

Pole to Pole Validation of the ERS-2 GOME Level 2 Products with the Ground-based SAOZ Network

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Abstract

The Global Ozone Monitoring Experiment (GOME), on-board the ESA ERS-2 platform, is a nadir-viewing UV-visible grating spectrometer observing the solar radiation scattered from the atmosphere or the Earth's surface. It aims at the measurement of total ozone, NO₂, OCIO and BrO, by application of the differential optical absorption spectroscopy (DOAS). As part of the GOME Geophysical Validation Campaign started on 20 July 1995, correlative ground-based observations of total ozone and NO₂ have been collected from seventeen SAOZ and SAOZ-like UV-visible DOAS spectrometers, at a variety of sites in the world, over an extended latitude range.

The comparison results between the GOME level 2 products (mainly total ozone) and the correlative SAOZ observations at high, middle and low latitudes are presented, including 1996 ozone hole conditions in Antarctica. The GOME pixels are selected such as the effective location of the satellite observations matches at best that of the zenith-sky ground-based measurements.

On average the GOME version 2.0 and the SAOZ total ozone are in close agreement. However the comparison still shows a clear dependence on the solar zenith angle of the GOME measurement as well as a difference in sensitivity. When combined together, the SZA dependence and the reduced sensitivity result in a high ozone column underestimation which amplifies at large SZA. Possible reasons for the discrepancies between GOME and SAOZ have been identified and quantified.

Keywords: GOME, ozone, nitrogen dioxide, stratosphere, validation, DOAS