

## ***Interactive comment on “Accuracy of retrieving temperature and humidity profiles by ground-based microwave radiometry in truly complex terrain” by G. Massaro et al.***

**Anonymous Referee #2**

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This study investigates on different approaches to improve the retrievals of temperature and humidity profiles from microwave radiometer measurements in a complex terrain. In the first part of the work the authors assess how the retrievals improve when a more robust radiosonde data set is used for the training of the retrieval algorithm, and also when the data set is classified in different categories according to different criteria (seasons, day-time, nighttime). All the retrievals are compared with 84 radiosondes launched during nighttime from September 2012 to May 2013. In the second part of the work the authors assess the retrievals when additional information from in-situ measurements at fixed levels are incorporated to the algorithm.

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Main comments: I consider that this is a well-written and interesting paper. I also think that although it is interesting to see that the retrievals improved when a more robust radiosonde data set was used for training the inversion algorithm, that is something expected and not innovative as the referee 1 pointed out. However, the idea of incorporating additional information from in-situ measurements to the retrieval algorithm in order to improve the retrievals in complex terrains can be really very useful. I agree with referee 1 that the authors should go further with this line and address the points that he mentioned. I am looking forward to see how the authors address his suggestions. I also wonder if would be possible using the radiosonde data to assess how affect the horizontal distance of this a-priori information to the improvement of the retrievals.

I also want to add few minor comments:

- Page 2272, lines 9-15: I think that it would be interesting that the authors mention if they use liquid nitrogen as cold load for the absolute calibration and how often they performed this calibration. - Page 2274, lines 17-18: “Figure 3 shows the mean RMSE computed between retrieved temperature and humidity profiles and radiosondes for this dataset. “ But Figure 3 only shows temperature profiles, so please correct that. - Page 22778, line 18: for the measurement performed in the slope is better to refer as 1600 meters above the valley floor, using the terms “above ground” could be confuse because the measurement is performed at the surface.

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