NDSC SUPPORT TO THE DEVELOPMENT OF ERS-2 GOME GEOPHYSICAL DATA

Lambert Jean-Christopher

E-mail: lambert@bira-iasb.oma.be
Belgian Institute for Space Aeronomy (IASB)
Avenue Circulaire 3
Telephone: 0032 2 373 0468
Fax: 0032 2 374 84 23

Co-author/s:
M. Van Roozendael, M. De Maziere, et al.

ABSTRACT

Operating aboard the ESAs ERS-2 heliosynchronous polar satellite since 1995, the Global Ozone Monitoring Experiment (GOME) measures the solar irradiance and the Earth radiance from 240 nm through 790 nm, at 0.2-0.4 nm spectral resolution. The atmospheric abundance of several trace species - such as O3, NO2, BrO, OClO, CH2O and SO2 - is derived from GOME spectra using differential absorption spectroscopy techniques. GOME has proven to be a major component of the global observing system and is the successful prototype of a series of new-generation spaceborne sensors.

The ground-based Network for the Detection of Stratospheric Change (NDSC) is another major contributor to the global observing system for atmospheric composition. Started in 1991, at the present time the NDSC includes five primary and two dozen complementary stations distributed from the Arctic to the Antarctic. The column abundance and vertical distribution of key atmospheric constituents are monitored at NDSC stations by a variety of complementary techniques and instruments such as UV-visible spectrometers, Fourier transform infrared spectrometers, lidars, millimeter wave radiometers, and ozone sondes. A main goal of the NDSC is to provide an independent calibration and validation of satellite measurements on the global scale as well as in the long term.

Through the geophysical validation of GOME data products and retrieval algorithms, ground-based observations associated with the NDSC have played a unique role in the further development of GOME. The NDSC provided an extensive, high-quality database to the GOME validation campaign conducted during the ERS-2 commissioning phase. It has generated well-controlled correlative data records needed for the quality assessment and the long-term verification of operational GOME data products. It has provided experimental support to advanced studies focusing on specific aspects of data retrieval. Furthermore, the synergistic use of GOME, NDSC and other correlative data has enhanced their geophysical exploitation.

The present paper highlights several contributions of the NDSC to the further development of GOME data products. Focusing on the integrated exploitation of multi-technique network data records, it also illustrates NDSC capabilities for the pseudo-global and long-term validation of future GOME-like spaceborne sensors.