EGU2020-15059
https://doi.org/10.5194/egusphere-egu2020-15059
EGU General Assembly 2020

The FDR4ATMOS Project

Günter Lichtenberg[1], Sander Slijkhuis[1], Mourad Hamidouche[1], Melanie Coldewey-Egbers[1], Bernd Aberle[1], Stefan Noël[2], Klaus Bramstedt[2], Tina Hilbig[2], Tim Bösch[2], Jean-Christopher Lambert[3], Jeroen van Gent[3], Daan Hubert[3], Paul Green[4], Sam Hunt[4], Matthijs Krijger[5], Angelika Dehn[6], and Gabriele Brizzi[7]

[1]German Aerospace Centre (DLR), Remote Sensing Institute (IMF-ATP), Weßling, Germany (guenter.lichtenberg@dlr.de)
[2]Institute of Environmental Physics / Remote Sensing (IUP/IFE), University of Bremen, Bremen, Germany
[3]Royal Belgian Institute for Space Aeronomy (IASB-BIRA), Brussels, Belgium
[4]National Physical Laboratory (NPL), Teddington, Middlesex, United Kingdom
[5]Earth Space Solutions (ESS), Utrecht, The Netherlands
[6]ESA-ESRIN, Frascati,Italy
[7]Serco, Frascati, Italy

The Fundamental Data Record for ATMOSpheric Composition (FDR4ATMOS) project is part of the ESA Long Term Data Preservation (LTDP) programme aimed at the preservation and valorization of data assets from ESA's Earth Observation (EO) Heritage Missions. It has two objectives. The first one is to update the SCIAMACHY processing chain for better Ozone total column data. After the full re-processing of the SCIAMACHY mission with the updated processor versions 9 (Level 1) and version 7 (Level 2), ground-based validation showed that the total Ozone column drifted downward by nearly 2% over the mission lifetime. This drift is likely caused by changes in the degradation correction in the Level 1 processor, that led to subtle changes in the spectral structures. These are misinterpreted as an atmospheric signature. FDR4ATMOS will update the Level 0-1 processor accordingly with the final aim of a mission re-processing.

The main objective of the FDR4ATMOS project is to develop a cross-instrument Level 1 product for GOME-1 and SCIAMACHY for the UV, VIS and NIR spectral range, with focus on the spectral windows used for O3, SO2, NO2 total column retrieval and the determination of cloud properties. Contrary to other projects, FDR4ATMOS does not aim to build harmonised time series based on Level 2 products (geophysical parameters) but to build a Fundamental Data Record (FDR) of Level 1 products, i.e. radiances and reflectances. The GOME-1 and SCIAMACHY instruments together span 17 years of spectrally highly resolved data essential for air quality, climate, ozone trend and UV radiation applications. The goal of the FDR4ATMOS project is to generate harmonised data sets that allow the user to use it directly in long-term trend analysis, independently of the instrument. Since this was never done for highly resolved spectrometers, new methods have to be developed that e.g. take into account the different observation geometries and observation times of the instrument without impacting the spectral structures that are used for the retrieval of the atmospheric species. The resulting algorithms and the processor should also be as generic as possible to be able to easily transfer the methodology to other instruments (e.g. GOME-2 and

Sentinel-5p) for a future extension of the time series. The project will support new applications and services and will enhance traceability of satellite-derived data with improved uncertainty estimates based on rigorous metrological principles.

FDR4ATMOS started in October 2019 and is currently in phase 1. We will present the motivation, goals and first results of the project.