## Assessment of the effect on ILS width of a temporary short-term fix in PS2 file.

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## Introduction

An error in Level 2 pre-processor has been detected by BOMEM consisting in the swapping in the file MIP\_PS2\_AX between the scalar variable lin\_shear\_var\_z (expected to be a vector) and the vector lin\_shear (expected to be a scalar). These two variables are used for the computation of the ILS.

In order to reduce the effect of the resulting error in the computation of the ILS a temporary shortterm fix in the PS2 has been suggested by BOMEM: this consists in averaging the shear variance values in order to obtain a scalar that fits the single shear variance field currently available, and duplicating the linear shear scalar in order to create a vector to fill the eleven shear fields currently available.

Some Level 2 tests performed with ORM during the Commissioning Phase had detected an error in the AILS width (see 'ORM Cal Val Analysis', TN-IFAC-GS0301, April 2003) and this error was listed among the not yet solved issues. These tests have been repeated with the modified PS2 file in order to see whether the temporary short-term fix in the PS2 file helps in reducing the observed AILS width error in Level 2.

This note reports the results of these tests.

## Procedure

The file MIP\_PS2\_AX was modified according to BOMEM suggestion: the following parameters:

01	
lin_shear[0]	0.00131504505394 cm
lin_shear[1]	0.00131504505394 cm
lin_shear[2]	0.00106277062115 cm
lin_shear[3]	2.01052285463E-4 cm
lin_shear[4]	0.00204380551911 cm
lin_shear[5]	0.00268312309865 cm
lin_shear[6]	0.00127584644749 cm
lin_shear[7]	0.00208292863331 cm
lin_shear[8]	0.00116941321442 cm
lin_shear[9]	0.00175622031756 cm
lin_shear[10]	0.00105814115019 cm
	lin_shear[0] lin_shear[1] lin_shear[2] lin_shear[3] lin_shear[4] lin_shear[5] lin_shear[6] lin_shear[7] lin_shear[8] lin_shear[9] lin_shear[10]

43. lin\_shear\_var\_z 0.0020000009499

were replaced by:

27. [0]	lin_shear[0]	0.004 cm
27. [1]	lin_shear[1]	0.004 cm
27. [2]	lin_shear[2]	0.004 cm
27. [3]	lin_shear[3]	0.004 cm
27. [4]	lin_shear[4]	0.004 cm
27. [5]	lin_shear[5]	0.004 cm
27. [6]	lin_shear[6]	0.004 cm

27. [7]	lin_shear[7]	0.004 cm
27. [8]	lin_shear[8]	0.004 cm
27. [9]	lin_shear[9]	0.004 cm
27. [10]	lin_shear[10]	0.004 cm

43. lin shear var z

ML2PP was run with the modified MIP PS2 AX for producing the inputs for ORM ORB.

0.001464834634

The ORM\_ORB code was run with the option for fitting, together with the nominal MIPAS target parameters, a band-dependent parameter used to modify the width of the ILS provided by Level 1. This parameter is named ILS broadening parameter and measures the requirement for either a broader ILS (positive values) or a narrower ILS (negative values).

The retrieval of each species provides the values of the ILS broadening parameters relative to all the spectral bands used for the analysis.

Since the ILS width is highly correlated with pressure, in order to limit the interference of the atmospheric broadening, that is observed at low altitudes, the tests were made with retrieval limited to altitudes above 40 km. The ILS broadening parameters were determined for all scans of orbit # 2081 for bands A, AB, B and C (no microwindows in band D have been used).

Figure 1 shows the retrieved ILS broadening parameters obtained from the analysis of orbit # 2081 as a function of scan ID for bands A, AB, B and C (no microwindows in band D have been used).



Figure 1. Retrieved ILS broadening parameters for the different bands as a function of scan ID.

The retrieved ILS broadening parameters averaged on the whole orbit for the different spectral bands are reported in Table 1

Table 1: ILS broadening parameters averaged on the whole orbit for the different spectral bands after the PS2 correction

А	AB	В	С
$6.09\ 10^{-3} \pm 2.2\ 10^{-3}$	$-3.33\ 10^{-3}\pm2.9\ 10^{-3}$	$-8.7 \ 10^{-3} \pm 3 \ 10^{-3}$	$2.25 \ 10^{-2} \pm 2.7 \ 10^{-3}$

As term of comparison, Table 2 reports the ILS broadening parameters averaged on the whole orbit for the different spectral bands as observed in the tests for the Commissioning Phase (April 2003) and hence before the PS2 correction. In that case, the averaged broadening parameter was negative for all bands, suggesting that the real ILS was sharper than the one computed by the Level 2 preprocessor.

Table 2: ILS broadening parameters averaged on the whole orbit for the different spectral bands before the PS2 correction

А	AB	В	С
-2. 63 $10^{-2} \pm 2 \ 10^{-3}$	$-4.49 \ 10^{-2} \pm 3 \ 10^{-3}$	$-5.73 \ 10^{-2} \pm 3 \ 10^{-3}$	$-4.43 \ 10^{-2} \pm 2 \ 10^{-2}$

## Conclusions

The AILS width correction is reduced by about one order of magnitude for band A, AB and B, therefore the PS2 correction surely helps in reducing the error on the ILS. However, an error is still detected for band C with an opposite sign with respect to Commissioning Phase tests.

The modified PS2 is part of V3.3 of MIPAS Level 2 auxiliary data.