

## ***Interactive comment on “Highly resolved global distribution of tropospheric NO<sub>2</sub> using GOME narrow swath mode data” by S. Beirle et al.***

### **Anonymous Referee #1**

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This manuscript is particularly interesting for its use of the GOME narrow swath mode (NSM) data and the investigation of resolution effects. I recommend publication after revision.

#### General comments:

Figure 4 and the associated discussion are anecdotal and not convincing as an explanation of the streaking in Figure 3b. The streaking persists over deserts such as the Sahara or central Australia where no large seasonal variation in NO<sub>2</sub> would be expected. The streaking may arise from incomplete removal of instrumental artifacts. Figure 4 and the associated discussion should be cut (or better justified). The method to correct for streaking seems appropriate even if the streaking does not arise from seasonal variation in NO<sub>x</sub> emissions.

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The linear relation between forward and backscan measurements may arise from snow cover if the cloud detection algorithm reports a snow covered scene as a cloudy scene. Snow cover would have the opposite effect of clouds in many cases. The correlation in Figure 9 is only applied to data in the continental northern hemisphere where snow confounds interpretation. Does the linear relationship exist in the tropics?

The grammar should be improved. A number of errors exist.

Specific comments:

Is the seasonal correction used to produce Figure 3c also applied to the NSM backscan? Inconsistencies would affect interpretation of Figure 9.

The discussion of the NO<sub>x</sub> lifetime should be related to previous calculations based on in situ measurements or model calculations. The mean wind speed (1 m/s) used in this calculation is low, even for a lower limit.

Technical comments:

Abstract: suggest change "allow to detect" to "allows detection" 1st sentence of introduction: suggest change "due to" to "since"

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Interactive comment on Atmos. Chem. Phys. Discuss., 4, 1665, 2004.

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