

## General response:

We sincerely thank the Editor and the referees for their careful review and insightful comments. We have provided detailed, point-by-point responses to the comments and suggestions from the Editor and referees. Each response addresses the specific feedback received, with detailed explanations and corresponding modifications to the manuscript where necessary.

Our responses are structured for clarity: Editor comments in black, our responses in blue, and manuscript modifications highlighted in red.

In general, our revisions primarily include the following points:

- (1) We revised the Notation section by arranging the variables alphabetically, with Latin symbols listed first, followed by Greek symbols.
- (2) We improved the explanations of the equations, including adding missing variable definitions, checking units and conversion factors, and clarifying the physical meaning of relevant parameters and integration terms.
- (3) We standardized the terminology used to describe canopy positions throughout the manuscript and figures. Specifically, we now consistently use “above the canopy” and “under the canopy” in the text, figure legends, and captions.

## Editor Comments:

**#1:** Thank you for working on the text, which has improved in the process. Unfortunately, there are still some issues with the methods section. Therefore, I am sending the paper back for another revision. There are still some problems with the equations, so please check that they are consistent in units and that established mathematical formulations are adhered to. This is a prerequisite for publication. I have added detailed comments below.

**Response:** Thank you for your constructive suggestions. We greatly appreciate the time and effort devoted to improving the quality and rigor of our work. We have thoroughly revised the paper in response to your comments.

**#2** The list of variables under „Notation“ is still not in alphabetical order, as requested.

Please check. Since you are using two alphabets, latin and greek, that are difficult to mix, it is maybe easier, if you first put the latin alphabet ([https://en.wikipedia.org/wiki/Latin\\_script](https://en.wikipedia.org/wiki/Latin_script)) and than the greek one ([https://en.wikipedia.org/wiki/Greek\\_alphabet](https://en.wikipedia.org/wiki/Greek_alphabet)).

**Response:** Thank you very much for your comments. We have carefully checked the “Notation” section and revised the order of the listed variables. The variables are now arranged alphabetically, with Latin symbols listed first, followed by Greek symbols, as suggested.

#3 Line 103: In the remainder of the paper also sub-canopy and below canopy is used to refer to the position below the trees. Also there are lots of mentioned of „inside“ in the text, where I think below the canopy is meant, but I am not sure (e.g. Fig 5). Can you please use only one notation for each canopy position (I believe they are only two positions: above and below the tree canopy). If really more than two canopy positions are required, please add a sketch and clearly denote which position is meant with which notation and wording and use is throughout the paper. This could be added to Fig. 2.

**Response:** Thank you for this helpful comment. We agree that inconsistent terminology may cause confusion regarding the canopy positions. We have carefully checked the manuscript and standardized the terminology throughout the text. Specifically, we now use only two terms: “above the canopy” to refer to free rainfall above the canopy, and “under the canopy” to refer to rainfall below the tree canopy. In addition, the terminology in Figs. 4-7 and their captions has been unified to “above the canopy” and “under the canopy”.

#4 Line 107: „free falling“.

**Response:** Thank you for pointing this out. The issue has been corrected accordingly (Line 105).

#5 Equation 2: need to define „i“

**Response:** Thank you for your valuable comments. We have added the definition of  $i$  in Equation 2 (“where  $i$  denotes the  $i$ -th raindrop, and  $N$  represents the total number of raindrops included in the calculation.”); please see Line 110.

#6 Line 112: The sentence is missing a noun, please correct the grammar.

**Response:** Thank you for your valuable comments. We have revised the sentence to “Then, the kinetic energy per unit area per unit rainfall depth  $E_{Kf\_R}$  ( $J m^{-2} mm^{-1}$ ) is as follows:” Please see Line 110-111.

#7 Line 127: erase „presented“

**Response:** Thank you for your comment. We have deleted “presented” as suggested. Please see Line 126.

#8 Equations 17 and 18:

Please check the units and conversion factors.

The rain intensity ( $I$ ) has units of  $\text{mm/h} = \text{Liter} / (\text{m}^2 \text{ hour}) = 0.001 \text{ m}^3/(\text{m}^2 \text{ hour})$  and  $\rho$  has units of  $\text{kg} / \text{m}^3$ . Without a factor, they do not match. Please also check whether this factor was missing in your calculations.

Also,  $m_s$  and  $m_d$  seem to become integration variables in eq 19, suggesting that a droplet distribution is considered below. Here in Eq. 17 and 18 only bulk values are defined (without a distribution). Please reconcile this and add an explanation.

**Response:** Thank you for your careful comment. We have revised Eqs. (17) and (18) by adding a conversion factor of  $10^{-3}$  to convert rainfall intensity from  $\text{mm h}^{-1}$  to  $\text{m h}^{-1}$ . Thus, the units of  $m_s$  and  $m_d$  are consistent with  $\text{kg m}^{-2} \text{ h}^{-1}$ . We have also checked the related calculations accordingly. In addition, we clarified that  $m_s$  and  $m_d$  in Eqs. (17) and (18) represent the bulk mass fluxes of splashed droplets and canopy drip droplets ( $\text{kg m}^{-2} \text{ h}^{-1}$ ). The droplet-size distributions are now represented by the normalized diameter-based mass-fraction distribution functions  $f_s(D)$  and  $f_d(D)$  in Eq. (19)-(21). Please see Lines 185-192.

#9 Equation 19:

Following on the comment above on Eq. 17 and 18: I am assuming this integral is meant to run over the drop size spectrum of the different droplet types? Please state this explicitly. Also, since the spectrum is probably defined by the drop diameter and it would be more consistent with remainder of the paper, if the equation was stated as an integration over diameter and not mass of the individual droplets.

**Response:** Thank you for your helpful suggestion. We have revised Eq. (19) so that the integration is performed over droplet diameter  $D$ , rather than over droplet mass. This is more consistent with the droplet size spectra used in the paper. We also explicitly stated that  $f_s(D)$  and  $f_d(D)$  are the normalized diameter-based mass-fraction distribution functions of splashed droplets and canopy drip droplets, respectively, and that the integrations are performed over the corresponding droplet diameter spectra. Please see Lines 185-192.

#10 Am I correct assuming that  $k_s + k_d \leq (1-\gamma)$ ? If yes, please state. Please state where does the  $1/2$  come from? It makes it appear as if only half of the mass of either fraction was considered. Please explain.

**Response:** Thank you for your helpful comment. We have clarified the mass-balance relationship among  $\gamma$ ,  $k_s$ , and  $k_d$ . In our formulation,  $(1-\gamma)$  represents the fraction of rainfall passing directly through the canopy, while  $k_s$  and  $k_d$  represent the fractions of splashed droplets and canopy drip droplets, respectively. Therefore, the constraint is  $(1-\gamma) + k_s + k_d \leq 1$ , or equivalently  $k_s + k_d \leq \gamma$ .

The factor  $1/2$  comes from the classical kinetic energy equation,  $E = 1/2 mv^2$ , and does not mean that only half of the mass was considered. Please see Lines 185-192.

**#11** Line 186: I am assuming that  $v_s$  and  $v_d$  calculated based on equation 12? If yes, please state this.

**Response:** Thank you for your comments. We have clarified that  $v_s$  and  $v_d$  are calculated using Eq. (10-12). Please see Line 187-188.

**#12** Figure 5: Please see comment on Line 103.

**Response:** Thank you for your comment. Following the response to Comment #3, we have revised the legend and related labels in Fig. 5 to ensure consistent terminology. The canopy positions are now uniformly denoted as “above” and “under”.