

Interactive comment on “The effect of sensor resolution on the number of cloud-free observations from space” *by* J. M. Krijger et al.

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Answer to Referee 2

4 October 2006

1 Summary

First the authors would like to thank the referee for his comments. Our replies to the comments are provided below referring to the same numbering as used by the referee. All comments were very useful and have been incorporated in the revised manuscript.

2 General Comments

1. The current paper quantifies cloud statistics. The effect of cloudiness on the accuracy of trace gas retrievals is different for different trace gases and outside the scope of this paper. For a number of trace gases this information can be found in other papers (such as Boersma et al., 2004; Koelemeijer et al., 1999; Meirink et al., 2005; Gloudemans et al., 2005). These are referenced in the introduction.

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2. "along-track column" is a row of pixels in the along-track direction. The text has been changed to clarify this:

Granules containing more than 50 faulty (as indicated by the MODIS Quality Assurance) pixel-rows in the along-track direction (which equals 3.6% of the total granule) were discarded.

3. The variance was due to low temporal variation, which we discuss into more detail in referee#1 response. Doubling the temporal sampling results in a more cloud-free North European summer, as expected. The spring is now more cloudy, but remains similar in cloudiness as the summer due to two (unexpected) very cloud-free days in April 2004.

4. The problem is that the increase of cloud-free observations gives infinite values in grid-cells where cloud-free observations are completely absent. Therefore we choose to present the data as cloud-reductions.

5. Caption was in error and corrected.

6. Absolute differences do not show any relative increase/decrease of useful observations, (as no information is present on the original amount of cloudiness). Doing so would require more figures to show the original amount, which also requires from the user to visually compare the exact same location on two different figures. As such the authors chose to present the information in a single figure allowing the reader to easier draw all information from a single figure.

7. The referee is right. It should read *We have also demonstrated .. largest in the more cloudy regions and seasons*. The following sentence starting with *However, it is ..* is therefore also deleted.

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3 Technical Corrections

1. Done

2. The 60x30 km² SCIAMACHY footprint is for 0.25 sec integration time (IT). The 0.125 sec IT (30x30 km² footprint) is only used in selected states and thus not globally applied in contrast to the 0.25 sec IT, which is globally applied. Because we focus in the paper on the global dataset we preferred to refer to the 60x30 km² footprint. Nonetheless, very generally speaking, 30x30 km² is better. We changed the text accordingly.

Envisat has a footprint on Earth ranging from 30 km× 30 km to 240 km× 30 km (across × along track)

3. Sentence has been changed to: *with a swath of 2330 km across track and a field of view 10 km along track (at nadir)*

4. ERS-1 changed to ERS-2.

5. Sentence has been changed into: *Instead, our interest being in future Earth observation of air quality*

6. Tabel changed into Table

7 and 8. The division into three latitude bands has now been made consistent, in both text, figures and table. Sentence has been changed to:

First we arbitrarily broke up the land-mass of northern South-America into three regions: South (5° S–20° S), Equator (5° S–5° N), and North (5° N–20° N) as indicated by solid lines in ...

9. Corrected

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 4465, 2006.

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6, S3523–S3526, 2006

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