

***Interactive comment on* “Evaluation of micro rain radar-based precipitation classification algorithms to discriminate between stratiform and convective precipitation” by Andreas Foth et al.**

Anonymous Referee #2

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Title: “Evaluation of micro rain radar-based precipitation classification algorithms to discriminate between stratiform and convective precipitation” Authors: Andreas Foth and co-authors

General comments:

The study discusses the two algorithms PDF and ANN for classifying convective and stratiform precipitation profiles based on MRR data. The authors utilizes the maximum reflectivity, mean Doppler velocity and maximum deviation in velocity within +/- 15 min. But there have been a numerous studies on this topic using various ANN based algorithms (e.g., Ghada et al., 2019, doi:10.3390/atmos10050251; Jergensen

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et al., 2020, DOI: 10.1175/WAF-D-19-0170.1). The paper is topic of interest. The authors presented only two algorithms. It could have been good to show the results from various ANN based models to discriminate the convective and stratiform profiles and compare them. Further, authors should include the validation metrics such as RMSE, MAPE, etc in tabular form for both the models. Perhaps, use of convolution neural networks (CNNs), Long-short Term Memory (LSTM) and recurrence neural networks (RNNs) will provide better forecast for time series data. However, I concern about following comments. I recommend that this manuscript requires major revision before its acceptance.

Detailed comments are provided below:

P2: Why authors are used two year data for training? Is this data covers the all dynamic ranges observed convection/stratiform? Any ANN based model, the training data should have the all range of values.

P3: Are three indices such soaring index (S), convection index (Ko), total totals (TT) derived using COSMO model data? If so, is COMSO derived indices are validated with indices calculated form radiosonde observations?

P3:L5: Why the authors are used 15 minutes interval, where MRR gives 1 minute data?

P4.L6-7: convective precipitation contains larger rain drops Is it true always? Include reference.

P4.L8-9: +/-15 min is a reasonable time span for classification of rain events.But, there are the occasions, where the life time of convection will be less than 15 minutes. Authors should modify the sentence. Include reference.

P5.L9:PDF and ANN method are based on training, the data has to be free of extreme or unphysical values.Do authors mean that the data cleansing? I understood that the data filter was performed in MRR data. If so, rewrite the sentence. However, what are the extreme values? Because, in general, if the trained data consists of all

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dynamics range, then the model will be able to predicted with better accuracy.

P5:L24: What are the modification are done in Liu et al. (2004) and Liu et al. (2009) algorithms.

P6:L23-24: the confidence of a discrimination algorithm can be improved by using three measurement variables instead of only one or two. . . . Are the proposed number of variables are sufficient? Is the model predicting better accuracy, if you consider more than three input variables? Is the prediction depends on number of depended variables? Why authors are not consider rain rate for training MLP model?

P8:L16: Is the MLP model is multivariate multi-step? I also suggest including a table with hyperparameters of MLP used in this study, rather than mentioned in the text.

P9: For readers, change line colour to red in figure 6 (m) & (n).

P9: I would rather suggest to include about “how often convective/stratiform/inconclusive profiles occur at JOYCE supersite?

P11: The relative occurrences of inconclusive profiles are equally weighting with convective/stratiform in this study? Are they meant for transition profiles?

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2020-290, 2020.

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