We thank the reviewer for their positive comments.

We agree that it would be easier for the reader to see the drip rate response to rainfall events by changing the order of the panels in Figure 3. The revised figure is shown at the end of this response. The new figure caption is:

Figure 3. Daily AET (from the AWRA-L), daily precipitation (light blue when outside the monitoring period) with timing of recharge events shown by red asterisks, and average 15 min total drips.

We agree that the figure caption for the revised Figure 4 (see https://doi.org/10.5194/egusphere-2025-84-AC1) is unclear. Figure 4b shows the distribution of the 48 h precipitation for all 41 recharge events, grouped by before fire and after fire. We will further revise the caption as follows:

"Figure 4 a) 48 h antecedent rainfall classified by month and whether before or after fire. B) box and whisker plots of 48 h rainfall amounts for all 22 recharge events before the fire (black) and 19 recharge events after the fire (red)."

We will revise Figure 6 so that the monthly minimum rainfall charge thresholds are clearer. The revised Figure 6 is shown at the end of this response. This differs very slightly from the previous version as we had incorrectly used an early draft version. We will expand the caption to clarify the content of this figure, and also highlight the data used in Table 1. The revised Table 1 is shown at the end of this response. At line 159 we will further clarify this analysis (new text is underlined):

"Because 48 h thresholds may be overestimated due to both the coarse sampling interval and the impact of extreme events, we first compared the minimum recharge threshold calculated for each month pre- and post-fire. Fig. 6 shows a qualitative reduction in the recharge threshold postfire using the minimum recharge in each month."

The new figure caption will read:

"**Figure 6**: Minimum 48 hr precipitation required for recharge to occur for each month. Black indicates that the minimum recharge threshold occurred pre-fire, while red indicates that the minimum recharge threshold occurred post-fire. These values are bolded in Table 1."

We will define BOM at its first use on line 103, and then replace the eight subsequent 'Bureau of Meteorology' uses in the main text with BOM.

We will expand the Fig. 7 caption to make it clearer that 7C and 7D are showing the same data at 7A and 7B, just grouped differently based on seasons. The new caption will read (new text underlined):

“**Figure 7**. Comparison of recharge thresholds pre-and post-fire using BOM data. A) all recharge events B) all recharge events grouped by three-month season C) all recharge events grouped by six month seasons summer/autumn and winter/spring D) all recharge events grouped by six month seasons autumn/winter and spring/summer. Note that sample sizes are different depending on seasonal grouping, most comparable for panel d, where Autumn/Winter have 9 samples for pre-fire, 8 samples for post-fire, and spring/summer have 13 samples for pre-fire, 11 samples for post-fire.”

We will expand the Discussion as suggested, and propose to split the second paragraph to allow an expanded comparison with the results of Bian et al (2019) and a more thorough comparison with post-fire ash processes. We also propose to lightly edit the conceptual figure (Figure 8) to align better with the new text and to make small improvements. We label the panels A to C to allow reference to these in the new text. We refer to widened fractures in panel B rather than panel C, as this is when that process occurred. We allow for a more realistic progressive change in rainfall recharge threshold over time that occurs as ash is removed from the land surface. We remove some of the ash fill in the fracture in panel B to allow for the short duration and peaky hydrographs observed in this time by Bian et al (2019).

Proposed new and revised text is underlined below, other text is existing text from line 200 in the preprint.

“The effect of the intense fire on the rainfall recharge threshold is evident, with a decrease in the amount of rainfall needed post-fire, with this most evident in spring / summer, from three months after the fire. The decreased rainfall recharge threshold coincides with changed hydrograph characteristics observed by Bian et al., (2019), where post-fire recharge event hydrographs had higher peaks and were of shorter duration. Bian et al. (2019) also observed a rapid post-fire shift in cave drip water stable isotope (δ^2H, $\delta^{18}O$) composition, interpreted as indicating that significant loss of existing soil and near-surface karst water had occurred during the fire due to evaporation. The isotope data took six months to return to the pre-fire baseline, suggesting that the epikarst water stores took six months to replenish and mix. Only limited evidence of ash-derived solutes was observed in the drip water post-fire, interpreted as an effect of volatilisation due to fire intensity.

