line 68): 'first' instead of 'First';
Reply: *We made the suggested adjustment.*

(lines 80-81): This part seems partially repetitive;
Reply: *We combined the two sentences into one to avoid redundancy: 'We selected four case studies with streamflow gauges spatially close both up- and downstream of the water body to demonstrate how daily and sub-daily flows are dampened by water bodies locally.'*

(lines 89-90): I do not fully understand the configuration of the Walensee case study. From Figure 1b it appears that both gauge stations are located downstream of the lake, or that the "upstream" gauge drains a different catchment. Could you clarify this hydrological configuration? Also, considering the 77% increase in catchment area between the two gauges, how does this affect the interpretation of the attenuation results?
Reply: *Thank you for pointing out the need to clarify the hydrological configuration of the Walensee case study. We added the following note to the text: 'Please note that the Linth (draining the area of Canton of Glarus) comes from the South, flows into the Walensee and then leaves the Walensee to the West. As a consequence, the upstream catchment is very narrow and located close to the upstream station (southern gauge).' The 77% increase in catchment area between the two gauges means that there are several tributaries that may also influence flood peaks in addition to the water body. We highlighted this in the following way: 'This means that this case study does not allow for a clean separation between the influence of the water body and tributaries on the flood peaks.'*

(lines 93-94): I do not fully understand this sentence, specifically why those early periods were excluded from the samples. Please clarify the reasoning;
Reply: *Thank you for highlighting the need for clarification. We added the following explanation: 'We trimmed both the up- and downstream time series to the period after the construction of the reservoir where necessary such that we could directly compare natural flood peaks upstream of the reservoir with their regulated counterparts downstream.'*

(line 125): When more than one water body is located upstream of a gauge station, how was the contributing area evaluated?
Reply: *We clarified that 'Then, we calculate the total area which lies above the most downstream water body in case it is located on the main stem or the most downstream water bodies in the tributaries if they are located in the tributaries and divide it by the river catchment area.'*

(lines 224 to 226): Here you describe the random forest model used to identify the most relevant catchment descriptors for explaining the D/H ratio. You identify contributing area percentage and catchment area as the most important descriptors, together with biogeographical region and geological permeability. Regarding the latter two variables, why is no physical interpretation provided? In the discussion, these descriptors are not considered anymore, although they were selected as relevant by the model. I think a deeper interpretation of their role is necessary, especially in terms of hydrological processes controlling the daily/hourly peak relationship. Also, the analysis is conducted only for the 10-year return period, correct? What do you expect would happen for higher return periods, for which the attenuation effect of water bodies is usually smaller? This limitation should be discussed more explicitly.

Reply: *Thank you for highlighting the need to come back to the other predictors in the discussion. We added the following statement to the discussion: 'While catchment area and contributing area percentage are the most important predictors of the D/H ratio, other predictors such as the biogeographical region, a metric for catchment similarity in terms of climate, geology, and vegetation, and other catchment characteristics such as permeability, an indicator for flashiness, only have limited predictive power (Fig. 5)'*
Yes, the main part of the analyses focuses on the 10-yearly flood peak because this estimate can be reliably derived given the rather small sample at hand. We clarified this in the methods section: 'We focus on 10-yearly extreme flows since these represent a good compromise between regular floods (e.g., 2-yearly) and more extreme floods (e.g., 30-yearly) and because they can still be estimated reliably given the rather small sample at hand, which would not be the case for very rare floods with longer return periods.' We also clarified this focus in the results section: 'To investigate how important these two factors are relative to each other for explaining the D/H ratio related to the 10-yearly flood peak…'

(line 236): Should this refer to Fig. 6a instead of Fig. 6b?
Reply: *Yes, we adjusted the reference accordingly.*

(lines 273-275): "Therefore we conclude that catchment area is a crucial factor influencing the peak ratio – unless much of the catchment area lies above water bodies." If I understood correctly, you are highlighting that catchment area generally controls the D/H ratio, but when a large portion of the catchment is drained by water bodies, this control is overridden and the ratio approaches unity due to strong attenuation of hourly peaks. I suggest reformulating this conclusion more explicitly, as it represents one of the key messages of the manuscript.
Reply: *We have rewritten parts of the discussion section to better highlight our key finding and its implications for flood estimation: 'Even small catchments could have similar daily and sub-daily flood peaks if they are strongly influenced by water bodies… These findings suggest that daily flood peaks are a good proxy for hourly flood peaks in strongly regulated catchments. This means that in such catchments, instantaneous peak flows may be estimated from daily peak discharge in case sub-daily data is not available.'*