



## **Monitoring of transatlantic long range transport of tropospheric NO<sub>2</sub> – Observation and simulation**

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The TEMIS Air pollution monitoring - Long-range transport (<http://www.temis.nl/lrt/>) data product's goal is to obtain a better understanding of the long-range transport of air pollution by using OMI satellite measurements, and FLEXPART simulations, to monitor the outflow of NO<sub>2</sub>. Currently the service is restricted to the North Atlantic region.

The OMI measurements provide us with the advantage of having daily global coverage with a high spatial resolution (13 by 24 km at nadir). Retrievals of the NO<sub>2</sub> slant column data are done with the DOAS technique. From these, the vertical tropospheric columns are derived using a combined modeling / retrieval / assimilation approach.

To avoid problems with high uncertainty of the retrieved tropospheric column due to an unknown quantity of NO<sub>2</sub> below the clouds, a corrected airmass factor was applied to the slant column, obtaining an observable (but shielded) value of the tropospheric NO<sub>2</sub> vertical column density. This value is likely to represent the total tropospheric column assuming that above the ocean there are no significant sources and that transatlantic transport mainly takes place above the clouds (typically 4-6 km, as indicated by trajectory simulations). Therefore the cloudy and cloud-free retrieval values can be taken together above oceans to form one congruent field.

Additionally the TEMIS long-range transport product also contains FLEXPART simulations of NO<sub>x</sub> outflow. This allows for better data interpretation, source allocation and adds information on the vertical distribution of the outflow. While not a quan-

titative tool, initial comparisons between OMI and FLEXPART look promising. To allow for even better comparisons we have recently implemented a temperature dependence of the NO<sub>x</sub> lifetime into the FLEXPART program. This way the extremely large overestimations of boundary layer NO<sub>x</sub> are avoided.