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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Evolution, current capabilities, and future advances in satellite ultra-spectral IR sounding" *by* W. L. Smith Sr. et al.

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General Comments

This paper gives a sound historical review of the development of thermal infrared spectroradiometric nadir soundings of the meteorological state of the atmosphere from aircraft and space (temperature and water vapor profiling in the troposphere). The historic review is complemented by a manifold of science politics information about decisions of (funding) agencies. In so doing the paper provides an impressive documentation of the lifework of W.L. Smith Sr. and collaborators which is exciting to read.

From a purely scientific point of the view, the message of the paper is that using more spectral channels per wave number, and using broader spectral coverage improves

the information content (vertical resolution) of remote soundings of water vapor and temperature profiles. This message is presented in a tutorial manner via selected practical examples. It is certainly not an original and new scientific finding, however.

All in all, we found the paper worthwhile to read, but it is not what we would expect a peer reviewed science paper to be.

One way forward might be to keep this paper at the level of an ACP Discussion Paper - to serve as a good foreword for the IASI Special Issue without the compelling need to achieve ACP peer review acceptance level. This is just a possible suggestion, and I would like to render this decision to the ACP editors.

Specific Comments

1. The abstract is limited to the historical aspect while the text gives examples for (a known) scientific finding in addition, see above.

2. Science politics comments on decisions of agencies and institutions (NOAA, NASA, ...) are at times so detailed, that the reader wonders whether the authors did dominate these decisions themselves in all cases, or, if not, to which degree these statements are guesswork.

3. The following terms are used but never clearly defined and separated quantitatively from each other:

- low-resolution spectral sounding

- high-resolution spectral sounding

- hyper spectral sounding

- ultra-spectral resolution sounding

4. The title is too broad: the paper is restricted to nadir met-soundings in the thermal IR. The title does not exclude related nadir sounding systems, both in the thermal and

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near infrared, solar occultation sounders, or limb sounders (as pointed out by Reviewer #1), which are not discussed, e.g., MOPITT, SCIAMACHY, GOSAT, etc.

5. The list of references contains an unusually high fraction of grey literature.

6. Fig. 1 might become more scientifically quantitative via being complemented by a Table giving relevant technical information on the different sounding systems (like spectral resolution and coverage, etc.).

7. Fig. 13 frames are too small.

End of Review

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 6541, 2009.