SCIAMACHY Quality Working Group (SQWG-3)

Progress Meeting 6

Telecon

14 June 2016 9:30 – 13:00
15 June 2016 9:30 – 12:00

Minutes

Version 2

Participants:
C. Lerot, A. Keppens (BIRA-IASB)
A. Dehn (ESA)
G. Brizzi (Serco)
K. Bramstedt, P. Liebing, S. Noël, K. Weigel (IUP)
G. Lichtenberg, S. Gretschany (DLR)
M. Krijger, R. Snel (SRON)

Agenda, see: *00_SQWG3_PM6_Agenda_v1.pdf*

Project Status

General/contractual issues (ESA/all)

- The CCN (extension of project to include verification/validation activities for the SCIAMACHY Level 2 data sets) from ESA was received at University of Bremen and is currently waiting to be signed by the university administration. There is a delay due to administrative issues; BIRA was informed about the status by email.
- The German national funding is extended until end of 2017 (to be aligned with the CCN). The budget is not large but makes it possible to continue some activities based on national funding.
- Normal activities, which are not part of the CCN, continue as planned and will end in January 2017. The CCN covers only verification/validation from BIRA (corresponding to activities that previously were covered through a separate contract, the MULTI-TASTE contract) and management from IUP.
- The ESL contract with DLR instead is currently ending in May 2017.

Status reprocessing L1V8, L2V6 (ESA/DLR)
Presentation by G. Brizzi, see:
01_2_SQWG3-PM6_ESA_on_reprocessing_v1.pdf

- The **L1V8** data are available from DissHarm (scia-ftp-ds.eo.esa.int) since 6 May 2016. 98.84% of all available L0 orbits could be processed to L1b (V7.04 99.0%). The complete L1V8 documentation is available at:

https://earth.esa.int/web/sppa/mission-performance/esa-missions/envisat/sciamachy/products-and-algorithms/products-information

- SciaL1c v3.2 was released and should be used instead of the version previously available for SQWG, but there are probably only minor updates. Version released is 3.2 revision 6 (6 Aug 2015).

- V7.04 is available at D-PAC until autumn 2016

- Issues for some orbits (47) were discovered after the public release. They will be documented in the README file and should be fixed for L1V9 if possible.

- **L2V6** processing is completed and available for expert users at D-PAC server eoa-dp.eo.esa.int. The public release is planned for end of 2016. The size of the files has increased due to new species. Note the change in the number of O3 profiles to extend the retrieval up to 65 km: L2 v5 data has 4 profiles while L2v6 has only one profile per tangent height.

- 32 products have format inconsistencies, 98.61 % of L1 data are available as L2.

- A L2 Readme File draft is circulated for revision/inputs.

- Feedback on the quality of the L2v6 products is expected also from SCILOV.

Verification/validation results L2V6 (BIRA)
- Data download complete after internal release of L2V6 May 27.
- There are no results, yet. Currently the file conversion is running.
- The full mission validation should be ready for PM7 in September and will be presented at ACVE.

Status operational products / baseline L1V9, L2V7 (DLR-IMF)

Level 1
Presentation by G. Lichtenberg, see: *02_sgp-l012-status-pm28.pdf*
- **WP2250** and **WP2270**: implementation completed.
- **WP2160** (Individual Pixel Characterisation for DBPM): implementation completed and verified.
- **WP2220** (Dark Calibration): new, corrected dark values received by SRON in March. Rare NaNs in values will be treated as bad pixels; more frequent NaNs in errors will be replaced by nearest neighbours. For documentation a reference to the existing summary about the data base and how it is generated will be added to the ATBD.
- **WP 2240** (Spectral Calibration Channel 6+): ISRF tested on sun data, implementation will be done off-line to relax schedule. For implementation only a change of the calibration data base is necessary.
- **WP2120** (Investigate/improve ESM diffuser solar reference spectra) and **WP2140** (Investigate/improve degradation correction): First version of SMM was already implemented. Update retarder matrix and ESM SMR pending. Waiting for final set of m-factors. K. Bramstedt will send an example file to

clarify the format of the m-factor file and continue with the implementation now; only the values will change for final m-factor file. ESM calculation should be changed from stepwise mean to individual spectra and mean of all. Edges (first 10/20 spectra) need to be left out. K. Bramstedt/SRON will define the range to be skipped at the edges consistent with m-factors.

AI-PM6-01 Send an example file to clarify the format of the m-factor to DLR (K. Bramstedt, IUP).

AI-PM6-02 Provide details on how to average SMR spectra to DLR (K. Bramstedt, IUP).

- **WP2260** (Investigate/improve polarisation determination and correction): Implementation of GOME-CHEOPS algorithm is finished and the ATBDs were analysed. A request for inputs (test data, unclear points) will be sent this week; afterwards (in the next two weeks) iterations between DLR and IUP Bremen are necessary. Schedule is on critical path, but so far no delay expected.
- **WP2210** (Investigate/improve and consolidate L1 errors): Information was sent from DLR to SRON and errors will be implemented in the process. Polarisation errors need to be done by P. Liebing. Documentation of error calculation is described in ATBD for V8, needs to be checked. Updates for the key data changes need to be considered. The error calculation will be reviewed after the polarization is done. A list which errors are considered and how they are derived should be provided as first result of WP2210 in September.

