

## Responses to comments - minor revisions

Thank you for your valuable and constructive comments on our manuscript. We appreciate your careful review, which has helped enhance the precision and strength of our work. Our answers are in [blue](#).

### Overall Assessment

This manuscript presents a novel application of information theory to evaluate the uncertainty and information content of variables used in commercial microwave link (CML) rainfall estimation and wet-dry classification. The study is well-motivated, addressing an important gap in the CML literature by moving beyond deterministic models to a probabilistic framework. The use of information theory to quantify the contribution of both sensor and environmental variables is innovative and has the potential to improve CML data processing. The manuscript is generally well-structured, and the analyses are sound. The author has addressed most of the issues raised in the previous round of revisions. I now believe the manuscript requires only minor revisions before it can be published. Below, I provide specific comments and suggestions for revision.

### Concerns and Recommendations

1. The description of the information theory framework is comprehensive but could be more accessible. Consider adding a simplified conceptual diagram illustrating how entropy and conditional entropy are applied to CML data processing (e.g., from raw data to probability distributions to uncertainty reduction).

[Thank you for the idea, we added the diagram to the Appendix \(L609 - 611 in the track-changes manuscript\).](#)

2. The binning strategy is critical to the analysis but is described in a fragmented manner (Sections 3, 4, and 5.3.3). Please consolidate and clarify the binning criteria, especially how bin edges were chosen for different variables (e.g., rainfall intensity, attenuation). A table summarizing binning strategies for key variables would be helpful.

[We inserted a new unified subsection \(3.1\) on binning in the Methods section \(L202 - 221 in the track-changes manuscript\). Tables 1 and 2 were enhanced by a new column defining the binning strategy.](#)

3. The dry-wet classification analysis was conducted on a single CML. While this is acceptable for proof-of-concept purposes, I recommend that the authors acknowledge this limitation in their conclusion and caution against overgeneralization.

[We provided further clarification in the conclusions \(L594 - 596 in the track-changes manuscript\).](#)

4. Language and Typos: The manuscript would benefit from thorough proofreading to correct minor grammatical errors and improve sentence fluency. Examples: Page 2, Line 30: "CMLs have successfully been employed" → "CMLs have been successfully employed"; and Page 5, Line 140: "Data carry information and information reduces uncertainty." → "Data carry information, which reduces uncertainty." In addition, some acronyms are not defined upon first use (e.g., WAA is used before its full form is given).

The text has been thoroughly proofread to ensure accuracy and coherence. Please see changes in the track changes in the revised manuscript.