

Atmospheric Chemistry and Physics Discussions

Special Issue: The IASI instrument onboard the METOP satellite: first results

Manuscript Number: acp-2009-65.

Monitoring of atmospheric composition using the thermal infrared IASI/MetOp sounder by Clerbaux et al.

Reply to Anonymous Referee #2

This paper provides an overview of the IASI instrument and some of the trace gas retrievals. It is generally well written and useful, with only some minor corrections needed. The results presented are very impressive!

Dear Reviewer 1,

Thanks a lot for the useful comments and enthusiastic review. We took them all into account, and a detailed point-by-point reply is provided hereafter.

1. Pg. 8309, l. 2 “satellites”; l. 15, “a unique”; l. 21 “for such satellite missions”.

2. Pg. 8310, l. 14 “in a polar orbit”.

3. Pg. 8313, l. 15 “allows the reduction of”

In the new version of the manuscript, the changes were done as suggested, for these 3 comments.

4. Pg. 8316, l. 8, for IASI it is not the lineshape that gives vertical resolution for IASI because at 0.5 cm^{-1} apodized resolution no individual lines are resolved. There are basically two cases for IASI: species for that are optically thin and have no vertical resolution (i.e., DOFS < 1), and species like water for which at least some lines are optically thick. The degree of optical thickness controls the height at which sampling occurs so that a very optically thick line has a weighting function that peaks high in the atmosphere. A clear statement of these points is required here.

Thanks for pointing this out. We made some changes in the paragraph to make it clearer, it now reads: “For cloud free situations, nadir looking TIR instruments can measure the atmospheric radiation down to the ground and, for some species, vertical information can be derived, provided ground emissivity, surface temperature and atmospheric temperature are known at the location of the measurement. For species that are optically thin total columns are retrieved, and for species like water vapour or ozone for which at least some lines are optically thick, profiles can be retrieved.”

5. Pg. 8318, l. 26, km? and “total column content”.

6. Pg. 8320, l. 14, “elevated”.

7. Pg. 8322, l. 4 and 13, replace “orbit” by “overpass”; l. 6, “edge of a continent”.

8. Pg. 8323, l. 12, “pioneering”.

9. Pg. 8324, l. 26, “authors”.

In the new version of the manuscript the changes were done as suggested, for these 5 comments.

10. Pg. 8322, replace the word “contamination” in two places by “contribution”. Some people are interested in the stratosphere!

Good comment! This was corrected as suggested.

Replace “CH₃OOH” by “CH₃OH”.

Thanks for noticing this typo.

11. Pg. 8366, “Arctic” in figure caption.

Corrected

Some of the units need to be explained, e.g., kg/kg for water (k is not capitalized) and ppm for methane. What exactly is being plotted in these two cases? The figures and scales are also hard to read.

- kg per kg is the unit that Eumetsat chose to provide water vapour content
- Methane is provided in ppm so that the plot not only shows the topography, as it is the case when CH₄ is plotted in total column units. Here we divide by the air density to remove this effect.

We completed the caption to provide more information relating to this.