NRT M-factor delivery document 06 Sep 2010

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1 Content

This document describes the m–factor dataset, produced by ife/Bremen according to m–factor tech-note [1]. M–factors for the calibration light path (M_CAL), the limb light path (M_DL) and the nadir light path (M_DN) to the science detectors are included. All other m–factors are set to the default value of 1.0, i. e. have no effect. The m–factors are delivered as auxiliary files as defined in the SCIAMACHY IODD [2]. M–factor version is 07.01.

This document describes a delivery within the near real time (NRT) setup of the Envisat ground segment. A delivery is foreseen every 7 days, it contains the calculated data for the past 7 days (including the current day) and an extrapolation for the next 7 days. In nominal case, the extrapolated m–factors will not be used. They are available in case of an early start of the level 1–2 processing or an delay in the m–factor delivery. The current package contains m–factors for:

- Calculated: 31 Aug 2010– 06 Sep 2010
- Prediction: 07 Sep 2010– 13 Sep 2010

Note: If there is no appropriate monitoring measurement for the delivery day available at the time of calculation, also the nominal calculated m–factors may contain predicted values. Especially for M_DN this will be the case, as the corresponding measurement is performed only every 3 days.

2 Delivered files

Table 1 gives the MD5 sums (md5 text mode) [3] and the names of the delivered m-factor files.

Table 2 gives information, how the file content is calculated: Based on actual measurements (*meas.*), an interpolated m–factor (*interp.*) or a predicted, i. e. extrapolated m–factor value (*pred.*) for three light paths.

Table 1: MD5 sum and filename of the delivered m-factor files.

md5-sum	m-factor auxiliary file
284140844916ed70039b2136a6f1874e	SCI_MF1_AXNIFE20100907_034312_20100831_183648_20100902_183648
ad5d61ab92b49c53cd6ffdba9302e824	SCI_MF1_AXNIFE20100907_034312_20100901_194547_20100903_194547
fd4261c210808b0c9fa5bd744419ccaf	SCI_MF1_AXNIFE20100907_034312_20100902_191410_20100904_191410
97aa82be2ac8788ccef9f7177d9e97ef	SCI_MF1_AXNIFE20100907_034312_20100903_184233_20100905_184233
172dda4c55768c882c360b30918880b6	SCI_MF1_AXNIFE20100907_034312_20100904_181056_20100906_181056
d89ef9da52462d346936da86e5028574	SCI_MF1_AXNIFE20100907_034312_20100905_191955_20100907_191955
c6d914dc512aa5bda37d6ba2c33c3565	SCI_MF1_AXNIFE20100907_034312_20100906_184818_20100908_184818
1536e4390e641565d1c777b77904bf16	SCI_MF1_AXNIFE20100907_034312_20100907_181641_20100909_181641
aadac27940e4b99676cbc74dc27c1c42	SCI_MF1_AXNIFE20100907_034312_20100908_192540_20100910_192540
5886bc4c9ad62bcfa3fd06c6e7e6f7db	SCI_MF1_AXNIFE20100907_034312_20100909_185403_20100911_185403
a5b93aa12d75c948b351fd30b16a4fea	SCI_MF1_AXNIFE20100907_034312_20100910_182226_20100912_182226
42f10cc6fcf0d3099d08e4ec031e6e06	SCI_MF1_AXNIFE20100907_034312_20100911_193125_20100913_193125
07d07c44fa0d2d2641a400eb93487239	SCI_MF1_AXNIFE20100907_034312_20100912_185948_20100914_185948
0847ef5438fc15d367a9d565f7be81a8	SCI_MF1_AXNIFE20100907_034312_20100913_182811_20101011_182811

Table 2: Source information for the individual m–factors of the delivery set.

validity identifier	M_CAL	M_DL	M_DN
20100831_183648_20100902_183648	meas.	meas.	interp.
20100901_194547_20100903_194547	meas.	meas.	meas.
20100902_191410_20100904_191410	meas.	meas.	interp.
20100903_184233_20100905_184233	meas.	meas.	interp.
20100904_181056_20100906_181056	meas.	meas.	interp.
20100905_191955_20100907_191955	meas.	meas.	meas.
20100906_184818_20100908_184818	meas.	meas.	pred.
20100907_181641_20100909_181641	pred.	pred.	pred.
20100908_192540_20100910_192540	pred.	pred.	pred.
20100909_185403_20100911_185403	pred.	pred.	pred.
20100910_182226_20100912_182226	pred.	pred.	pred.
20100911_193125_20100913_193125	pred.	pred.	pred.
20100912_185948_20100914_185948	pred.	pred.	pred.
20100913_182811_20101011_182811	pred.	pred.	pred.

