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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Measurement of the water vapour vertical profile and of the Earth's outgoing far infrared flux" *by* L. Palchetti et al.

L. Palchetti et al.

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REPLY TO L.MILLAN-VALLE

1. COMMENT
I believe that more enfasis should be given to the fact that a uncooled detector was used. For instance, explaining the reason of using uncooled detectors which does not seem obvious because a cooled detector will offer better signal to noise ratio. Also, the title could be change in order to include with uncooled detectors.

REPLY
Also another reviewer made comments about the "unjustified" use of uncooled detectors. The rationale for the use of uncooled detectors has already been discussed in previous publications and we made the mistake of giving for granted that it is an ad-

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vantage in terms of size, weight and flexibility of applications. We shall add a short sentence to include this missing information in the revised text. Concerning the title, we prefer not to include the reference to uncooled detectors, which is recalled just below in the abstract.

2. COMMENT
More enfasis should be given to the fact that the OLR from water vapour is one of the uncertainties in climate research and numerical weather prediction.

REPLY
We are grateful to the reviewer for pointing out this further missing information, which is a fundamental motivation of this paper. A sentence will be added in the revised text.

3. COMMENT
In the abstract line 18 it is said that the derived flux differs in the far infrared (0-600) ... Are you interpolating between 0-100 cm-1 because the spectral range you used is only between 100-1400cm-1.

REPLY
No, we are not interpolating. The flux is derived from the retrieved atmospheric state by using the radiative transfer as described in Sect.5. A clarification will be added in the abstract stating that the knowledge of the atmospheric state is used to determine the spectral radiation flux ” also at frequencies that have not been observed”.

4. COMMENT
In p. 17744 when the sections are introduced, section 6 (the conclusions) is not mention.

REPLY
The following sentence will be added in the revised text: ”Conclusions are reported in Sect. 6."

5. COMMENT

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In p. 17745 some characteristics of FIRST are mentioned, I believed that if this measurements are not going to be used there is not point in mentioned. The results of the paper will be more efficient if the analysis of FIRST data gives the same results (considering that the FIRST spectral range covers the whole spectral range of REFIR-PAD)

REPLY
FIRST was mentioned as part of a discussion of the "state of the art". Actually this implies that the first paragraph of Sect.2 does not belong to this section and will be moved into the introduction.

6. COMMENT
In p. 17747 when it is mentioned that the Lorentz function is replaced with the Van Vleck Weisskopf function a explanation (maybe a plot showing the interference of the imaginary part) of why this is important for the FIR and not for the IR will make the things clearer.

REPLY
On the basis of this comment a further change will be made to the clarification made to the first comment at pag. S8818 of the "Reply to Referee 1". The following sentence will be added in the revised text: "This function represents the most rigorous model of the convolution between collisional and temperature broadening effects. The correction is important at low frequencies where the half width of the lines cannot be considered much smaller than the central frequency. Therefore it is not necessary for most of the fitted spectrum, but given its small computational cost, it was used at all frequencies."

7. COMMENT
In p. 17749 line 7 it is written errore rather than error

REPLY
It will be corrected.

8. COMMENT

ACPD
7, S9503–S9506, 2008

At the end of p. 17753 and the beggining of page 17754 it is written that the characterization of the outgoing radiation flux could be attained, using uncooled detectors ... I think that the characterization can be done also with cooled detectors.

REPLY
The sentence will be rephrased in the revised text as: ”We argue that a comprehensive characterisation of the outgoing radiation flux can be attained, even with uncooled detectors, ...’

9. COMMENT
Fig. 3 label should say temperature rather than only T.

REPLY
The label will be updated in the revised text.

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 17741, 2007.