NRT M-factor delivery document 01 Dec 2008

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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: 25 Nov 2008– 01 Dec 2008
- Prediction: 02 Dec 2008– 08 Dec 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
0c1f6594cacf1a8e90bf8af1887c31f4	SCI_MF1_AXNIFE20081216_152312_20081125_191704_20081127_191704
9d6a0a0ea20cc846f786233ae336f562	SCI_MF1_AXNIFE20081216_152312_20081126_184527_20081128_184527
4b9a10d9b9cf1184906e472c7229b18c	SCI_MF1_AXNIFE20081216_152312_20081127_181350_20081129_181350
d2a079abbcf5eb296fd2ec0bbba1222d	SCI_MF1_AXNIFE20081216_152312_20081128_192249_20081130_192249
a46bc3f9c5cec6a4ddd4c6089b3dffd3	SCI_MF1_AXNIFE20081216_152312_20081129_185112_20081201_185112
07c7597c59afc18ddd0293f4c1a43151	SCI_MF1_AXNIFE20081216_152312_20081130_181935_20081202_181935
473e00c588c3fb67dd8effcd80441289	SCI_MF1_AXNIFE20081216_152312_20081201_192833_20081203_192833
9c38022b910c28d1bbdd986298b6ff10	SCI_MF1_AXNIFE20081216_152312_20081202_185656_20081204_185656
8cb5665a5025782f810c0a73db9fb689	SCI_MF1_AXNIFE20081216_152312_20081203_182519_20081205_182519
a72a7e9368b78f0582913e485549fac6	SCI_MF1_AXNIFE20081216_152312_20081204_193418_20081206_193418
978d6f69ccbae8826729242044c3282a	SCI_MF1_AXNIFE20081216_152312_20081205_190241_20081207_190241
18c7e5f2eed0b18c02fa755eb68127ac	SCI_MF1_AXNIFE20081216_152312_20081206_183104_20081208_183104
c55628c32e69234302b820fc53bb5588	SCI_MF1_AXNIFE20081216_152312_20081207_194003_20081209_194003
a019bf917b687faff3d160b5dca90d5c	SCI_MF1_AXNIFE20081216_152312_20081208_190826_20090105_190826

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

validity identifier	M_CAL	M_DL	M_DN
20081125_191704_20081127_191704	meas.	meas.	interp.
20081126_184527_20081128_184527	meas.	meas.	interp.
20081127_181350_20081129_181350	meas.	meas.	interp.
20081128_192249_20081130_192249	meas.	meas.	meas.
20081129_185112_20081201_185112	meas.	meas.	pred.
20081130_181935_20081202_181935	meas.	meas.	pred.
20081201_192833_20081203_192833	meas.	meas.	pred.
20081202_185656_20081204_185656	pred.	pred.	pred.
20081203_182519_20081205_182519	pred.	pred.	pred.
20081204_193418_20081206_193418	pred.	pred.	pred.
20081205_190241_20081207_190241	pred.	pred.	pred.
20081206_183104_20081208_183104	pred.	pred.	pred.
20081207_194003_20081209_194003	pred.	pred.	pred.
20081208_190826_20090105_190826	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	1.0129	1.0117	1.0071	1.0008	1.0044	1.0013	1.0400	OK
2	1.0017	1.0049	1.0030	1.0008	1.0018	1.0010	1.0200	OK
3	1.0005	1.0014	1.0016	1.0000	1.0004	1.0009	1.0100	OK
4	1.0005	1.0006	1.0025	1.0000	1.0003	1.0012	1.0100	OK
5	1.0007	1.0015	1.0028	1.0002	1.0004	1.0015	1.0120	OK
6	1.0013	1.0021	1.0028	1.0002	1.0007	1.0016	1.0100	OK
7	0.9985	1.0004	1.0011	–	–	–	1.0070	OK
8	1.0006	1.0026	1.0031	–	–	–	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 24 Nov 2008, therefore M_{t_0} is taken from the m–factor file `SCI_MF1_AXNIFE20081124_225529_20081124_194841_20081126_194841` .