3 Content check

M–factors describe the degradation of the instrument and are used to compensate for it in the radiometric calibration. Fast changes with time are not expected, i. e. the ratio $M_{ratio,t}$ of m–factors M_t this delivery to the m–factor M_{t_0} of the previous delivery day should be close to 1. The ratio $M_{ratio,t}$ and its reciprocal value should not exceed a

Table 3: Detector pixels used for the calculations described in this document. SCIAMACHY has 8 channels with 1024 pixels per channel. The pixel range is given as the first and last pixel in each channel. For channel 2, the pixel number is given in wavelength order, i. e. the pixel numbers are already reversed.

channel	1	2	3	4	5	6	7	8
pixel	197	1140	2131	3117	4151	5226	6154	7178
range	784	1859	2943	3925	4863	5914	7157	8181

Table 4: Content check results.

	max. ratio (ch. 6/7: median)			mean ratio				
	M_CAL	M_DL	M_DN	M_CAL	M_DL	M_DN	limit	status
1	1.0234	1.0097	1.0111	0.9998	1.0034	1.0026	1.0400	OK
2	1.0012	1.0066	1.0037	1.0001	1.0021	1.0018	1.0200	OK
3	1.0007	1.0015	1.0017	0.9997	1.0001	1.0008	1.0100	OK
4	1.0021	1.0011	1.0019	0.9997	1.0000	1.0009	1.0100	OK
5	1.0035	1.0009	1.0020	0.9998	1.0003	1.0008	1.0120	OK
6	1.0048	1.0022	1.0034	1.0004	1.0012	1.0016	1.0100	OK
7	1.0005	1.0016	1.0027	–	–	–	1.0070	OK
8	1.0016	1.0021	1.0029	–	–	–	1.0120	OK

certain limit l:

$$M_{ratio,t} = \frac{M_t}{M_{t_0}} \qquad \text{with} \quad M_{ratio,i} < l \qquad \text{and} \quad \frac{1}{M_{ratio,i}} < l \tag{1}$$

This limit is defined for each channel. The limits are derived from a time-series of deliveries simulated for 2007 [1]. For channel 1 to 6, each individual pixel for each dataset has to meet the criteria. Channel 7 and 8 are the infrared detectors with a varying number of bad or dead pixels with unpredictable behavior. A criterion for each pixel is not applicable, therefore a median over the channel is used as $M_{ratio,t}$ and has to meet the criteria. Blind pixels, the overlap regions and channel 6+ are excluded from the calculations, see table 3.

The previous delivery day t_0 is 30 Aug 2010, therefore M_{t_0} is taken from the m–factor file `SCI_MF1_AXNIFE20100831_034245_20100830_190825_20100901_190825` .

Table 4 summarizes the results for this delivery. Also the settings for the limit are given. For information only, also the mean ratio is given. *OK* in the last column means, that the criteria is fulfilled for the channel.

This delivery is within all limits and can be used.

4 Visualization of content check

Figure 1 shows the ratio $M_{ratio,t}$ for all delivered m–factors for each channel. The grey boxes visualize the maximum ratio allowed.

References

[1] Bramstedt, K, Calculation of SCIAMACHY M-Factors, *Technical note*, IFE-SCIA-TN-2007-01-CalcMFactor, Issue 1, ife Bremen, 2008.

[2] Balzer, W, and Slijkhus, S, *Technical document*, SCIAMACHY Level 0 to 1b Processing Input / Output Data Definition, ENV-TN-DLR-SCIA-0005, Issue 5, DLR Oberpfaffenhofen, 2000.

