NRT M-factor delivery document 23 Jun 2008

Klaus Bramstedt, ife Bremen

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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 06.01.

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: 17 Jun 2008– 23 Jun 2008
- Prediction: 24 Jun 2008– 30 Jun 2008

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
14763c47854e997dd08c3ae77e925577	SCI_MF1_AXNIFE20080623_215551_20080617_183650_20080619_183650
0d64621f58998fb56a8959168826a791	SCI_MF1_AXNIFE20080623_215551_20080618_194548_20080620_194548
7654eb68d1e9256a9ba7e1bc1046e236	SCI_MF1_AXNIFE20080623_215551_20080619_191411_20080621_191411
dc02a637b1f46c719e433c3f9b9944dc	SCI_MF1_AXNIFE20080623_215551_20080620_184234_20080622_184234
52134e930616c52783c3d0714de5cfc4	SCI_MF1_AXNIFE20080623_215551_20080621_181057_20080623_181057
105ac58f653c7becdf57648e31c1778f	SCI_MF1_AXNIFE20080623_215551_20080622_191956_20080624_191956
c7f1d4691e959e8e92c254ec4c752c93	SCI_MF1_AXNIFE20080623_215551_20080623_184819_20080625_184819
5dd455a50b8b26ed7a03f66c5ff14d72	SCI_MF1_AXNIFE20080623_215551_20080624_181642_20080626_181642
a42c1f4e89cc7a5bf5e4e3c8a8109703	SCI_MF1_AXNIFE20080623_215551_20080625_192541_20080627_192541
9315e26f717b76cecc980afced3fab9b	SCI_MF1_AXNIFE20080623_215551_20080626_185404_20080628_185404
7bcf0c7be4787a4df8f5a2755f6171cb	SCI_MF1_AXNIFE20080623_215551_20080627_182227_20080629_182227
dffd0830a564756f9961f8664b9de58b	SCI_MF1_AXNIFE20080623_215551_20080628_193126_20080630_193126
f879770a8b22ab895738060d6e0ecfab	SCI_MF1_AXNIFE20080623_215551_20080629_185949_20080701_185949
7293c50e6298842a271eb2eb56e40bb2	SCI_MF1_AXNIFE20080623_215551_20080630_182812_20080728_182812

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

validity identifier	M_CAL	M_DL	M_DN
20080617_183650_20080619_183650	meas.	meas.	interp.
20080618_194548_20080620_194548	meas.	meas.	meas.
20080619_191411_20080621_191411	meas.	meas.	interp.
20080620_184234_20080622_184234	meas.	meas.	interp.
20080621_181057_20080623_181057	meas.	meas.	interp.
20080622_191956_20080624_191956	meas.	meas.	meas.
20080623_184819_20080625_184819	pred.	pred.	pred.
20080624_181642_20080626_181642	pred.	pred.	pred.
20080625_192541_20080627_192541	pred.	pred.	pred.
20080626_185404_20080628_185404	pred.	pred.	pred.
20080627_182227_20080629_182227	pred.	pred.	pred.
20080628_193126_20080630_193126	pred.	pred.	pred.
20080629_185949_20080701_185949	pred.	pred.	pred.
20080630_182812_20080728_182812	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	1.0065	1.0151	1.0072	1.0017	1.0057	0.9981	1.0400	OK
2	1.0027	1.0070	1.0020	1.0011	1.0029	0.9995	1.0200	OK
3	1.0009	1.0021	1.0016	1.0004	1.0008	0.9990	1.0100	OK
4	1.0010	1.0010	1.0016	1.0004	1.0004	0.9991	1.0100	OK
5	1.0015	1.0020	1.0024	1.0007	1.0013	1.0003	1.0120	OK
6	1.0020	1.0023	1.0017	1.0010	1.0015	1.0000	1.0100	OK
7	1.0001	0.9997	0.9978	–	–	–	1.0070	OK
8	1.0012	1.0001	1.0012	–	–	–	1.0120	OK

certain limit l:

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

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 16 Jun 2008, therefore M_{t_0} is taken from the m–factor file `SCI_MF1_AXNIFE20080616_215526_20080616_190827_20080618_190827` .

