

## ***Interactive comment on “Matching radiative transfer models and radiosonde data from the EPS/MetOp Sodankylä campaign to IASI measurements” by X. Calbet et al.***

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We wish to thank R. Knuteson for his positive and helpful comments. His comments are reproduced in bold below.

**General Comments: This is a very interesting and potentially important validation study however an inadequate description of how the calculations were performed leads to inconclusive results. This work is very important because it has direct impact on whether bias corrections ("tuning") can or should be performed in remote sensing retrieval of tropospheric water vapor.**

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Again, we wish to thank Knuteson for the comments. We will try to improve the paper based in his comments.

**Statement from paper: "LBLRTM has a long development history and for the current study version 11.6 was adopted together with spectroscopical parameters from the HITRAN 2004 database including updates." Comment: What database updates exactly? The authors are leaving out critical information that is required to draw conclusions from this study. The details of the LBLRTM version differences 11.6 and 11.3 and OSS needs to be described. More importantly the exact spectroscopic database and "updates" must be included along with an explicit reference to where the relevant water vapor spectroscopic information comes from and whether that spectroscopic data has peer reviewed publications that describe how it was obtained. Recent presentations have shown significant differences in obs-calc depending on what spectroscopic updates are included. In particular, the work of Coudert needs to be discussed and whether the LBLRTM and OSS calculations used this information or not. Coudert et al., 2008, Vol. 251, pp. 339-351 (J. Molecular Spectroscopy) My suggestion is to greatly expand the discussion of the RTM versions and in particular how the individual calculations were performed. At a minimum, the AER line database version needs to be identified that was used for each calculation along with a reference that describes the differences of the AER database versions and where future readers can obtain those particular database versions.**

We will follow this recommendation and expand the section on RTMs describing exactly the databases used. We hope to make it clearer in the upcoming version of the paper.

**Statement from Paper: "... three different RTMs OSS, LBLRTM 11.3 and LBLRTM 11.6 "... Comment: These are clearly NOT three different RTMs since OSS is derived from LBLRTM v11.3 and LBLRTM v11.6 is an incremental change from v11.3. The authors do not state what AER database was used in the LBLRTM calculations so it is not possible to interpret the results in a meaningful way. In**

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**particular the assertion that the obs-calcs agree within the instrument noise is far too strong a statement given the lack of explicit information on the "calcs".**

Agreed that the RTMs are not completely independent to each other, but they are different version nevertheless. This will be made clearer in the upcoming version.

**My recommendation is to remove the OSS from the OBS-CALC comparison. The implication that OSS is somehow "better" than the LBLRTM version it is derived from seems absurd. If there are other reasons for showing the OSS results, i.e. because it is being used operationally at EUMETSAT for example, then that should be treated as a separate discussion where the error between OSS and LBLRTM v11.3 (calc-calc) is explicitly shown for the cases studied and those differences explained.**

OSS is important to us, because, as you say, it is a fast RTM that we need in an operational environment. We will keep OSS in the paper, but we do admit more importance should be given to LBLRTM. We will include a final figure where we plot the bias and standard deviation of OBS-CALC for one LBLRTM. A calc-calc plot will not be included because this is not the main objective of the paper, to validate OSS versus its parent RTM, LBLRTM. It is known OSS reproduces fairly well the results from LBLRTM (that is why the results are so similar (Figs. 9-13) ).

We hope the modifications introduced in the paper will make it more useful and readable. We wish to thank R. Knuteson for taking the time to comment on our paper.

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Interactive comment on Atmos. Meas. Tech. Discuss., 3, 4497, 2010.