

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

### **Anonymous Referee #1**

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The paper highlights history and development of high spectral resolution atmospheric nadir sounding. It is a helpful summary of the current state of the art and of the scientific evolution over the last years, but it contains little new science. It clearly demonstrates what can be done with this technique today, but it does not advance one specific scientific issue. The paper is surely helpful for political and strategic discussions in operational meteorology, but it will not directly stir scientific discussion.

It is well structured and clearly written. The abstract summarizes the historic aspect of the paper, but does not make any reference to the retrieval examples and validation results that are shown.

The paper completely ignores the second development line in high resolution atmo-

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spheric IR spectroscopy. This line, concentrating on the limb emission observation strategy and represented by space instruments like TES (US) and MIPAS (EU), also contributed essentially to the technological and methodical advancement of the field.

Specific comments:

Chapter 5: An error analysis is missing. Fig. 3 and 4 do not contain any error bars. A quantitative comparison is therefore not possible. Has the sonde data been degraded to the vertical spatial resolution of the nadir sounder?

Chapter 6: Here IASI data and IASI data that has been degraded to ABI level is compared. In both cases the IASI retrieval code has been used. It seems more logical to me to use the ABI retrieval code for the second case. The reasoning should be made clear.

In general, the interpretation of the data is performed in a very qualitative way. In particular, the comparison with the drop sonde data is not convincing. Fig. 7 is too small, at least in a print-out.

Chapter 7: The description of the retrieval of wind is very basic. I assume that retrieval studies have been performed. It would be interesting to see exemplary results of such studies.

Chapter 8: Fig. 9 is not extremely illustrative. In fig. 11, a residual plot between the two spectra is missing. For fig. 11 as well as 12, information about the parameterization (spatial and temporal integration) is missing. I could not conceive the message of fig. 13.

In summary, the paper is worth publishing after improvement, but from its intention and content it would better fit in 'Atmospheric Measurement Techniques'.

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

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