Atmospheric
Chemistry
and Physics
Discussions

Open Access

Interactive comment on "Diurnal, seasonal and long-term variations of global formaldehyde columns inferred from combined OMI and GOME-2 observations" *by* I. De Smedt et al.

Anonymous Referee #1

Received and published: 30 April 2015

This is an interesting and relevant publication, which I recommend to be published in ACP. The manuscript describes in great detail the retrieval algorithm used to infer tropospheric formaldehyde (HCHO) columns from the OMI and GOME-2 satellite instruments. The derived products are then evaluated and analyzed for temporal and spatial variability and trends.

The authors provide a clear description of the products and tools used and the analysis applied. The paper is very well written and easy to read. Accompanying their analysis the authors give a good demonstrations of the limitations of the products and their interpretation while at the same time highlighting the value and possible applications

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

of the data set. This is very important information for users of satellite derived HCHO products.

Their analysis also yields some interesting scientific results that reflect the changes in human activity on tropospheric chemistry such as emission reductions in Western Europe and the Eastern US or changes due to deforestation in the Amazon.

I have a few comments and questions I appreciate if the authors could address:

(1) I am confused whether the SCIAMACHY time series was also processed with the new algorithm. In Section 6 GOME-2 and SCIAMACHY are used combined for analysis, so I assume both rely on the same retrieval algorithms? A good agreement between the two products is mentioned on Page 12265, line 5 with reference to Fig 14-16, but to me the graphs do not seem to make this clear. Have there been any more comprehensive comparisons to ensure consistency between the different products?

(2) Also related to Fig 14-16 I wonder if the authors have an explanation for why the trend series over California is not significant for OMI and only significant for SCIA/GOME-2. For all other regions either both or only OMI show significance which as they mention is reasonable giving the higher HCHO columns at the OMI overpass.

(3) Fig 14-16 as referenced in the text are not in line with the Figure order.

(4) Section 3.2: I could not quite follow how this correction is applied. It is stated that the median column over the Pacific is subtracted from the slant columns together with a polynomial latitudinal fit and then replaced by the latitudinal dependence of modeled HCHO columns (the same model as used for a priori I assume). Would one expect that over the Pacific the HCHO columns are then near-zero? And why are the corrected columns larger than the uncorrected columns. It would help if this part is rewritten to describe the individual steps in a very clear way.

(5) Figure 9: It would help to adapt the colorscale of this Figure to show the same scales for both GOME-2 and OMI yet resolve hotspots.

C2132

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 12241, 2015.

Interactive
Comment

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper