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Interactive comment on “Microwave radiometer to retrieve temperature profiles from the surface to the stratopause” by O. Stähli et al.

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The manuscript describes a new instrument for remote sensing of atmospheric temperature profiles from the ground and the method of interpreting the data. It also shows examples of retrieved temperature profiles and time series, and presents an error analysis using radiosondes and satellite measurements for comparison. The subject is appropriate to the scope of AMT, and related work is properly cited. Simultaneous sensing of the tropospheric and stratospheric profiles is a novel development. The manuscript is in general well written, including a concise and complete abstract. However, some additional explanation, as noted below, would perhaps make the paper more useful to others.

In Sections 3.5 and 3.6, the a-priori temperature covariance matrix S_a is specified as

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exponentially decreasing off-diagonal. What are the advantages or disadvantages of this synthetic correlation in the retrieval compared with using a-priori statistics, e.g. from radiosondes, as done with ASMUWARA (Martin et al, 2006)?

In Section 5, the authors mention that the tropospheric profile and stratospheric profile were retrieved independently and then merged to produce the data in this paper (presumably Fig. 6). How was the merging done?

Minor comment: In the captions to Figs. 12, 17, and 19, it would be clearer to say that the dashed lines indicate plus and minus one standard deviation around the mean.

Interactive comment on *Atmos. Meas. Tech. Discuss.*, 6, 2857, 2013.

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