Dear anonymous reviewer #2,

We thank the you for this positive feedback, the careful review of our manuscript and the useful comments. We will use these to improve the manuscript. We respond to each comment below (original comment in black font, our response in blue font).

This manuscript uses rainfall simulation and tracer experiments, including NaCl, Uranine, Bromide and deuterium, to understand the magnitude and spatial distribution of overland flow (OF) and topsoil return flow TIF) at two plots in a pre-Alpine catchment, one with clear-cutting, one with grassland. They also explore the celerity and velocity for OF and TIF. Overall, they put in very significant effort to conduct all the experiments. I find it is overall hard to follow all the experiments.

We thank the reviewer for recognizing the experimental effort involved in this study and for the constructive feedback on the manuscript. We would like to clarify that the "natural clearing" referred to in this study is not a result of clear-cutting, but rather a natural forest opening.

Specific Comments:

It seems that the mean intensity for experiments in clearing and grassland is quite different (Table 2). I would guess that might also impact the partitioning between OF and TIF, where high intensity for grassland will result in a higher OF. So, I am not sure which plays a bigger role, intensity or soil macropores.

Thank you for this pertinent comment. Indeed, a higher rainfall intensity can generate more OF, and this is probably part of the reason why we have such a difference. However, we have also monitored this location during natural rainfall events and have observed a similar distribution of OF and TIF, see table below. Thus, we do not think that the differences between the plots is mainly due to the differences in the rainfall intensity

Table 1: Runoff ratio of overland flow and topsoil interflow at the clearing and grassland locations under different natural rainfall events.

			Clearing		Grassland	
Date of rain event	Rain depth (mm)	Mean Intensity (mm/h)	OF runoff ratio (-)	TIF runoff ratio (-)	OF runoff ratio (-)	TIF runoff ratio (-)
2022-09-14	19.6	2.5	0.02	0.13	0.23	0.01
2022-09-16	50.6	2.0	0.45	0.57	0.81	0.00
2022-09-26	18.1	1.6	0.16	0.28	0.30	0.01
2022-10-01	33.6	2.0	0.29	0.40	0.54	0.01
2022-10-02	24.9	2.2	0.21	0.13	0.75	0.01
2022-10-08	6.3	0.9	-	-	0.17	0.00

Although we observe some variability in the runoff ratios from event to event, which are probably due to differences in antecedent moisture conditions, rain depth, intensity, the general trend supports our observation that most of the rain (simulated or not) turned into OF and not TIF.

Does that matter if two sprinklers contribute more total deuterium mass at the overlapped area (in the middle of Figure 3a)?

We thank the reviewer for this comment. While Figure 3a may have given the impression of a substantial overlap, the actual area where the sprinklers intersected was small. Additionally, the sprinklers apply less water near the edges of the application area, which means that the overlapping zone likely received only slightly more water and tracer. In theory, the local additional application of deuterium and water could generate a local pulse of water or could cause ponding on the surface. However, we did not observe this, and all water infiltrated quickly into the soil. The extra pulse of water and deuterium may also lead to some more preferential flow which would lead to a faster breakthrough than for the other areas. However, we a) would expect this to average out when looking at the full application area and b) did not use the deuterium breakthrough curve to calculate the velocity due to the uncertainty in calculating the minimum distance to the trench.

How do you determine the first increase in the flow rate in Figure 5? I think there are flow rate up and down before and after the points you labelled. Why are the locations you labelled the response to the water pulse? Thank you.

Thank you for these comments. We will explain more carefully how we selected the first responses of the water pulses in the revised document.

To determine the first increase of the flow rate, we selected the first rising limb that occurred directly after the application of the water pulses. The small increases during the long rising limb might be due to small changes in the sprinkling rate (Fig 5a) and due to variations in the pumping rate (Fig 5b, see section 4.1).

It took me a long time to really understand what Figure 6 represents: I guess you can unify with NaCl/Uranine/Bromide using red lines, and only with deuterium with grey shading in Figure 6.

For greater consistency with Figure 4, we will change the gray lines to red lines and only use the gray shading only to indicate the period of the deuterium application.

For Table 3, you can list the duration of each tracer experiment and their start time if possible.

The tracer applications were 'instantaneous' (i.e., within a minute (see Line 218), except for the deuterium applications, which took 30 minutes in the clearing and 17 minutes in the grassland (see Lines 227-229). The actual application times are indicated with red lines and gray shading in figures 4 and 6. The duration of the experiments is given in Table 2. The actual start time of the tracer applications during the day seems fairly irrelevant and we thus prefer to not include this information in Table 3 to avoid that it looks very cluttered. The actual times are however, indicated in the datasets.

Also, if possible, add a table for sample collections and collection intervals.

We will add a table with the details about the number of samples collected and at which interval. Also, we will add information about the number of samples that were analysed.