We hypothesise that a post-fire loss of soil water storage would allow runoff generation to be more effective across areas of bare limestone to the zones of focused recharge (Fig. 8). Figure 8A presents our conceptualisation of the pre-fire hydrology, with patchy soil and soil filled fractures retarding overland flow and storing water. Recharge occurs when overland flow occurs to focused recharge zones. The decrease in rainfall recharge threshold starts to be observed post-fire, when the land surface above the cave was covered with thick ash deposits (see Fig. 1). Our observations at the site showed a thick and widespread ash cover immediately post fire (Fig.1) which was absent four months post fire (Fig. A3), with bare rock and absence of shrubby vegetation observed one year post-fire (Fig. A4). This is compatible with the presence of ash produced by the high-severity experimental burn, combined with the moderate rainfall experienced in the days immediate post-fire (10.4 mm in the week following the experimental fire), resulting in the formation of an ash crust. The presence of an ash crust (Figure 8B), combined with clogging of any remaining soil pores, is likely to have altered overland flow pathways to the recharge zones (Woods and Balfour, 2008; Balfour et al., 2014). Bian et al (2019) demonstrate that recharge events at this time had peakier and shorter duration hydrographs and an altered water isotope composition than pre-fire (Bian et al 2019). We conceptualise this period as one where recharge and associated recharge thresholds could be impacted by the ash cover, and when recharge occurred, it was through fractures that were relatively free of soil, vegetation and water and which had been potentially widened during the fire.

When this ash was subsequently transported from the surface above the cave, as observed four months after the fire (Fig. A3), the loss of the retarding effects of the ash crust, combined with the effect of soil removal and karst fracture enhancement, resulted in enhanced infiltration and consistently reduced rainfall recharge thresholds (Figure 8C). Recharge events that occurred at this time still had peakier and shorter duration hydrographs than pre-fire (Bian et al., 2019) due to the loss of surface soil and increased area of bare rock and associated loss of soil storage and retardation of overland flow. Drip water isotope composition during this post fire period returns to the pre-fire baseline, indicative of the replenishment of water in subsurface karst fractures and voids. Despite this replenishment, the combination of peakier and short duration hydrographs and decreased rainfall recharge thresholds suggests a longer-term change in hydrology, due to soil loss, increased bare rock, and widened fractures, the combination of which enhanced overland flow and fracture flow."

