Revision #1 (egusphere-2025-5110-manuscript-version4.pdf)

I thank the authors for their replies and revisions, which helped to clarify many of the doubts raised in the first review. I especially appreciate that the authors have included some physical interpretation of the results of their analysis, which in my opinion is crucial in order to achieve a better general understanding of SSF response, beyond describing the idiosyncrasies of observation sites. I encourage the authors to do further revisions in this regard. Also, there are still a few issues that stick out to me, in the answers to my comments and in the revised version:

- The newly added estimates for the topographic catchment areas show that these are very different (~tenfold), meaning that the specific discharges from the trenches for a given flow rate are scaling differently. This makes comparisons of the rates with which the SSF volumes increases at the two sites more difficult to. Of course, this does not mean that the trenches are necessarily more similar, but could rather increase the contrast between the two. Maybe you can think about this and include possible effects of the different catchment sizes in the discussion of your findings, e.g., with the different levels of contributing area you found?
- L. 21/l 803: In the abstract and conclusions, you state that *"the rate at which the [total] event SSF volume increased with [total] rainfall clearly differed between the two trenched hillslopes"* ("total" being only added in Conclusions). In contrast, you wrote in response to the first round of reviews: *"when considering the big picture of all data points, the general pattern of the rainfall-SSF volume response is indeed broadly similar at both trenches."* and *"We revised the text to convey that the general rainfall -SSF volume pattern does not substantially differ between the two trenches."* This is a contradiction – perhaps these parts in the abstract and the conclusion were just overlooked?
  I suggest to revise the abstract and the conclusions to match the authors' response with regard to the trenches being broadly similar in the SSF response. Any differences that the authors would like to point out should be mentioned in the abstract/conclusions, not just stated to be "clear". Furthermore, I encourage the authors to not rely on visual inspection, but to use statistical testing to investigate if the differences in observed patterns are systematic or random.
- *L. 648f: "Other hillslope-based studies have also shown that small Ptot (<5 -12 mm) are sufficient to activate SSF"*
  and, in Author's reply: "We describe how in other studies <5–12 mm of rainfall was enough to activate SSF (i.e. to generate SSF). Figure 6 of Tromp-van Meerveld and McDonnell (2006) clearly shows how SSF was also generated for rainfall amounts much smaller than 55 mm. Only for "significant" SSF to occur rainfall had to exceed 55 mm. Fu et al. (2013) state that "the generation thresholds of total event precipitation for measurable interflow at plots A and B were found to be 12.0 (event 10 in Table 1) and 13.7 (event 3 in Table 2) mm".
  I do not want to be too nitpicky here, but to be accurate, it must be stated that these citations do not support the statement with the numbers (5-12 mm) in the present form. Tromp-van Meerveld and McDonnell (2006) report (insignificant?) SSF events due to rainfall sums smaller than 55 mm, but I fail to see support for the 5 to 12 mm statement. Instead, they were insistent with the rainfall threshold of 55 mm for significant SSF. For Fu et al, it simply is not in the range 5-12 mm, but just a bit larger, as you rightfully point out in your response cited above. I do not see any drawback in being exact here, and revise the sentences in question. The study does not have to exactly reproduce numbers of earlier studies at other places, which might be site-specific anyway. Instead, it would be

interesting to compare and discuss the different thresholds found throughout the studies. For example, why is the reported threshold for “significant SSF” of 55 mm so much higher than in the present study, which mainly investigates rainfall amounts smaller than this threshold?

Technical Comments

Fig 1: The hillshading, especially in the right panel, is still confusing (to me and to the colleagues I asked). It suggests a convex shape above the trench, while the contours show that it’s concave. This was also mentioned by reviewer #1. Maybe you can try different angles?

Table 2: Add estimated catchment sizes as trench properties.

Fig. 8: Mention that the ASI adjustment factor is shown in parentheses in the caption for explanation.