Data investigation Summary	Sheet MIP_IFAC_ADF_V3.7			Page 1 of 5	
Sheet	Issue: Issue 1	Date	ate 13.02.2004		
	Prepared by: Piera Raspollini	Proce	ocessing site: IFAC		
ENVISAT MIPAS	Ref: TN IFAC_GA_2003_05_pr, describing ADF2 version from V3.0 to V3.6				
Subject: ADFs update V3.7				AO / ESL Ref.: 17580/03/I-OL	
Inputs					
New OMs for both NRT and OFL pr	ocessor (Oxford University)	(Others		
Outputs NON_UPGRADED_FILES MIP_CS2_AXVIEC20031021_145337_20020706_060000_20080706_060000 MIP_IG2_AXVIEC20031118_151533_20031201_000000_20081201_000000 MIP_MW2_AXVIEC20031021_145505_20020706_060000_20080706_060000 MIP_PI2_AXVIEC20031021_145745_20020706_060000_20080706_060000 MIP_SP2_AXVIEC20031021_150016_20020706_060000_20080706_060000			Location	n/Access (ftp,)	
UPGRADED_FILES ASCII NRT OM2 PS2 OFL OM2 PS2 BIN NRT MIP_OM2_AX_NRT_V3.7 MIP_PS2_AX_NRT_V3.7 OFL MIP_OM2_AX_OFL_V3.7 MIP_PS2_AX_OFL_V3.7					
Tools					
 Tools for the generation of Level 2 auxiliary data in ICD format ([RD2]) Tools provided by Astrium for the generation of binary MIP_**2_AX files ML2PP and ORM_SDC for testing the new ADFs 					
Recommendations					
Problem Areas					

Continuation Sheet	Sheet: MIP_IFAC_ADF_V3.7	Page 2 of 5
	Issue: Issue 1	Date 13.02.2004

Rationale of the activity

The report MIPAS _SPR#33 by Sven Bartha (ASTRIUM) identifies a problem in ML2PP in case that an OM characterized by only one tangent altitude is selected. Two methods can be followed to overcome the problem: either make the retrieval approach of ML2PP (and then IPF) more robust for handling this particular case or eliminating that type of OMs from the OM database. Considering that the retrieval of only one or two points of the profile provides results that are characterized by large systematic errors, the option of eliminating from the OM database the OMs with fewer than 3 sweeps was finally preferred. This solution allows to solve the problem with the ESA products in a very short time and avoids that the Level 2 processor wastes time in providing results that are not sufficiently accurate.

Another problem was reported by ESA consisting in the increase of NESR after the switch-on of the heater (since the middle of January 2004). A consequence of this is that NESR values are now no longer compatible with the NESR template in the PS2 file.

Indeed in the Level 2 ADF (in particular PS2) a NESR threshold as a function of frequency is tabulated, and it is used by the Level 2 pre-processor to exclude from the analysis the OMs containing the most noisy Mws, i.e the ones whose mean NESR exceeds the threshold. The threshold has to be modified according to the increased noise.

Summary

Modifications with respect to V3.6 involve only the files MIP_PS2_AX and MIP_OM2_AX.

As far as the file MIP_PS2_AX is concerned, modifications involve the NESR threshold.

As shown in Figures $\overline{1}$ and $\overline{2}$, where the NESR threshold used in the ADF2 versions previous to the current one is

superimposed to the NESR values reported in Level 1 file of orbit #9816 (Figure 2 represents a zoom of Figure 1 at high frequencies), NESR exceeds the threshold for most of the frequencies.

The multiplication of the noise threshold by a factor 2.5 makes the threshold higher than the measured noise in orbit #9816 for most of the measured spectral points (see Figures 3 and 4, where the scaled NESR threshold is superimposed to the NESR values reported in Level 1 file of orbit #9816).

The files MIP_PS2_AX_NRT_V3.7 and MIP_PS2_AX_OFL_V3.7 have been modified scaling the NESR threshold of a factor 2.5 (only the 5 points relative to the lowest frequencies have not been changed, since the thresholds were already very high).



Figure 1 - NESR reported in Level 1 file relative to orbit #9816 as a function of wave-number (in red) and NESR threshold used in the ADF2 versions previous to the current one (in green).





Continuation Sheet	Sheet: MIP_IFAC_ADF_V3.7	Page 5 of 5			
	Issue: Issue 1	Date 13.02.2004			
After this change in the threshold in only of a highest priority because it contained a M The choice of scaling the NESR instead of (#9816) is not considered to be statistically wavenumber. Furthermore, the scaling of t selection of microwindows and on their we As far as the impact of the increased noise processor do not add new information. The standard deviation (esd). With the January the nesr from Level 1 has increased.	ne case in orbit #9816 a lowest priority OM w W whose NESR exceeded the threshold. changing its behaviour with frequency is moti significant to determine from it the behaviour he noise threshold allows to maintain unchang sight in the OMs. on the quality of the products is concerned, the Level 2 processor computes the propagation orbit (#9816) we have verified that esd is incr	ras preferred to an OM characterized by ivated from the fact that only one orbit of the noise as a function of the ged the assumption on noise used in the e analysis of the products of Level 2 of measurement error on estimated eased, but this only reflects the fact that			
Concerning the total error, this is made of two components, random error and systematic error. An increase in the nesr produces an increase in the esd which becomes the predominant component in the total error. This is confirmed by a reduction in the final chi-square (see table below).					
chi-squareorbit 9816 (January)orbitpt1.141h2o0.620o31.041hno31.121ch40.941n2o0.791no20.670	t 9163 (December) 79 87 34 28 09 05 88				
An assessment of the quality reduction could be estimated from a detailed definition of the NESR increase as a function of frequency. This would however be only an estimate and a rigorous assessment should be provided by validation measurements. A large variation of the NESR may lead to the need for a revision of the microwindow selection.					
Concerning the file MIP_OM2_AX, the following modifications were performed by Anu Dudhia: (a) removed all OMs from priority list with fewer than 3 retrieval levels (b) reselected retrieval levels to be more obviously consistent with available sweeps For example, the earlier version sometimes had no retrieval at altitudes where measurements were included. The new version should have a retrieval level at every altitude where measurements are available. (c) added extra OMs to allow for cloud contaminated plus corrupt sweep combinations. Nominal OMs are unchanged.					
Modification (a) in the OM data avoids that the Level 2 processor crashes in presence of OMs characterised by only one or two tangent altitudes. This has been verified for orbit # 8617, i.e. the one for which ML2PP crashed with the old set of OMs.					