Minutes of Meeting

Meeting #5 of MIPAS Quality Working Group
4-5 October 2004
ESA ESRIN- Frascati

LEVEL 2

- J. Smeets (S&T) describes the monitoring of the quality of MIPAS products performed by means of the IDL-based software QUADAS. He describes the draft of the MIPAS daily report.

AI_L2_5.01 ESA to put the draft of the MIPAS daily report on the Uranus server.

AI_L2_5.02 All to review the draft of the MIPAS daily report.

The monitoring of the temperature shows a discontinuity in the polar region.

AI_L2_5.03 IMK to check if the observed temperature discontinuity can be explained by stratospheric warming.

J. Smeets shows the monitoring of the convergence flag, from which it seems that the NRT retrieval does never reach convergence. This is due to an error in the interpretation of the convergence flag, so almost all the NRT retrievals reach convergence.

AI_L2_5.04 S&T to modify the plots reporting the convergence of the retrievals in agreement with the convergence flag.

The monitoring of the tangent pressure versus latitude shows an excessive variation in correspondence of about 80 degrees north. In general MIPAS products include the results of non converged retrievals.

AI_L2_5.05 S&T to regenerate the plots with filtering/indication of non-converged retrievals.

J. Smeets (S&T) shows the plot reporting the differences between the engineering and the retrieved tangent altitudes.

B.Carli (IFAC) suggests that it is better to show the difference between the engineering and the retrieved differences between two consecutive altitudes, instead of the correction on the absolute altitude.

J. Langen (ESA) points out that as a monitoring quantity the correction on the absolute altitude may be a better quantity.

J. Smeets (S&T) shows the plot reporting the fitted offset, and an orbital variation of the offset is osservable.

B. Carli (IFAC) suggests that probably this variation is due to the water vapour continuum that interferes with the fit of the offset.

J. Smeets (S&T) describes the monitoring of the ADFs.

C. Piccolo (OU) notices that some times in level 2 products there are more files corresponding to the same orbit, with the same scans but with different retrieved values.

AI_L2_5.06 All to send pathological products to ESRIN.

J. Smeets (S&T) describes how QUADAS works.

AI_L2_5.07 S&T to extract the table showing the database content.

- R. Mantovani (ESA) describes the Level2 IPF configuration. In IPF 4.62 the anomalies of cloud detection, negative variance values and profile counting bug have been fixed. The V4.0 and V4.1 of ADFs are ready, but they have not been disseminated yet.

- R. Mantovani (ESA) describes the data anomaly status.
  The excessive processing time for Level 2 off-line processing has been temporarily solved changing the ADFs. The zero-pressure values anomaly will be solved in the next IPF delivery. The 1 second difference between NRT and OFL products and the PCD dataset anomaly are under investigation. In the ozone pT error propagation matrix the values are set to zero or are very large; this problem affects also the prototype and is under investigation by S. Bartha (ASTRIUM). The number of sweeps per scan in one orbit processed with V4.61 off-line appears to be 22 instead of 17; the problem has been addressed to S. Bartha (ASTRIUM).

- S. Ceccherini (IFAC) with reference to AI_L2_4.07 proposes an alternative procedure to determine the vertical altitude grid of the retrieved profiles. The proposed procedure uses the hydrostatic equilibrium and the ECMWF pressure profile to determine a reference altitude. S. Ceccherini (IFAC) proposes to choose as reference the altitude corresponding to the nominal tangent altitude of 33 km, where the error in the retrieved pressure is minimum.

J.-M. Flaud (LPPM) notices that at 33 km the ECMWF values are not reliable and it would be better to choose a lower altitude to use as reference altitude compatibly with the fact that at low altitudes clouds could be present.

T. Steck (IMK) says that at IMK they use 20 km as reference altitude. If a cloud is present at 20 km they choose the lowest altitude free by clouds as reference altitude.

The suggestion is also made of using for this correction all the information contained in an altitude range.

- S. Bartha (ASTRIUM) describes the ML2PP status. The patch SCR35 to add to ML2PP in order to process data at reduced spectral resolution was delivered to ESA and to IFAC. This patch is available for Solaris 2.8/SPARC and Linux/PC. The development of "batch mode" is nearly finalised. In order to allow the implementation of SCR35 in IPF some test data have been generated.

J. Smeets (S&T) suggests to add the "sweep direction flag" (forward or reverse) into the new level 2 product format.

- J. Remedios (UL) makes a presentation on the references atmospheres. In particular he describes the problem of the updates of CO_2 profiles. He proposes to add the seasonal climatology variation for CO_2 in IG2 for troposphere and stratosphere.

AI_L2_5.08 UL to provide updated CO_2 climatology before of QWG #6.

- S. Ceccherini (IFAC) makes a presentation on the activities for the operations at reduced spectral resolution performed at IFAC. He shows that there is no major difference for Level 2 processing to use 25 cm^{-1} or 10 cm^{-1} step in the NESR grid. However most of the chi-square values are smaller when using 25 cm^{-1} step, as expected when better NESR estimates are made. He shows the results of the runs of ORM performed with the three different versions of MWs, OMs and LUTs delivered by OU. With the last version correct results are in general obtained except for O3, for which a large value of chi-square is obtained. He shows that two MWs of O3 are responsible for such large value of chi-square.