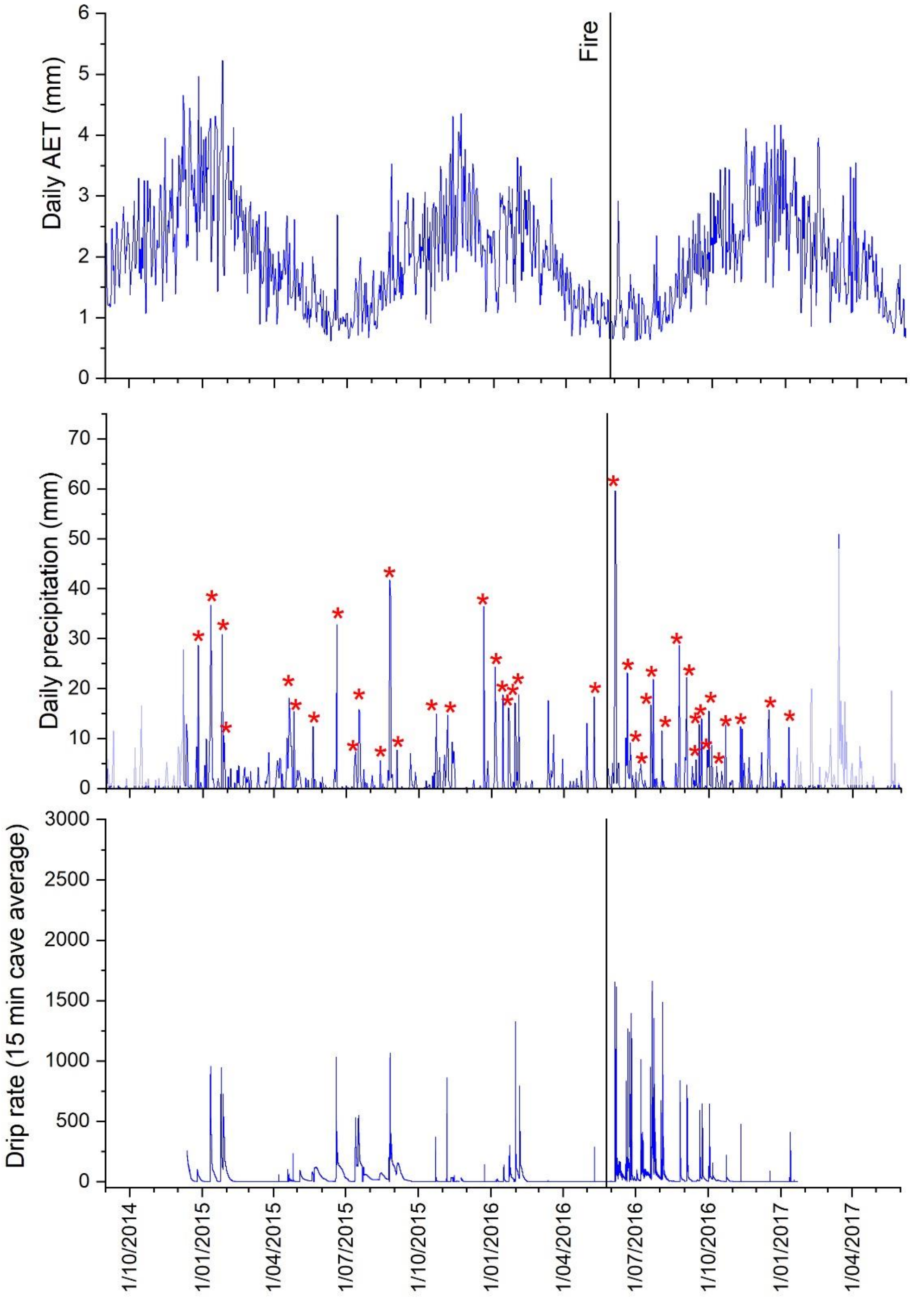

Figure 3. Daily AET (from the AWRA-L), daily precipitation (light blue when outside the monitoring period) with timing of recharge events shown by red asterisks, and average 15 min total drips.

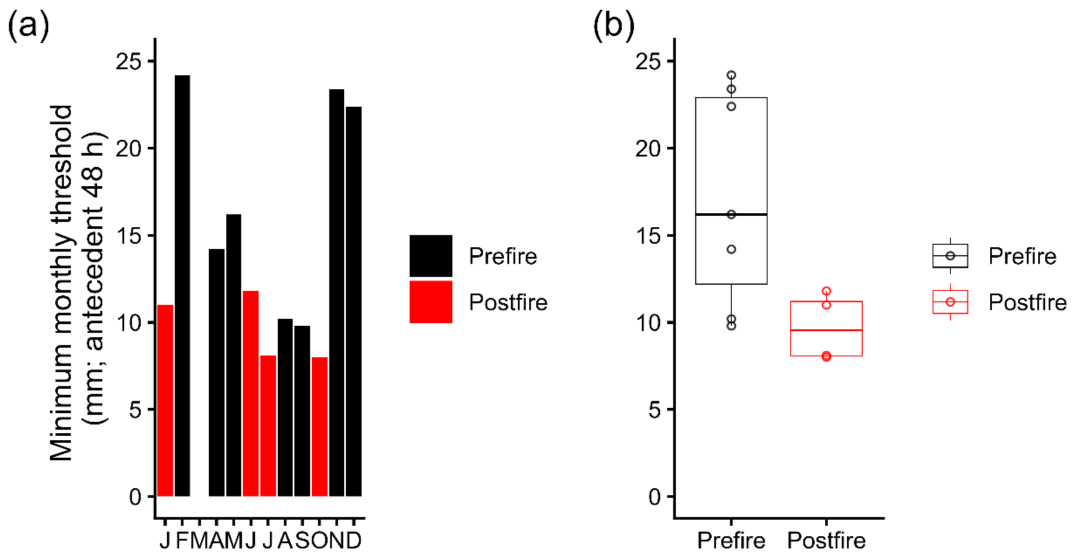

Figure 6: Minimum 48 hr precipitation required for recharge to occur for each month. Black indicates that the minimum recharge threshold occurred pre-fire, while red indicates that the minimum recharge threshold occurred post-fire. These values are bolded in Table 1.

