



## **Tropospheric NO<sub>2</sub> retrieval via DOAS method using airborne GeoTASO data over the Korea Peninsula during KORUS-AQ campaign**

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KORea-United States Air Quality (KORUS-AQ) campaign is a joint study between National Aeronautics and Space Administration and National Institute of Environmental Research of Korea to improve the ability of air pollution monitoring from space-born measurements.

We retrieved tropospheric nitrogen dioxide (NO<sub>2</sub>) slant column density (SCD) via Differential optical absorption spectroscopy (DOAS) method from the GEOstationary Trace and Aerosol Sensor Optimization (GeoTASO) LV1B data during the KORUS-AQ period.

These NO<sub>2</sub> SCD were converted to tropospheric vertical column density using a linearized pseudo-spherical scalar and vector discrete ordinate radiative transfer (VLIDORT) with the inputs of trace gas profiles from the Community Multiscale Air Quality (CMAQ) model, Geostationary Ocean Color Imager (GOCI) aerosol optical depth, and Moderate Resolution Imaging Spectroradiometer (MODIS) single scattering albedo and surface reflectance.

In this campaign period, tropospheric NO<sub>2</sub> has a large values in Seoul and metropolitan area.

The tropospheric NO<sub>2</sub> retrieved GeoTASO has certain correlation with surface NO<sub>2</sub> volume mixing ratio obtained from in-situ measurements which is located within 2 km. We also investigated the uncertainties of the NO<sub>2</sub> retrieval in terms of AMF calculation. Errors of 20%, 0.04, 0.01 and 1 km error of AOD, SSA, surface reflectance, and aerosol peak height lead to GeoTASO NO<sub>2</sub> AMF error up to 18.0, 8.6, 24.1, and 37.1%, respectively.