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

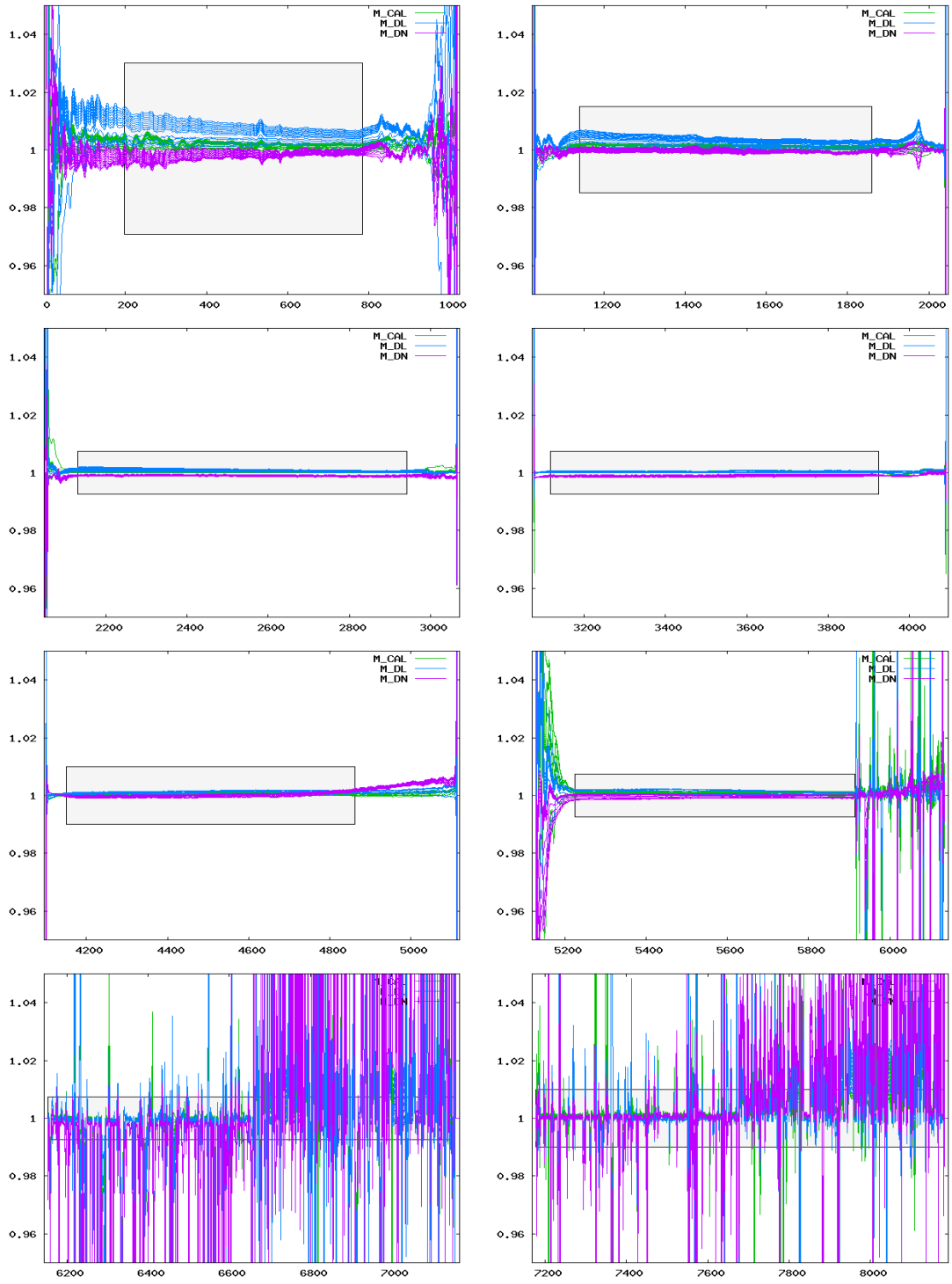

Figure 1: Ratio of delivered m-factors (17 Jun 2008– 30 Jun 2008) to the corresponding m-factor of the previous delivery day (16 Jun 2008). The grey boxes visualize the maximum ratio allowed.