AI-PM6-03 Provide a list which L1 errors are considered and how they are calculated (DLR, September 2016).

- **Other L1 tasks**: The porting to new CFI geolocations library and the scial1c update for netCDF will be done after the baseline is finished.

Level 2

- **WP3110** (Documentation and improvement of error calculation): Not started yet, implementation has higher priority and WP3110 depends on the calculation of L1 errors (WP2210). Unrealistic high L2 errors are possible if they are calculated based on L1 errors, because error cancellation/correlations are not considered. There is no L1 error correlation matrix. If L1 is ready in September, not much can be done for L2. Most probably the error calculation can only be documented not improved.

Presentation by S. Gretschany, see:
02_2_SQWG3_PM6_BrOtropo_LimbClouds.pdf

- **WP3140** (Limb cloud flagging): Implementation is finished, verification, i.e. comparison to IUP reference data needs to be done.
- **WP3240** (Tropospheric BrO): The verification data set was processed by BIRA. Tropospheric BrO at DLR is currently produced with the prototype processor; implementation in the operational processor is ongoing. Filtering for cloud fractions is not adjusted completely between DLR and BIRA, therefore 5% of data (mainly over ice) could not be considered in the comparison. A small offset is found between the BIRA and DLR data. The reason is

differences in the total BrO columns and mainly caused by a disagreement in the AMF for CTHs between 3 and 8km.

New product format

Presentation by G. Lichtenberg, see: *02_sgp-l012-status-pm28.pdf*

- Sample products have been sent out after the MTR in February 2016. Major comments or objections for them should be sent in the next 4 weeks, smaller comments can afterwards still be taken into account until end of August, when the implementation will be completed.

Schedule

- L1 and L2 baseline have to be finished in September 2016. L1 schedule is critical but still possible, L2 is on schedule.

- Current planning is to have the polarisation implementation ready in the beginning of August 2016.

- The first draft of the L1 verification report by DLR will be delivered before August, the skeleton baseline status report end of June.

- Verification report for L2 is pending. Agreement on verification data set is needed: standard verification data set with 200 orbits or diagnostic data set with about 5000 orbits (not possible without generation of data base).

AI-PM6-04 Check if it is sufficient to use the verification data set for a first assessment of L2 data quality; if not, provide a list of required orbits. (BIRA)

Recent findings

Degradation correction (SRON/IUP)

Presentation from J.M. Krijger, see:
03_ESS_SQW2_PP_001_PM6_contamination.pptx

- **WP2140** (Degradation correction): An issue with the ESM diffuser correction was found and needs to be corrected. Unrealistic OBM m-factors were found for shorter wavelengths. Model constraints need to be changed to correct it. Since it is more pronounced for small aperture it should not matter much for most data. New model version will be finished in the coming days.

- L1V8 over-correct non-existent degradation (as seen for V7 < 1%) for >600nm (about 2-3%). This should be corrected for V9. The correction requires only parameter changes, no code change necessary. A short description of this issue (~20 lines) should be included in the L1V8 README file.

AI-PM6-05 Write a description about the over-correction of the degradation for L1V8 for the README file. (SRON).

- Final version of the m-factors needed in the beginning of July at IUP to compute retarder parameters, DLR needs them latest for L1 effect on L2 verification in late August.

AI-PM6-06 Provide final set of degradation correction parameters (SRON, beginning of July 2016).

AI-PM6-07 Provide an m-factor file based on final degradation correction parameters but with retarder parts set to zero (K. Bramstedt, IUP, beginning of July).

AI-PM6-08 Produce retarder parameters (P. Liebing, IUP, end of August 2016).

- A difference in SCIAMACHY solar irradiance around 800-1000nm compared to other instruments was found. It can only be corrected if the reason is known. The new set of m-factors is needed to look into it in more detail. Probably it will not be corrected but documented in the baseline.

AI-PM6-09 Document the difference in SCIAMACHY solar irradiance around 800-1000nm in the README for L1V8. (K. Bramstedt, IUP).

Phase 2 Activities

WP1300: SCIAMACHY Product Handbook maintenance (IUP)
Presentation from K. Weigel, see:
04_1_Handbook_SQWG_PM6_20160615.pdf
- Updates needed for content (change to L1V9, L2V7, replace outdated figures, links, and reference, update text were necessary) and formatting (numbering, equation format, page separation).
- Formatting inputs will be done first until end of July, updates for content start afterwards.

AI-PM6-10 Send list with necessary formatting updates to G. Brizzi (K. Weigel, IUP).

AI-PM6-11 Include/organize formatting changes (G. Brizzi, ESA, end of July 2016).

WP2230: Test degradation correction (SRON/KNMI)
- First comparisons for L1V8 have been performed, see also presentation from J.M. Krijger (03_ESS_SQW2_PP_001_PM6_contamination.pptx)
- Similar investigations are planned for L1V9. It would be useful to have a corresponding test data set (e.g. one day per week) as early as possible, this could be without polarisation/retarder.