- R. Koopman (ESA) makes a short summary on the status of the instrument and on the possibilities for the future measurement modes. If single-slide mode will be adopted then the 2 seconds long sweeps are the most likely.

- A. Dudhia (OU) presents the simulations performed at OU of the full spectrum measured by MIPAS using the off-line Level 2 profiles plus IG data to define the atmospheric status. The simulated full spectrum is then compared with the spectrum measured by MIPAS. The purpose of this study is to investigate the discrepancies between simulated and measured spectra outside the microwindows used for the operational retrieval. The analysis of the residuals shows some differences due to CO_2 line-mixing and some other differences in band AB that could be related to the continuum of water. Other differences are explained by the fact that simulations don't take into account NLTE.

- C. Belotti (IFAC) describes some action items made at IFAC from the QWG meeting #4:
-the delivery of the ADFs with spec_event_flag changed from "B" to "N"
-the comments provided to the product quality disclaimer
-the preparation of the web page where to collect all the publications related to MIPAS.
  He says that for copyright reasons it is not possible to put the full text version of papers published in journals that hold the copyright on the web, and so he suggests to put only the abstracts.

M. Ridolfi (UB) suggests to put a password for the access to the full text version.

R. Koopman (ESA) suggests to use the same password used to download the MIPAS data, so the people interested to MIPAS data can have access to the publications.

R. Koopman (ESA) notices that it is still open the action item of the previous meeting:

AI_L2_4.09 All to upload papers on MIPAS (in pdf format), published after the launch, to the Uranus server.

C. Belotti (IFAC) shows the results of the analysis of the forward/reverse issue performed at IFAC. CH4 and N2O profile oscillations induced by forward/reverse sweeps appear to be limited to the analysis performed with the ESRIN processor before the correction of 3rd November 2003. The analysis of the residuals shows that the forward/reverse offset is small with respect to the NESR.

A. Kleinert (IMK) says that the differences in the forward/reverse sweeps observed in the data processed in ESRIN are observed also in the integrated radiances obtained by the Level 1b files.

AI_L2_5.09 IFAC to verify if there are differences in ADFs used by the analyses performed in ESRIN and in Kiruna. To inform ESA of results.

- A. Dudhia (OU) describes the procedure to select the MWs for the operations at reduced spectral resolution (0.0625 cm^{-1} sampling). He assumes the same vertical nominal scenario as that of the 0.025 cm^{-1} resolution, and he tries to minimise the systematic errors and the time processing.

B. Carli (IFAC) asks if it is expected to obtain a chi-square value of about 6 for ozone as showed by S. Ceccherini (IFAC) in his presentation.

A. Dudhia (OU) says that it is not expected a such large value.

AI_L2_5.10 IFAC to compare the profiles of ozone for orbit #10798 retrieved at full and at reduced resolution.

AI_L2_5.11 OU and IFAC to continue the investigation regarding the large value of chi-square for ozone.

AI_L2_5.12 LPPM to investigate possible spectroscopic problems in the selected MWs.

- B. Carli (IFAC) shows the status of the activities for the operations at reduced spectral resolution.
  Taking into account the fact that the reduced resolution operation (0.0625 cm^{-1} sampling) will not probably be used in future, he asks if it is necessary to provide the ADFs also for the NRT retrieval.

R. Koopman (ESA) answers that it is necessary to deliver the ADFs only for the off-line retrieval.

- M. Ridolfi (UB) makes a presentation on testing new MIPAS observational modes with the ORM and synthetic spectra at 0.0625 cm-1 spectral resolution. He considers three scenarios: that used with the original resolution (3 km step), 2 km step and 1.5 km step. He defines some quantifiers to estimate the performance of the retrieval and calculates them in correspondence of the three scenarios. In the variance-covariance matrix he considers only the diagonal elements.

A. Dudhia (OU) says that it would be possible to take into account also the off-diagonal elements.

AI_L2_5.13 OU to perform the theoretical analysis in order to consider the full variance-covariance matrix.

M. Ridolfi (UB) concludes that temperature, H2O and more marginally O3 and HNO3 would benefit from an improved vertical resolution, and that the oscillations appearing in the profiles retrieved with ORM from scans with 2 and 1.5 km sampling step are smaller than the measurement noise. However since the ESD increases significantly with decreasing the vertical sampling further microwindows will have to be included in the retrieval if a vertical sampling grid finer than 3 km will be used.

- T. Steck (IMK) reports the investigations made at IMK on new possibile observation scenarios. He remarks the necessity to find a compromise between improvement of the horizontal sampling and better vertical resolution in UTLS and upper stratosphere. In order to evaluate the horizontal resolution he shows the 2d averaging kernels for 1d retrieval from which we deduce an horizontal resolution between 300 and 350 km. He shows the results of simulations corresponding to different scenarios. He concludes that the new MIPAS spectral resolution leads to a reduction of the limb sequence distance from about 500 km to values below 300 km, so the single profiles are not independent anymore and there is the necessity to switch to a new measurement mode. Increasing the vertical resolution to 2 km or to 1.5 km implies an increase in the estimated noise so that additional microwindows and/or regularization are necessary.

- B. Carli (IFAC) describes the possible workplan in case that the single-side measurement mode would be chosen.

The QWG meeting #6 will be held on 13-14 January 2005 at IFAC (Florence) as planned.
The QWG meeting #7 will be held on 18-19 April 2005 at IFAC (Florence).