



The Potential Role of Biogenic Soil Emissions of Nitric Oxide for the Tropospheric Nitrogen Dioxide Column Density over Oasis Ecosystems in the Extremely Arid Regions of Northwestern China

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Even in arid soils, nitric oxide (NO) is microbiologically produced in the uppermost soil layers. Once NO is emitted from soils, it will be rapidly oxidized by atmospheric ozone (O₃) to nitrogen dioxide (NO₂), which (under daylight conditions) will partially be photolyzed back to NO, or will react with the OH radical to form gaseous nitric acid. In our contribution, we will present a first estimate of the potential role of NO soil emissions for the tropospheric NO₂ column density over typical, agriculturally used oasis ecosystems in the extremely arid region of northwest China (Xinjiang Uyghur Autonomous Region). For that, we have chosen three oases in the Ruochang region (Uyghur: Qakilik), which is climatologically classified as one of the few cold desert climate regions of the world.

For our study, we analyzed monthly mean tropospheric NO₂ column densities (molecules cm⁻²) based on SCIAMACHY data for 2006. We compare satellite observation data for the residential heating periods (December & January) with those

from the period of highest agricultural activity (August-October, no heating season). Our analysis resulted in $(1.49 \times 10^{15} \text{ NO}_2 \text{ molecules cm}^{-2})$ for December and $(1.15 \times 10^{15} \text{ NO}_2 \text{ molecules cm}^{-2})$ for September. This simply means, that for the tropospheric NO_2 concentration levels over the study area, the NO emissions from soil might be as important as the more anthropogenic sources (heating).

NO_2 column densities deduced from satellite data will be compared to those which are calculated from measurements of NO release from soils of the Xinjiang province and the application of a standard (area source) dispersion model.