AI-PM6-12 Check to if it is possible to provide an extended test data set without polarisation (and until when) (DLR, 24 June 2016).

WP3260: Link SCIAMACHY time series to follow-on sensors (IUP)

- IUP will create a TN with a table containing information on which products can be used in combination with previous and follow-on sensors to generate long-term time series and possibly existing projects covering this generation. A first version is expected in September 2016.

WP4400: Review of documentation (IUP)

- Not started yet. IUP will review documentation for L1V9/L2V7 for completeness based on a list provided by DLR. Focus will be to check if relevant information for a future data user is missing, no detailed individual review of all documents will be performed in this WP.

<mark>AI-PM6-13</mark> Provide a list of documents describing the current product versions, i.e. ATBDs with corresponding reference documents (DLR, until PM7 in September 2016).

- **The SQWG team recommends that all available relevant SCIAMACHY documentation should be archived at ESA in the context of long-term data preservation.**
  This is not part of this work package but important to start before people are leaving the institutes. ESA plans to archive all available documents to make them accessible for future data users. To allow the others to check if their institute has additional documents, ESA will provide a list of existing documents in the archive. Before documents are destroyed they should in doubt rather be stored and sent for sorting and archiving to ESA. This might require an additional dedicated project.

WP4600: Summary of L1 and L2 baseline status (DLR-IMF)

- A skeleton document will be provided in June (see above); an example document will be ready in July, the final version in November 2016.

General

Schedule / Work plan (all)
Presentation by S. Noël, see: *05_1_SQWG3_PM6_Schedule_v2.pdf*

- Both L1 and L2 baseline are expected to be ready until end of August such that after that verification activities can start.
- The work plan for the degradation correction activities is as described above.
- **WP2150** (Investigate/improve polarisation key data): Remaining issue: SRON to provide the documentation on how keydata have been calculated
- **WP2210** (Investigate/improve and consolidate L1 errors): A list of errors and how they are implemented will be provided by DLR (see <mark>AI-PM6-03</mark> above). SRON will provide a TN describing how key data errors are derived until October/November 2016. Using this and the ATBD, DLR will provide a final TN on how errors are implemented until end of this year.
- **WP3110** (L2 Errors): start after September 2016, as for L1 final document will be provided by the end of the year.
- **WP3140** (Limb clouds): Can be closed, verification is a separate WP.

- **WP2230** (Test degradation correction): For L1V8 the test was performed (see above). For L1V9 the tests are planned but depend on the availability of reprocessed data. If possible data products without retarder and polarisation (extended test set, ~1 day/week) will be used, TBC.
- **WP4700** (Implementation of standard product format): Some comments to the L2 format were sent from IUP in March. Additional comments to the L2 format are required. The new product formats are planned to be implemented in October 2016. New example products should be provided as answer to the comments.

Status AIs (IUP)

Presentation by S. Noël, see: *05_2_SQWG3_PM6_AI_v2.pdf*

- **AI-MTR-2**: closed. Answer from IUP: It is difficult to transfer findings from the scientific O3 limb processing to the operational one due to more complex calculations and because the scientific algorithm development is not completed.
- **AI-MTR-14**: closed. Answer from IUP: the implementation should be possible, but some adaptations would be required to use the tropospheric NO2 algorithm also for O3. These changes mainly mean to switch off some parts of the NO2 algorithm and to consider that for O3 only one profile per state is available instead of four for NO2.

AI-PM6-14 Check if tropospheric O3 can be included in the operational processor based on the existing tropospheric NO2 routines (DLR).

- **AI-PM5-4**: closed. Complete geolocations for lunar states can be included in the new format. The necessary information can be derived with the CFIs.

AI-PM6-15 Send exact definition what geolocation information needs to be included. (K. Bramstedt).

- **AI-MTR-3**: Needs albedo data base from BIRA, open
- **AI-MTR-4**: open
- **AI-MTR-5**: open
- **AI-MTR-10**: closed
- **AI-MTR-11**: closed, replaced by AI-PM6-03

Date/place of next meeting (all)

- **PM7**: will take place in Bremen for two half days: 21./22.09.2016, starting/ending 14:00
- A telecon can take place in-between with part of the SQWG, if necessary.

AOB

- Please send more detailed inputs for the Monthly Reports.
- Ralph stops to work at SRON in summer. The team thanks him for his long-time support and his valuable contributions to the project.
- **Contributions to ACVE:**
  - L1/L2 posters from G. Lichtenberg
  - Validation results BIRA (possibly oral)
  - More contributions if possible

- **SSAG:**
    - o It was proposed to have an SSAG end of the year/beginning of next year by J. Burrows.
    - o An SSAG meeting at the end of the year (shortly before the ministerial conference) is considered to be not useful. It should be discussed if February/March 2017, i.e. after or together with the final meeting of SQWG is possible.
- To create an overview when people are available during summer all should send their planned vacation times to S. Noël or K. Weigel who will then provide the corresponding list to the partners.

<mark>**AI-PM6-16** Provide vacation times (summer 2016) of relevant key personnel to IUP (SN, KW) (all, until 04.07.2016)</mark>