Readme file for

GOME Level 2 version 5 products

Field	*Content*
Document Title	Read me file for GOME Level 2 version 5 products
Reference	DLR/GOME/RFM, Issue 1.0 Date September 2012
Affected data sets	This readme file applies to the GOME Level 2 products generated with the GOME Level 2 Data Processor Version 5.
Abstract	Major changes in version 5 compared to previous versions 4.x, and details on the Level 2 data set from the full mission reprocessing campaign.
Product Specification References	[1] R. Spurr, M. van Roozendael, D. Loyola, C. Lerot, J. van Geffen, J. van Gent, C. Fayt, J.-C. Lambert, W. Zimmer, A. Doicu, S. Otto, D. Balis, M. Koukouli, C. Zehner, GDP 5.0 Upgrade of the GOME Data Processor for Improved Total Ozone Columns — Algorithm Theoretical Basis Document, DLR/GOME/ATBD/GDP5, Iss./Rev. 1B, August 2012. [2] J-C. Lambert, M. Koukouli, D. Balis, J. Granville, C. Lerot, and M. Van Roozendael, GDP 5.0 Upgrade of the GOME Data Processor for Improved Total Ozone Columns — Validation Report, TN-IASB-GOME-GDP5-VR, Iss./Rev. 1B, August 2012. [3] D. Loyola, W. Zimmer, S. Kiemle, P. Valks, M. Pedergnana, Product User Manual for GOME Total Columns of Ozone, NO2, tropospheric NO2, BrO, SO2, H2O, HCHO, OClO, and Cloud Properties, DLR/GOME/PUM/01, Iss./Rev. 2E, August 2012. Documents [1], [2], and [3] are available on: http://earth.eo.esa.int/pcs/ers/gome/reprocessing [4] Van Roozendael, M., et al. (2012), Sixteen years of GOME/ERS-2 total ozone data: The new direct-fitting GOME Data Processor (GDP) version 5— Algorithm description, *J. Geophys. Res.*, 117, D03305, doi:10.1029/2011JD016471. [5] Brion, J., Chakier, A., Daumont, D., Malicet, J., Parisse, C. (1993) High-resolution laboratory absorption cross-section of O3. Temperature, effect *Chem. Phys. Lett.*, 213, 610-612
Filled by	Diego Loyola, DLR

Change log

This document shall be amended by releasing a new edition of the document in its entirety. The Table below records the history and issue status of this document.

Issue	Date	Change
1.0	August 2012	First release

Description	# Total Ozone GOME Level 2 GDP data version 5.0 (GDP5) includes a complete new retrieval algorithm (GODFIT) for total ozone, as described below and in References [1] and [4]. Previous GDP total ozone algorithms up to GDP 4.x were based on the DOAS method. ## *Retrieval set-up* GDP5 is based on the GODFIT algorithm created by BIRA/RTS/DLR. GODFIT includes direct radiative transfer simulation of earthshine radiances and Jacobians with respect to total ozone, albedo closure and other ancillary fitting parameters - a temperature profile shift, and amplitudes for undersampling and Ring-effect interference signals. Simulations are based on climatological ozone profiles extracted from the TOMS Version 8 database, classified by total column amounts. GDP5 uses the high-resolution Brion-Daumont-Malicet ozone absorption cross-sections [5], replacing older GOME-measured flight model data. The semi-empirical molecular Ring correction developed for GDP4 has been adapted for direct fitting. Cloud pre-processing for GDP5 is done using updated versions of cloud-correction algorithms OCRA and ROCINN. ## *Product characteristics* Total ozone and effective temperatures (temperature shift) are retrieved for every single measurement. Error bars and averaging kernels for each measurement are provided as part of the retrieval algorithm.

Cloud information (cloud fraction, cloud-top pressure and optical thickness) are derived directly from GOME measurements.

Details can be retrieved from [1] and [3].

Known problems and features

Retrievals under snow/ice conditions and strongly cloud-contaminated scenes (cloud fraction > 0.85) are more difficult and the results may be less accurate. Corresponding flags are included in the product (see [3] GOME Product User Manual, chapter 6.5 “Cloud Properties Group” and chapter 6.8 “Detailed Quality Description”).

Initial Validation Results

The reprocessed GOME GDP5 record maintains the remarkable long-term stability of time series at the percentage level already achieved with GDP4. Furthermore, validation results show a clear improvement in the accuracy of the ozone product with reduced solar zenith angle and seasonal dependences, particularly in comparison with correlative observations from the ground-based network of Brewer spectrophotometers.

Details on the validation analysis and results are available in [2].

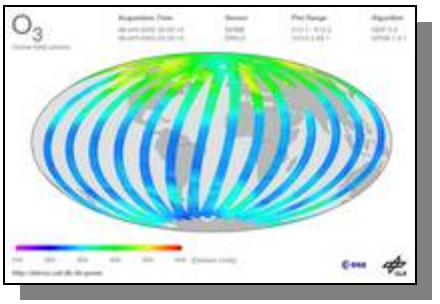
Total NO_2

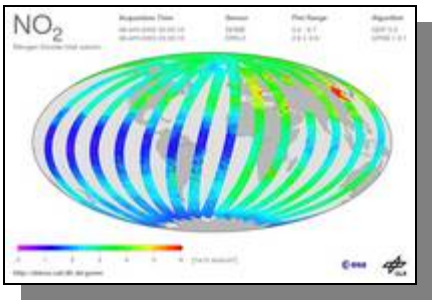
There are no changes on the total NO2 product. They are computed using the same algorithm as with the previous GDP 4.x.

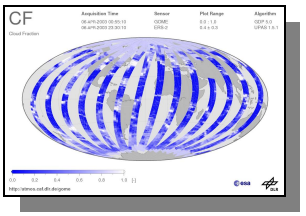
Additional Resources

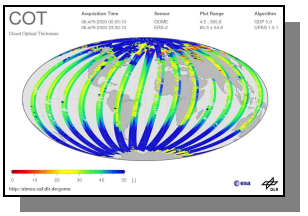
Additional information on GDP and the operational products including imagery can be found at:

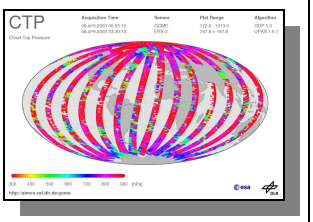
http://atmos.eoc.dlr.de/gome











All relevant documents can be download from:

http://atmos.eoc.dlr.de/gome/documentation.html

and

http://earth.eo.esa.int/pcs/ers/gome/reprocessing