This paper presents a novel framework for evaluating agricultural losses following extreme short duration precipitation events. The framework adopts flood hazard maps at the monthly scale to capture the crop-stage dependent vulnerability and builds on methods that were recently developed for extreme value analysis and for simulating extreme precipitation events with realistic intra-event joint return period. The study adopts precipitation events with up to 6-h duration, and with intra-event volumes dependencies analysed over the 10-min, 30-min, 1-h, 3-h and 6-h durations. The paper demonstrates that the agricultural flood risk estimate is sensitive to the choice of design storm characteristics (e.g. duration window for which the event's return period is set).

The paper is well written and clear. The methods used in the framework are fit for purpose and nicely combined, and the framework is applied in a flood-prone agricultural area in northern Italy. Overall, the manuscript is within the scope of *Hydrology and Earth System Sciences* however some sections require minor corrections and/or additional details to strengthen the paper.

General comments

Even though the authors briefly discuss in the discussion section, I think more emphasis should be put on the antecedent soil moisture and how it could be included in the analysis as this plays an important role for crop damages.

How does the fact that return periods are calculated independently for each month impact the EAL? Considering that different design storm scenarios are considered, how are they aggregated in the EAL calculation?

The authors state that Cache et al. (2025) consider 'only events whose actual wet duration spans the entire [360-min] window', which is not true. This error leads to other wrong affirmations and to analysis to compare the differences between including solely events of 360-min duration events and more, or to also including shorter duration events. These analyses are not wrong, however their motivation to compare to Cache et al. (2025) is. Additionally, the methods are quite lengthy already. I would therefore suggest correcting the statements and including the analysis comparing the inclusion or exclusion of shorter duration events in the Supplementary Material. This includes, for example, paragraph in lines 298-303 and Section 3.1.3.

In line with the comment hereabove, the method section includes elements that are eventually not used in the modelling framework. I would suggest moving the model configurations that are not adopted in the Supplementary Material, and simply refer in a line what configurations were tested.

Specific comments

- Line 10: the abstract states that 'long-duration events generally [produce] the highest damages'. However, this actually refers to events with 6-h duration – which is the longest duration considered but not long per se. I would suggest reformulating this.
- Line 116: Clarify that the return period refers to the rainfall event's return period.
- Line 118: Please clarify what a 'representative scenario' is.
- Line 119: What if multiple damaging flood events occur in a unique month? Is Bm = max{i}?
- Eq 6: It is somewhat confusing that k is index for months but K is classes of intensities. I would suggest to use k as indexes for the classes instead of i, and i as index for months instead of k.
- Line 184: Typo in 'rain gauge'

- Line 187: Please introduce what ordinary events are.
- Line 203: add a comma ‘In the present framework, […]’
- Line 230: add a comma ‘Under left-censoring, […]’
- Line 272: Please clarify what is meant by ‘improving the stability near the boundaries of the unit interval’.
- Line 273-280: As it reads now and through the comparison with the methods in Cache et al. (2025), the paragraph seems to suggest that the presented method samples events with multiple intensity-duration constraints. However, after reading the entire paper, it seems like this is not the case. I suggest reformulating for clarity.
- Line 296: I am not sure ‘observed duration’ is the most rigorous wording here.
- Line 296-297: This requires some corrections. First, dj has not been introduced so far and nothing points to the fact that the duration of dj are strictly increasing. As such, if dj was, for example, [10, 60, 30, 360, 180], then the statement would be wrong. Additionally, the statement seems only true if the storm duration is shorter or equal to dj (and not shorter than dj+1 as stated in the paper). For example, let’s take dj = 10 min and dj+1 = 30 min. If a precipitation event lasts 20 min, then it is shorter than dj+1 yet Xdj would not be equal to Xdj+1.
- Line 333: Could be reformulated to ‘from rainfall depth to uniform variable in the copula space’.
- Line 338: The word ‘copula’ should be replaced by ‘joint distribution’ as the copula provides only uniform variable, while the joint distribution provides the rainfall volumes.
- Eq 15 and 16: Eq 16 includes a line with ‘state’ and ‘probability’ while Eq 15 does not. The authors might want to make the notations consistent.
- Line 368: I am not sure whether Müller and Haberlandt (2018) is the correct reference. I believe it should be Müller-Thomy (2020)?
- Fig. 2: The legend hides a large proportion of Fig. 2c. I would suggest putting the legend as a 3-column box below the crop map.
- Lines 448-450: I would suggest adding a column with $\Sigma \Delta\tau$ as it is currently hard to see the differences.
- Lines 524, Fig. S3: As I understand it, the SMEV is fitted to the precipitation data separately for each monthly block. If this interpretation is correct, the use of the term ‘annual maxima’ may be somewhat confusing. However, I leave it to the authors to determine whether this terminology is the most appropriate and rigorous in the context of their methodology.
- Line 510: Please introduce and clarify what is meant by ‘unconditional copula’.
- Fig. S8: Some typo have crept in the title (see the ‘reference model ?’ and ‘caractherized’)
- Line 519: The author’s statement that Cache et al. (2025) does not apply an ordinary-event filtering is wrong. In fact, Cache et al. (2025) selected only events reaching 1.1 years in at least one of the target durations. It is, however, true that Cache et al. (2025) did not conduct an analysis of the impact of the selected threshold on the results.
- Section 3.1.5: This section is not very clear to me. From the previous section, it seems like rho_min threshold is used to remove low-intensity events. How does rho_min differ from q? Why is not a unique threshold used (as Section 3.1.4 actually seems to suggest)?
- Line 574: Refer to comment above, regarding the filtering of ordinary events in Cache et al. (2025).
- Line 606 and Fig. S15: How are observed events selected, given simulated events are conditioned on T=5 yr.

- Fig. 4: How were these months selected? Other months could be added in the Supplementary Material.
- Methods: Introduce how the seasons are defined (e.g. summer is JJA?)
- Line 646: Why were these target duration chosen?
- Line 647-648: Do you mean min, median and max of total rainfall depths?
- Results: It would be nice to visualise the hyetographs used to derive the results.
- Results: Table 1 distinguishes between rainfed and irrigated fields, however this is not later discussed. Does the irrigation have an impact on the analysis/results?
- Discussion: How do you expect the results to change compared to state-of-the-art agricultural flood risk assessment?
- Fig. 9: The caption should refer to 'bars' instead of 'curves'. What is meant by 'duration envelope'?
- Throughout the paper: be consistent with the use of US or UK English ('modeling' or 'modelling', 'characterize' or characterise'...)
- Throughout the paper: be consistent with the use of hyphen ('multiduration' vs. 'multi-duration', 'flood risk' vs. 'flood-risk', 'physically based' vs. 'physically-based'...)
- Throughout the paper: verify the correct use of hyphen, em dash and en dash (e.g. line 82,165, 173...)
- Throughout the paper: make sure to introduce notations and acronyms (e.g. L-CV in line 213, L1 and L2 in Line 211, CDF in line 312, AMC in line 618, rf and ri in Table 1)