

Response to EC1

This manuscript presents a comparison between deep-learning approaches (a pointwise multilayer perceptron and a Transformer-based Swin U-Net that explicitly learns spatial context) to identify non-precipitating echoes in weather radar observations. They prove that the best performance is achieved by combining architectures that effectively exploit spatial context (Swin U-Net) with richer information sources (dual-polarization and short-term temporal evolution). The subject is appropriate for AMT and I suggest minor revisions, that should be very easy to address.

Response: Thank you very much for your positive assessment of our manuscript and for your careful and constructive comments. We appreciate your recognition of the importance of combining spatial-context learning with polarimetric and temporal information for non-precipitation echo (NPE) identification.

We have carefully considered all of your suggestions and revised the manuscript accordingly. The revisions clarify the construction of the high-confidence test dataset, the time interval between radar scans, the rule-based screening procedure, and the manual inspection of training samples. We have also checked the references and figure caption and corrected the typographical errors.

Following the earlier interactive discussion and additional model comparisons, the conventional U-Net is now presented as the primary spatial-context model, with a direct comparison against Swin U-Net included in Sect. 4.4. Our point-by-point responses are provided below.

Specific comments and responses

1. Line 32: Please briefly specify the meaning of “a high-confidence test subset”.

Response: Thank you for this suggestion. We have clarified the term in the Abstract (lines 23–24). The high-confidence test subset refers to Test Dataset A, comprising 1,000 test cases whose reference labels were manually inspected and judged to be physically consistent with the radar observations. Ambiguous samples were excluded from the high-confidence dataset. Further details on dataset construction and label inspection are given in Sect. 2.2.

2. Line 113: Please specify the time interval between the “two consecutive scans”.

Response: Thank you for pointing this out. The typical interval between two consecutive radar volume scans in the Guangzhou S-band radar dataset is approximately 6 min. We have specified this interval in Sect. 2 (lines 114–116) and explained that the two-volume inputs represent short-term echo evolution over approximately 6 min.

2. Lines 43 and 48: Cite the references appropriately.

Response: Thank you for the suggestion. We have reviewed and revised the corresponding passages in the Introduction and provided appropriate references for the challenges of NPE identification and the variable radar signatures, spatial structures, and temporal characteristics of different echo types.

4. Line 197: “Echoes with ρ_{hv} lower than 0.85” and other thresholds are derived from Huang et al. (2023) and Huang et al. (2018), is that correct?

Response: Thank you for this question. Yes. The rule-based identification criteria were adopted from Huang et al. (2018), in which echoes with $\rho_{hv} < 0.85$ were initially identified as potential non-meteorological echoes. The same study also applied a connected-region threshold of 20 radar gates to correct small isolated regions and reduce misclassification. Huang et al. (2023) further employed the $\rho_{hv} < 0.85$ criterion to identify biological scatterers in the eye of Typhoon Lekima (2019). We have clarified the sources of these criteria in Section 2.2 of the revised manuscript.

5. Line 219: Please check the figure caption.

Response: Thank you for pointing this out. We have revised the caption of Fig. 2 (lines 216–219) to clarify the variables and their units, the two observation times, and the meanings of the labeled and NPE-filtered radar fields.

6. Lines 229–230: “We manually collected high-quality samples from the initial rule-based NPE identification results to build the training dataset”. Do you mean that the samples were all manually inspected? If yes, replace “collected” with “inspected”.

Response: Yes. All samples selected for the high-quality training dataset were manually inspected after the initial rule-based screening. We have replaced “collected” with “inspected” and expanded the description in Sect. 2.2 (lines 231–240). Specifically, two experts experienced in weather-radar interpretation examined the spatial morphology and polarimetric characteristics of the radar echoes. Ambiguous or uncertain samples were excluded from the high-confidence dataset.

7. Line 437: Correct “filed” with “field”.

Response: Thank you for identifying this typographical error. We have corrected “filed” to “field” in the revised manuscript.

8. Line 440: Correct “Scatterers” with “scatterers”.

Response: Thank you for pointing this out. We have corrected “Scatterers” to “scatterers” in the revised manuscript.

9. Line 503: Correct “Temporal” with “temporal”.

Response: Thank you for pointing this out. We have corrected “Temporal” to “temporal” in the revised manuscript.