**Atmospheric
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Comment

Interactive comment on "Retrieval of global water vapour columns from GOME-2 and first applications in polar regions" *by* S. Noël et al.

Anonymous Referee #1

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There is much interest in the water vapour products from GOME-2 and other instrument in this class and this paper provides a good first view of the quality of the water vapour product that can be expected from GOME-2. With regard to the analysis of the deviations between GOME-2 and SCIAMACHY it would be useful first to assess the possible East-West biases or other errors in the GOME-2 data in isolation before comparing to SCIAMACHY. This will help in assessing the origin of the residual differences between GOME-2 and SCIAMACHY. The analysis presented implies that the AMC-DOAS algorithm itself may introduce some East-West biases in the GOME-2 data as a result of the wider swath which would weaken the case for the differences between GOME-2 and SCIAMACHY being related to temporal sampling for example. It would be helpful to rank the possible sources of the differences in terms of likelihood

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rather than providing a number of possibilities with no expressed opinion on the most likely. Additionally, has comparison to water vapour products from other instrument on Metop been considered. This could give an additional independent (in ter,s of class of measurement) view of the quality of the GOME-2 water vapour data. Please discuss.

For more detailed comments see below.

Line 17 pg 17540 replace "have a look at" with "see" Line 24 pg 17540 Please clarify the altitude range for which temperature increase in the Arctic is expected to be largest. Line 20 pg 17541 Replace "sun-fixed" with "sun-synchronous" Line 4 pg 17452 were any modifications to the AMC -DOAS algorithm required to accommodate the wider swath of GOME-2? Line 14 pg 17544 Which version and configuration of SCIATRAN is used - pseudo-spherical? Lines 8 - 20 pg 17545 This hypothesis would explain the difference between GOME-2 and SCIAMACHY data however on pg 17544 there is an indication that there is an East-West asymmetry in GOME-2 data itself which may arise from the AMC-DOAS algorithm as discussed on pg 17544 or from calibration effects. An clear analysis of whether there is a systematic bias in the GOME-2 data itself, either from AMC-DOAS or calibration, would be useful as a starting point before assessing the hypothesis that the GOME-2/SCIA effects due to different temporal sampling. Line 25 pg 17545 note that the frequency of GOME-2 narrow swath data has been reduced to once per month

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