



## **Nördlinger Ries campaign on Soil Emissions (NORISE) – DOAS measurements of NO<sub>2</sub> and HCHO in an agricultural region**

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Soil is a major source of total nitrogen oxide (NO<sub>x</sub> = NO + NO<sub>2</sub>) emissions with a fraction of about 15% on a global basis. Soil emissions, stemming from bacterial emissions of NO, are controlled by abiotic and microbiological processes which themselves depend on ambient environmental conditions like soil type, moisture content, temperature as well as agricultural management practices such as fertilization. In recent laboratory experiments it was found that dry soils also exhibit enhanced emissions of several volatile organic compounds (VOC) including HCHO when first wetted.

A campaign dedicated to the analysis of trace gases emitted by soils was organized in the Nördlinger Ries in Bavaria, Germany, a 25 km wide circular plain, formed by a meteor impact about 14.5 million years ago and nowadays dominated by arable land.

The main objective of the NORISE campaign is to characterize trace gas levels in a highly agricultural environment. The time frame, consequently, comprises a whole growing season from April 2014 to January 2015. The focus is on trace gases which can be measured using the DOAS approach in the UV/VIS spectral range, i.e. NO<sub>2</sub> and HCHO, using two mini-MAX-DOAS instruments and one long-path DOAS instrument.

The retrieved NO<sub>2</sub> and HCHO column densities are examined for long-term variations over the entire growing season and short-term events which are both linked to environmental conditions like precipitation patterns and temperature changes. In addition, the analysis of soil samples taken from fields, distinguished between organic and conventional cultivation, gives further insights into soil activities.