TRACE GAS VALIDATION AND QUALITY ASSESSMENT SYSTEM FOR ATMOSPHERIC SENSORS ON METOP

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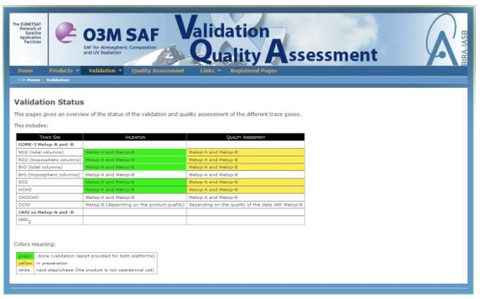
Introduction

As part of the EUMETSAT's Satellite Application Facility on Ozone and Atmospheric Chemistry Monitoring (O3M-SAF), BIRA-IASB has been responsible for the validation and Quality Assessment (QA) of a number of trace gases products. For the second phase of the Continuous Development and Operations Project (CDOP-2) a new **Trace Gas Validation and Quality Assessment (TGV-QA) web-portal** has been set-up, which **aims at providing in near-real-time complete information on the status of the operational data products from GOME-2 and IASI on the successive Metop platforms**. The current version of the TGV-QA portal (**www.cdop.aeronomie.be**) is **operational** for **NO2, BrO** and **HCHO** total and tropospheric column measurements of **GOME-2/Metop-A** and **Metop-B**. For the current phase of the CDOP project (until 2017), the system will be developed to cover a number of additional gases measured by the GOME-2 and IASI sensors (NO2, BrO, HCHO, SO2, glyoxal, HNO3 and OClO) on board of the three EUMETSAT MetOp platforms. The validation approach is based on an **end-to-end methodology** where individual components of the level-1-to-2 retrieval chain are addressed. Evaluations are carried out using a suite of **correlative observations** performed by **complementary ground-based remote sensing instruments** (**zenith-sky and direct sun DOAS, MAXDOAS, and FTIR** from selected NDACC stations) and **satellite instruments** (**GOME, SCIAMACHY and OMI**) supported by radiative transfer and chemical-transport modelling tools. We present a demonstration of the system and focus on selected regions where correlative ground-based measurements are currently available, with a particular emphasis on the MAXDOAS stations operated by BIRA-IASB at Observatoire de Haute Provence in South of France and Beijing/Xianghe in China.

www.cdop.aeronomie.be

■ The trace gas validation and quality assessment web-portal is now operational for NO_2, BrO and HCHO validation part from GOME-2 on Metop-A and Metop-B:



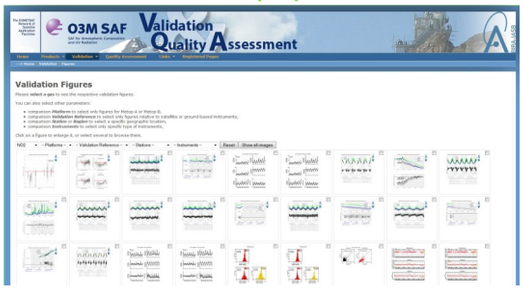
Validation: full validation exercise for new products before reaching operational status (e.g., new gases and Metop-B products)

Quality Assessment (QA): regular online monitoring of operational products, in order to ensure their stability (internal verification by the developer institutes + regular comparisons to correlative datasets, performed by the validation groups)

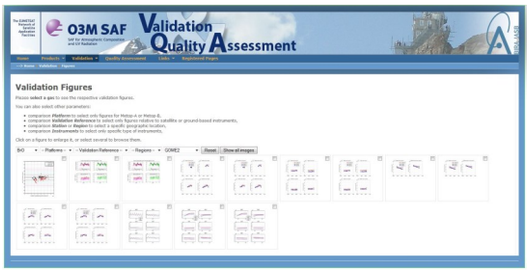
The quality assessment part will follow soon, with regular comparisons with other satellite datasets and available ground-based measurements.

