

MEASUREMENTS OF NO₂ USING A MOBILE DOAS SYSTEM IN GORJ COUNTY, ROMANIA

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Abstract: *In this work we present Differential Optical Absorption Spectroscopy (DOAS) measurements performed on board of a motor vehicle in Gorj County, Romania. The mobile DOAS system used is based on a UV-VIS spectrometer, a fiber optic, a telescope, a GPS system and a portable PC. The target trace gas is the nitrogen dioxide (NO₂). The measurements were performed on July, 19th 2013, in the area of two important industrial power plants located nearby Rovinari and Turceni city. The recorded spectra were analyzed with the QDOAS software to produce NO₂ Differential Slant Column Densities (DSCDs). During our measurements, close to the power plants, very large amounts of NO₂ ($\sim 1.2 \times 10^{17}$ molec./cm²) were detected.*

Keywords: *nitrogen dioxide, mobile DOAS observations*

1. Introduction

Nitrogen dioxide (NO₂) is a trace gas which is known as an important pollutant in the atmosphere, influencing both tropospheric and stratospheric levels. The main anthropogenic sources of NO₂ are related to transport and industry while biogenic sources are mostly due to the microbial activity in soil, the oxidation of ammonium nitrate and lightning [1]. Previous studies have confirmed that NO₂ has a harmful influence on human health and vegetation [2].

The Differential Optical Absorption Spectroscopy (DOAS) technique [3] [4] is one of the most commonly used methods for the determination of NO₂ at tropospheric and stratospheric levels. The DOAS technique is a well established method which has been successfully used for the determination of atmospheric trace gases absorbing the solar

radiation in the spectral range from the UV to the Visible. NO₂ can be determined by the DOAS technique from different static or mobile platforms such as cars [5], airplanes [6], UAV [7] and satellite sensors like SCIAMACHY [8], OMI [9] and GOME-2 [10].

2. Methodology and Data

In this work we present mobile DOAS zenith-sky measurements performed in Gorj County, Romania. The measurements were performed on July, 19th 2013 in the vicinity of two important power plants from Romania located nearby Rovinari (44.9°N, 23.15°E) and Turceni city (44.66°N, 23.38°E), (see Figure 1). The measurements were started from Târgu-Jiu city at 7.85 UTC and ended at 11.62 UTC around Turceni city. During the car measurements, three rounds around the