



Towards validation of tropospheric nitrogen dioxide columns from space with columns deduced from ambient air measurements at different altitudes in the Alps

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Monitoring of atmospheric trace gases is of importance to observe trends and to confirm the success of air pollution measures. The extension of ground-based monitoring networks - as for instance the Swiss National Air Pollution Monitoring Network (NABEL) operated at EMPA – with tropospheric columns from space will be an important future step to exploit the new technologies in order to reach this aims.

Space-borne tropospheric columns are rarely validated. We present a possible validation method of space-borne tropospheric columns using measurement data from the Swiss National Air Pollution Monitoring Network (NABEL) and two alpine stations from Germany (Zugspitze, Wankgipfel). The specific orographic situation in the alpine region allows operating measurement stations at different altitudes. With these measurements assumed to be representative for the lower free troposphere under favourable conditions a tropospheric column can be estimated. In order to account for the decreasing sensitivity of space-borne instruments towards the lower part of the troposphere, these “ambient air columns” are further combined with averaging kernel information.

Using tropospheric nitrogen dioxide (NO₂) columns from the Global Ozone Monitoring Experiment (GOME) first comparisons are made and the potential for being used as an additional validation method is discussed.