[3] RFC 1321 - The MD5 Message-Digest Algorithm, *Internet RFC/STD/FYI/BCP Archives*, 1992

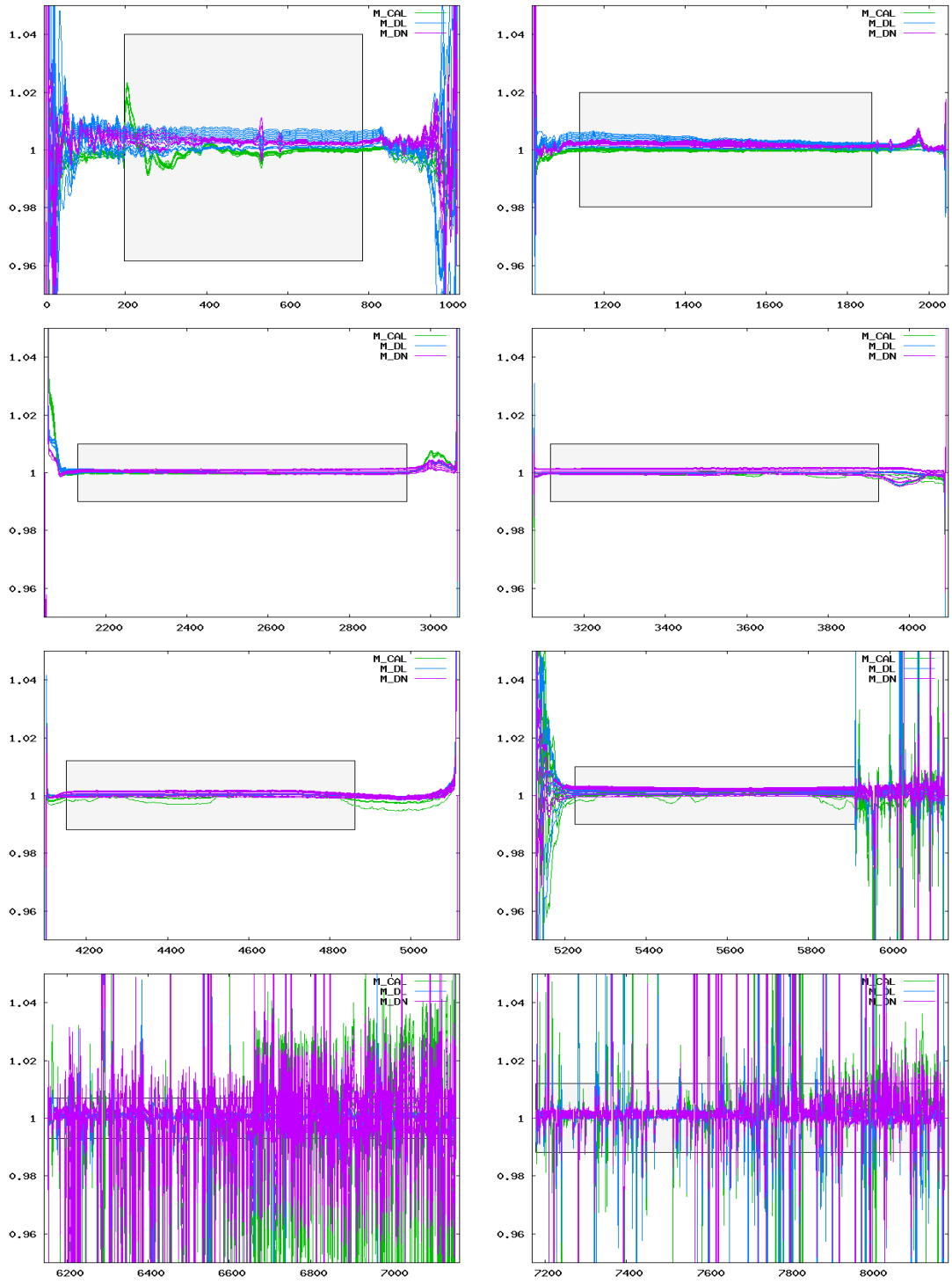

Figure 1: Ratio of delivered m-factors (31 Aug 2010– 13 Sep 2010) to the corresponding m-factor of the previous delivery day (30 Aug 2010). The grey boxes visualize the maximum ratio allowed.