

## ***Interactive comment on “Monitoring of atmospheric composition using the thermal infrared IASI/MetOp sounder” by C. Clerbaux et al.***

### **Anonymous Referee #1**

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#### General

This is an introductory paper to a series of more detailed papers and has been reviewed as such. The paper is generally sound, but is somewhat long in places. It would benefit from being shortened before final publication.

#### Specific Major Comments

Section 1 – Introduction – As I understand it the AIRS instrument is not “dedicated to operational weather forecasting” - it is a research instrument. It certainly has improved weather forecasting, but it is on a research satellite, not an operational one.

The list of tropospheric sounders is limited to the Fourier Transform spectrometer instruments and even then omits significant instruments such as GOSAT, ACE and the

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like.

In the next sentence (8310-9) reference is made to “compromises” but there are no statements of what these were.

Section 2.1 – This is mainly a repeat of Table 1 in words

Section 2.4 – Figure 2 has two lines on it, but they are not distinguished

Section 3.2.1 – The discussion of “FLG\_CLDSUM” is confusing. First it is a flag (8317-9), then it is a percentage (8317-11) – but what a percentage of what is not defined. In the next sentence (8317-13)  $FLG\_CLDSUM > 0$  is the problem condition. I am not sure that introducing what is obviously a program variable name is helpful at this point – but more explanation of the meaning of this indicator would be helpful. Also it would be useful to tie this back to the statement (8316-12) that “only data that are not contaminated by clouds . . . were selected for further processing. . .”

The last sentence of 3.2.1 (8317-14) does not fit there and its significance is unclear. Where do the emissivity data come from and how are they related to the cloud filtering?

Section 3.2.3 – 8319-27 indicates that data were validated with GOME-2 products and with a chemistry-transport model – it’s probably only my opinion, but in my opinion validation essentially involves the comparison of two measurements and therefore validation cannot be performed using one set of measurements and a model.

Section 3.3.1 – This is where averaging kernels play a significant role. 8321-12 gives the basis for the plots of Figure 7, but fails to specify where the first level of the temperature profile occurs and what the averaging kernel appropriate to that level looks like. Since the entire discussion is about separating the temperature near the surface from the temperature at the surface, this information is important. The essential question is: Are the measurements of temperature at the first atmospheric level independent of the temperature measurements of the surface?

The explanation of Figure 7 is also rather long

4 Conclusions and Discussion – much of this section is a re-iteration of the rationale and characteristics of the instrument. It could be significantly shortened without loss to the paper. There are references to several useful websites, etc. – but these are neither discussion nor conclusions of the paper and should be moved into another section.

Specific minor comments:

8309-1.1 “Atmospheric remote sounding from satellites is an. . .”

8309-21 “The preparation of such satellites missions starts long. . .”

8310-13 “Eumetsat in October 2006 in a polar orbit.”

8310-29 “considered as a first step for the”

8311-15 “The focus here is on species that are relevant to the chemistry, leaving aside the ones of significance for climate studies.”

8312-17 “solar backscatter for wavenumbers >2000cm<sup>-1</sup>

8312-23 “The raw spectra are of high” [not sure what is meant by “on-fly”]

8313-13 “delivers about 1 300 000 spectra per day.”

8317-24 “..constrained) also taking. . .”

8318-15 “Systematic retrievals of trace gas species started as soon as. . .”

8318-16 “Datasets of more than 18 months duration are available. . .”

8324-26 “The authors acknowledge. . .”

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Interactive comment on Atmos. Chem. Phys. Discuss., 9, 8307, 2009.

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