■ Examples of the validation tab for NO_2, BrO and HCHO:

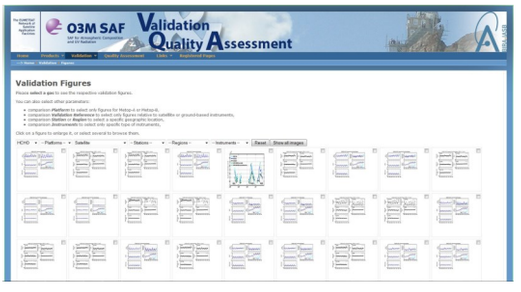
NO2: total and tropospheric columns



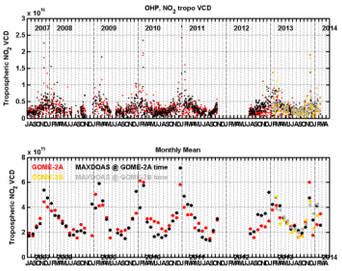
BrO columns

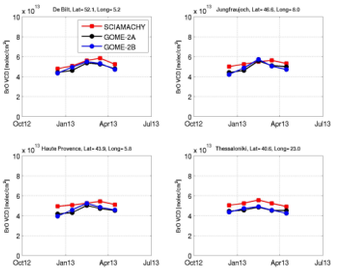


HCHO columns

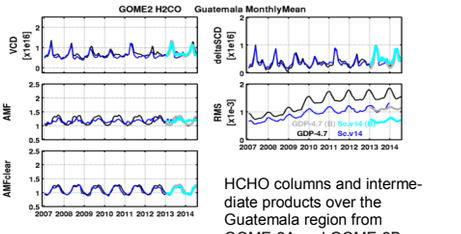


Tropospheric NO_2 columns at OHP from MAXDOAS, GOME-2A and GOME-2B.



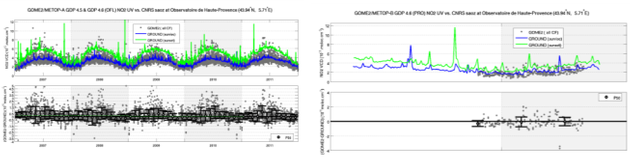


BrO columns over selected regions from SCIAMACHY, GOME-2A and GOME-2B.

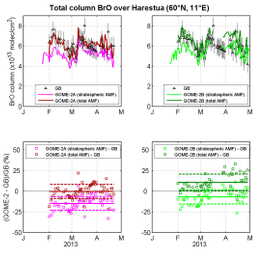


HCHO columns and intermediate products over the Guatemala region from GOME-2A and GOME-2B from the operational (GDP-4) and the scientific product (Sc.v.13).

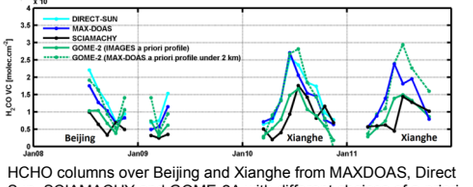
See also poster n° 172, De Smedt et al.



Total NO_2 columns at OHP from SAOZ, GOME-2A and GOME-2B.



BrO columns over Harestua station, from ground-based zenith sky, GOME-2A and GOME-2B.



HCHO columns over Beijing and Xianghe from MAXDOAS, Direct Sun, SCIAMACHY and GOME-2A with different choices of a-priori profile for the retrieval of HCHO columns.

Visit our website and see all the validation figures and reports for GOME-2 on Metop-A and on Metop-B!!

Next steps

- In the next months: online Quality Assessment figures.
- In the next years: extension to other trace gases measured by the GOME-2 and IASI sensors, such as glyoxal, HNO_3 and OClO.
- The validation system will largely benefit from harmonization and automatization of the ground-based remote-sensing data within the NORS project (Demonstration **N**etwork **O**f ground-based **R**emote **S**ensing Observations in support of the GMES Atmospheric Service).

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