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Atmospheric Measurement Techniques Discussions

Interactive comment on "The Passive microwave Neural network Precipitation Retrieval (PNPR) algorithm for AMSU/MHS observations: description and application to European case studies" *by* P. Sanò et al.

Anonymous Referee #1

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This work(The Passive microwave Neural network Precipitation Retrieval (PNPR) algorithm for AMSU/MHS observations: description and application to European case studies) showed a new algorithm for AMSU/MHS, which is well written and very easy to follow. Also, the authors demonstrated four very interesting case studies. I recommend this paper get published after the author address the following issues.

Major: More conservative words should be used in the conclusion part. I have not doubt that this NN algorithm works well for all four cases shown in this paper. But

I don't think you can generalize to say that in the conclusion part "The comparison with the HSAF H02 v2.3 algorithm (operational until June 2013) confirmed the good performance of PNPR and better agreement with the ground-based precipitation data." All the statistics (Fig. 16 and Table 3) are solely based on the four cases. Therefore, before more comprehensive comparisons have been done, this conclusion can only be applied to these four cases. Maybe, the over-all performance of the H02 and NN are similar.

Minor: 1. It seems that the authors imply that the NN method is more computationally efficient than Bayesian framework. (It is worth noting that NNs are able to handle such large databases being at the same time computationally very effi-cient, as opposed to a Bayesian approach (i.e., Kummerow et al., 2001; Marzano et al., 1999; Sanò et al., 2013) which is usually employed for conically scanning radiometers characterized by one constant viewing angle.). Bayesian algorithm should be as efficient as any other algorithms. It really depends on how to set the search radius and how to construct the databases.. Some previous work showed that the Bayesian framework could be very efficient (e.g., Petty, Grant W., and Ke Li. "Improved passive microwave retrievals of rain rate over land and ocean. Part I: Algorithm description." Journal of Atmospheric and Oceanic Technology 30.11 (2013): 2493-2508. and You, Yalei. "A new over-land rainfall retrieval algorithm using satellite microwave observations." (2013)). Even in the framework used by Kummerow (2001), by adjusting the search radius, the speed will not be a big issue.

2. I am not sure I understand how the CCA has been done. ("A linear combination of TBs (LCT) at 50.3, 89, 150 GHz whose coefficients are obtained from the CCA with respect to the surface rain rate. These channels showed the highest correlation coefficients in the CCA analysis in the database for all types of background surfaces"). Generally, the CCA is applied to two multiple variables fields. Here the Tbs are multiple variables (50.3, 89 and 150), but the rain rate is single variable. So I am a little bit confused about this. Do you mean, you do PCA to the Tbs and find the best PC with

rainrate based on correlation? please explain.

3. It is mentioned that “The algorithm provides also the phase of the precipitation ... ”. Is it possible that a snow-fall case is provided? Or the Hungary (1 Dec, 2009) is the snow case?

4. It may be better to put all the figures for one case all together (e.g., Figs. 10, 11, 12). 6 panels in one figure is much easier to compare the different features.

5. Do you see any beam-filling effect for the different viewing angle? What I mean is: the rainrate over the edge will be always smaller since the the larger pixel size. Does this contribute to the underestimation of the rainfall in Fig. 16?

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