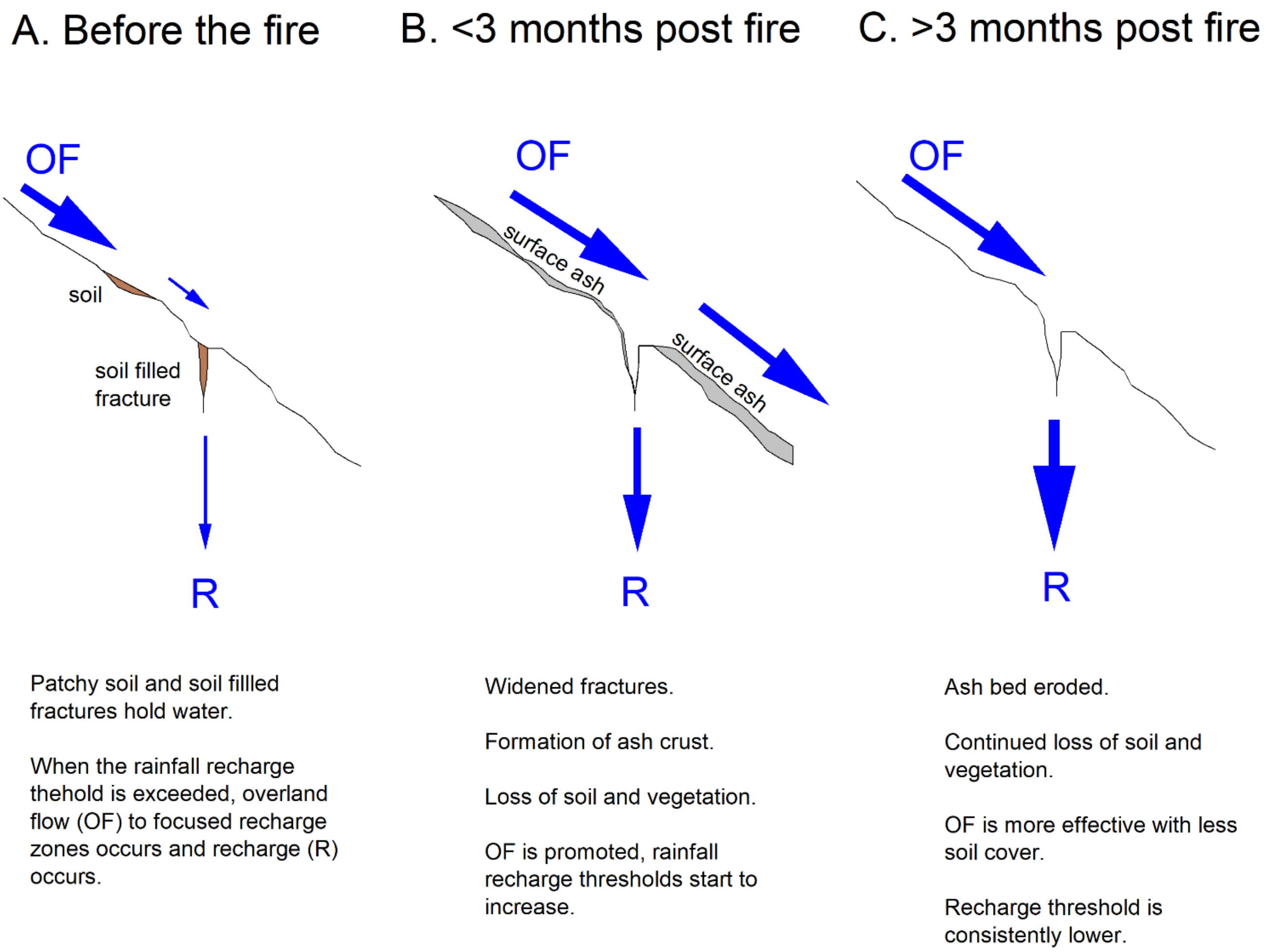

Figure 8. Conceptual figure of the recharge processes (A) before the fire (B) less than three months after the fire and (C) More than three months after the fire.

Pre-fire				Post-fire			
Event	Date	48 h precip-itation (mm) BoM	48 h precip-itation (mm) AWRA-L	Event	Date	48 h precip-itation (mm) BoM	48 h precip-itation (mm) AWRA-L
1	25/12/2014	**22.4**	28.7	24	4/06/2016	107.6	76.1
2	11/01/2015	60.5	55.5	25	18/06/2016	**11.8**	14.8
3	24/01/2015	64.4	30.9	26	24/06/2016	18	13.6
4	27/01/2015	*19.8*	19.8	27	6/07/2016	***8.1***	8.1
5	20/04/2015	35.8	32.4	28	20/07/2016	18.6	23
6	25/04/2015	**14.2**	15.5	29	22/07/2016	43	22.2
8	19/05/2015	**16.2**	14.6	30	2/08/2016	*12.9*	12.9
9	18/06/2015	42.2	38.3	31	24/08/2016	39.8	33.1
10	13/07/2015	12.2	9.8	32	2/09/2016	35.2	28
11	16/07/2015	*18.1*	18.1	33	14/09/2016	11	6.3
12	12/08/2015	**10.2**	5.9	34	18/09/2016	16.4	13.9
13	25/08/2015	88.2	80.5	35	21/09/2016	18.4	16.6
14	3/09/2015	**9.8**	8	36	29/09/2016	12.2	12.1
15	22/10/2015	27	20.8	37	4/10/2016	10.6	9.1
16	5/11/2015	**23.4**	23.6	38	11/10/2016	**8**	6.4
17	21/12/2015	30	36.6	39	22/10/2016	12.2	12.7
18	6/01/2016	12.6	13.1	40	9/11/2016	25.2	13.7
19	15/01/2016	*20.3*	20.3	41	16/12/2016	24.8	20.5
20	21/01/2016	21.8	16.2	42	10/01/2017	**11**	12.3
21	29/01/2016	34.6	17.2				
22	4/02/2016	**24.2**	20.9				
23	8/05/2016	21.8	18.4				

Table 1. Summary of recharge events. Data in italics: incomplete returns for the BOM station on these dates. AWRA-L data was used. Recharge event 7 occurred on 4th May 2015 and was a local rainfall event not captured in the gauge. The monthly minumum recharge thresholds presented in Figure 6 are in bold.