

SCIAMACHY Validation and Interpretation

- SCIAMACHY occultation product versus SAGE III (presentation by Ghassan Taha)
- Summary of validation activities
- Product quality status reports
 - ◆ Level 1
 - ◆ O3 + NO2 column
 - ◆ Other products
- Open issues from SCIAVALIG meeting (9-9)
- Long-term validation status



Summary of validation activities

- Several large campaigns have been successfully performed:
 - ◆ M-55 / Sicily balloon
 - ◆ Kiruna balloon campaign (4 payloads)
 - ◆ Mauna Loa campaign
 - ◆ Mantra balloon (Canada)
 - ◆ Falcon campaign (operating now)
- UARS and other relevant satellites were operated
- Many ground-based measurements were performed
- Central Website has undergone a lot of changes
- German validation website now on-line
- "German contribution to the validation of SCIAMACHY" → published
- High-level "SCIAMACHY Validation Plan" (NIVR) → final stage
- "SCIAMACHY Detailed Validation Plan" (SCIAVALIG) → final stage, to be published in approx one month
- First verification activities are performed within SCCVT



Product quality status reports

- ➡ Operational level 1b products are available at the satellite receiving institutes.
- ➡ We have not seen any 'operational' level 2 product yet: 7 level 0 files have been processed with a stand-alone version of the prototype processor to level 1b and level 2 and given to the verification teams.
- ➡ We have not seen any OL products yet.
- ➡ Operational meteo-products in BUFR format are available to the meteo-cal/val PIs
- ➡ The reports here are on the 7 level 1b files, with the current SciaL1c applicator, the 7 level 2 files and the meteo products.



Level 1

➡ Irradiance:

- ◆ Average difference with Kurucz is very small for channels 1-3, 5, 6 (R. de Beek), after transmission corrections also for channel 7 and 8
- ◆ Channel 4 shows offset → better with 'alternative' (IFE) calibration
- ◆ Differences are less than 3%

➡ Radiance:

- ◆ Polarisation correction is not performed: expected errors up to 10-20%
- ◆ Several issues still open, no estimate on the systematic errors
- ◆ Scan-angle dependence in channel 7 and 8 (M. Buchwitz)

➡ Polarisation:

- ◆ Q values are 0 too often, and there seem to be strange 'forbidden values' for certain parts of the orbit
- ◆ U values (theoretical and PMD 7) show unrealistic behaviour
- ◆ Polarisation from overlap regions is always 0



Level 2

☞ O3 column UV:

- ◆ 5-10% too low for $\text{sza} < 88$ (SCIA-FM vs GOME-FM)
- ◆ Large scale pattern are ok
- ◆ Between -60000 and +20000 DU for $\text{sza} > \sim 90$, most are 0 DU, AMFs are negative and zero. (bug, to be fixed)
- ◆ Slant columns look realistic

☞ O3 column vis: much too high, not correlated with O3 (UV) (calibration)

☞ NO2 column:

- ◆ Values are realistic for $\text{sza} < 88$
- ◆ Tropospheric NO2 is not visible (GDP 2.4)
- ◆ Negative, 0 (or much too high) values for $\text{sza} > \sim 90$, AMFs are negative and zero (bug, to be fixed)
- ◆ Negative values in the tropics (GDP 2.4)

☞ Clouds:

- ◆ Cloud fraction is 1 everywhere (algorithm requires PMD-initialisation (?))
- ◆ Cloud top pressure has unrealistic values (?)



Level 2 (continued)

- ➡ Other UV/Vis columns are missing (wrong number of fitting windows)
- ➡ NIR columns are very unrealistic (calibration, but not only?)
- ➡ CO₂ is 0 everywhere, H₂O (ch 8) is negative everywhere
- ➡ METEO products: ozone is unrealistic (?)



Open issues from SCIAVALIG meeting (9-9)

Concerns:

◆ Data distribution

- ☞ Verification team has 7 level 2 NRT files, no OL products yet
- ☞ Most validation teams have received no data at all, and no official message on when to expect it (other than 15 August)
- ☞ OL products (including profiles) will not be available before mid December

◆ Data processing

- ☞ People who have to do the updates in calibration (SOST, IECF) don't get a continuous flow of data → data processing will not be up-to-date

◆ Operational algorithm development

- ☞ There is no clear schedule for level 2 development, other than a milestone for O3 and NO2 profiles
- ☞ It is not clear how much effort will be put in the implementation of new scientific findings



Open issues (continued)

- ➡ Proposal: to centralise the validation of scientific products
 - ◆ With a form on the web site, validation scientists can enter their measurement coordinates, times and product types
 - ◆ A tool to find the right states, extract the level 1, with the right clusters, to facilitate the processing by scientists
 - ◆ List all processed states and products on the web site
 - ◆ Validation scientists directly contact the product-developers for the data, to make sure that they get latest versions and additional info and also to feed back their results.
 - ◆ Preliminary validation results can be put on the restricted access part of the web site.
- ➡ Validation workshop 20/21 November (in conjunction with TROPOSAT), only if there is data!



Long term validation

☞ Funding situation:

- ◆ Netherlands: funding secured until (and including) 2005
- ◆ Germany: funding until (and including) 2003, after that only little funding which may be used for delays in existing products (but not enough for what is needed)
- ◆ Belgium: part financed by PRODEX is secured, part financed by GMES proposal is waiting for approval.

☞ VINTERSOL initiative