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

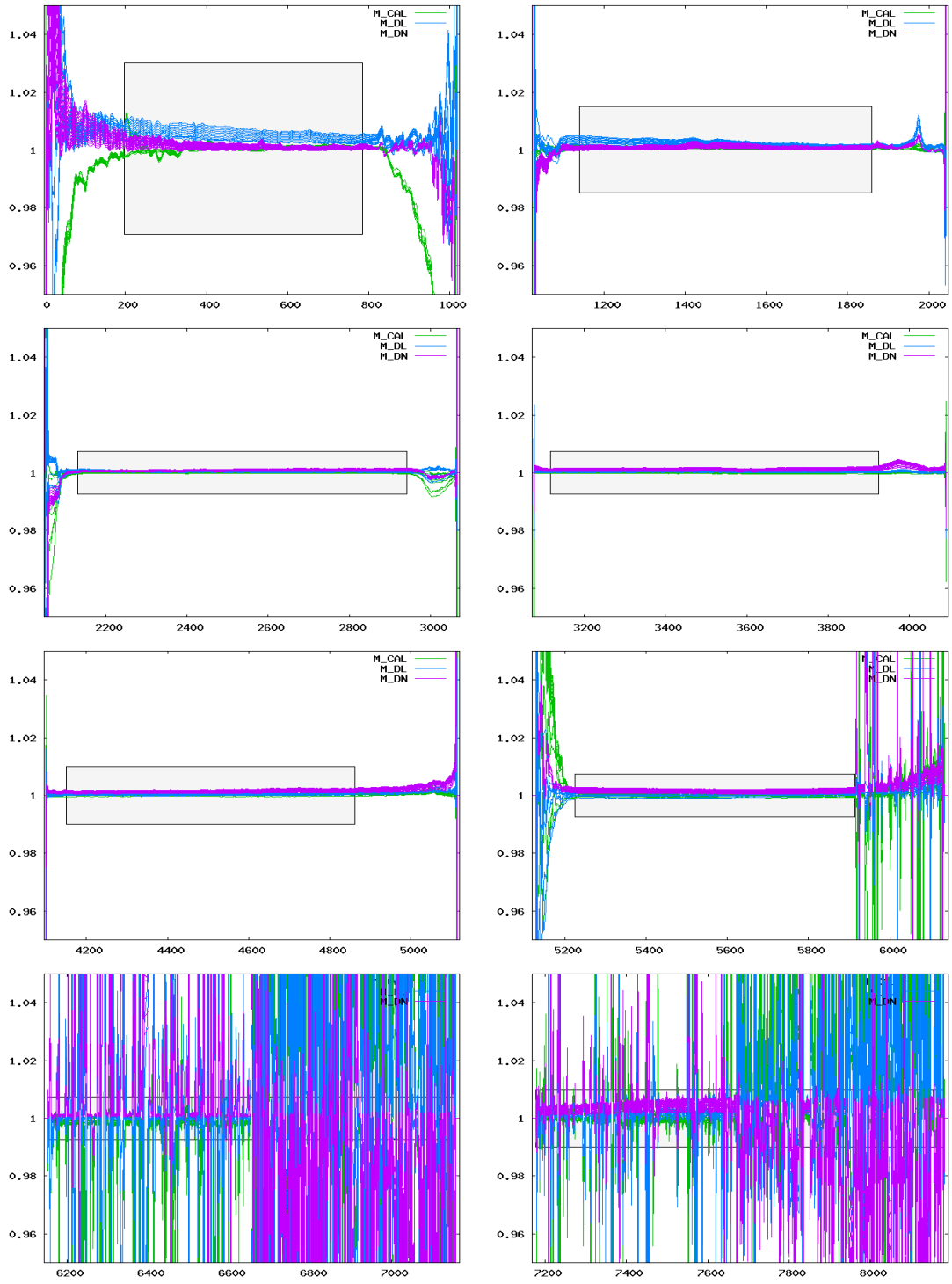

Figure 1: Ratio of delivered m-factors (25 Nov 2008– 08 Dec 2008) to the corresponding m-factor of the previous delivery day (24 Nov 2008). The grey boxes visualize the maximum ratio allowed.