

## Height Resolved Ozone Information from GOME Satellite Data

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### Abstract

The derivation of stratospheric ozone information from UV nadir measurements from space is a well established technique. The channel 2b of the ERS-2 GOME spectrometer is potentially suited to retrieve information on tropospheric ozone as well. At the University of Bremen a Full Retrieval Method (FURM) based on the optimal estimation formalism was developed. For the radiative transfer calculations the forward model GOMETRAN was implemented. It was designed at Bremen University for the evaluation of GOME data and allows the simultaneous computation of the multiple scattering radiance field and of weighting functions for various atmospheric constituents. In this paper vertical distributions of O<sub>3</sub> including tropospheric information derived with FURM from GOME channel 1a (240nm - 314nm) and channel 2b (312nm - 405nm) data are presented. In this spectral region the backscattered solar radiance is influenced by gaseous absorption, scattering by air molecules, aerosols and clouds, and by surface reflectance, which therefore have to be included in the fit process. Retrieval results in the troposphere may be improved by adding a fit parameter based on the temperature dependence of the O<sub>3</sub> absorption cross sections in the Huggins bands. In addition to these parameters the so called Ring effect (rotational Raman scattering on N<sub>2</sub> and O<sub>2</sub> molecules) has to be taken into account in the retrieval. A description of FURM including error analysis and an estimate of the height resolution of the retrieval are given. Finally, a comparison with independent measurements (selected sonde and satellite measurements) is made.

**Keywords:** ESA European Space Agency - Agence spatiale europeenne, observation de la terre, earth observation, satellite remote sensing, teledetection, geophysique, altimetrie, radar, chimie atmosphérique, geophysics, altimetry, radar, atmospheric chemistry