

## ***Interactive comment on “Intercontinental transport of nitrogen oxide pollution plumes” by M. Wenig et al.***

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The paper presents GOME measurements and FLEXPART simulations of long range transport of NO<sub>2</sub> from SA pollution sources. I fully agree with the authors that they provide evidence for transport of boundary layer pollution from the African continent to the sea. However, for several reasons I believe that the impact of lightning produced NO<sub>x</sub> is underestimated in the study:

- Many of the GOME pixels with high NO<sub>2</sub> presented in the study are partially cloudy and close to regions where LIS detects lightning. This is no coincidence as transport and thunderstorm activities are closely related.
- Pollution NO<sub>2</sub> is probably partly hidden below clouds whereas lightning produced

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NO<sub>x</sub> has a tendency to accumulate in the upper part of the cloud where it can be detected by GOME (see the paper presented by Hild et al. at the last EUROTRAC meeting).

- It is not clear from the text, how the authors estimated the integrated lightning contribution from the sparse LIS measurements.
- In another case study in the same region, comparably large NO<sub>2</sub> signals could be linked to lightning detected by LIS while transport of polluted boundary layer air could be excluded (Hild et al., manuscript in preparation).

My interpretation of the observed NO<sub>2</sub> would therefore be, that it is a combination of transport of pollution NO<sub>x</sub> from SA and in-situ lightning produced NO<sub>x</sub>, the latter probably providing the larger contribution in the later phase of the transport event. In so far, also the main conclusion of the paper concerning intercontinental transport would be affected.

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