NRT M-factor delivery document 30 Jan 2012

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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: 24 Jan 2012– 30 Jan 2012
- Prediction: 31 Jan 2012– 06 Feb 2012

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
22ff441368abb40c3c5fc4b6c2b700b3	SCI_MF1_AXNIFE20120131_082744_20120124_191958_20120126_191958
5b3e52318e2ee6c707c98b7b3fcf730f	SCI_MF1_AXNIFE20120131_082744_20120125_184312_20120127_184312
5d88e303d13d45f9aa2e80e6fbb00b45	SCI_MF1_AXNIFE20120131_082744_20120126_180627_20120128_180627
a38acae54a55f99a47d89e6b08541746	SCI_MF1_AXNIFE20120131_082744_20120127_190955_20120129_190955
75b9afd7c852f7c38ce9150f09aed09d	SCI_MF1_AXNIFE20120131_082744_20120128_183310_20120130_183310
dcb4b86048526af083a95466982276f9	SCI_MF1_AXNIFE20120131_082744_20120129_193638_20120131_193638
6b669d51ff7ede2da1698bd227703cce	SCI_MF1_AXNIFE20120131_082744_20120130_185953_20120201_185953
54a6c332fb28df6abd9bf913b9ff551a	SCI_MF1_AXNIFE20120131_082744_20120131_182307_20120202_182307
346ee0ffa52cc74f1b10ff86b97accaa	SCI_MF1_AXNIFE20120131_082744_20120201_192636_20120203_192636
90592d7ed7634a8e09c6fa06201f9141	SCI_MF1_AXNIFE20120131_082744_20120202_184950_20120204_184950
0baaa50c5a84a79fa6bf89ae9870b182	SCI_MF1_AXNIFE20120131_082744_20120203_181305_20120205_181305
db45bf70527da5975f4bd9e5c14a6ae3	SCI_MF1_AXNIFE20120131_082744_20120204_191633_20120206_191633
7a94ecf10ad0f289dfe1b51f6f736ebc	SCI_MF1_AXNIFE20120131_082744_20120205_183948_20120207_183948
b6071f8a588818df1519536dec964eac	SCI_MF1_AXNIFE20120131_082744_20120206_180302_20120305_180302

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

validity identifier	M_CAL	M_DL	M_DN
20120124_191958_20120126_191958	interp.	interp.	interp.
20120125_184312_20120127_184312	meas.	meas.	meas.
20120126_180627_20120128_180627	meas.	meas.	meas.
20120127_190955_20120129_190955	meas.	meas.	meas.
20120128_183310_20120130_183310	meas.	meas.	meas.
20120129_193638_20120131_193638	meas.	meas.	interp.
20120130_185953_20120201_185953	meas.	meas.	meas.
20120131_182307_20120202_182307	pred.	pred.	pred.
20120201_192636_20120203_192636	pred.	pred.	pred.
20120202_184950_20120204_184950	pred.	pred.	pred.
20120203_181305_20120205_181305	pred.	pred.	pred.
20120204_191633_20120206_191633	pred.	pred.	pred.
20120205_183948_20120207_183948	pred.	pred.	pred.
20120206_180302_20120305_180302	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	1.0135	1.0596	1.0641	0.9994	0.9822	0.9819	1.0700	OK
2	1.0017	1.0177	1.0144	1.0004	0.9947	0.9957	1.0200	OK
3	1.0018	1.0056	1.0054	0.9992	0.9983	0.9989	1.0100	OK
4	1.0013	1.0017	1.0018	0.9994	0.9993	0.9997	1.0100	OK
5	1.0039	1.0030	1.0049	1.0003	0.9998	1.0004	1.0120	OK
6	1.0023	1.0018	1.0011	0.9996	0.9992	1.0000	1.0100	OK
7	1.0014	1.0010	1.0009	–	–	–	1.0070	OK
8	1.0069	1.0074	1.0073	–	–	–	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 23 Jan 2012, therefore M_{t_0} is taken from the m–factor file `SCI_MF1_AXNIFE20120124_095053_20120123_181629_20120125_181629` .

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

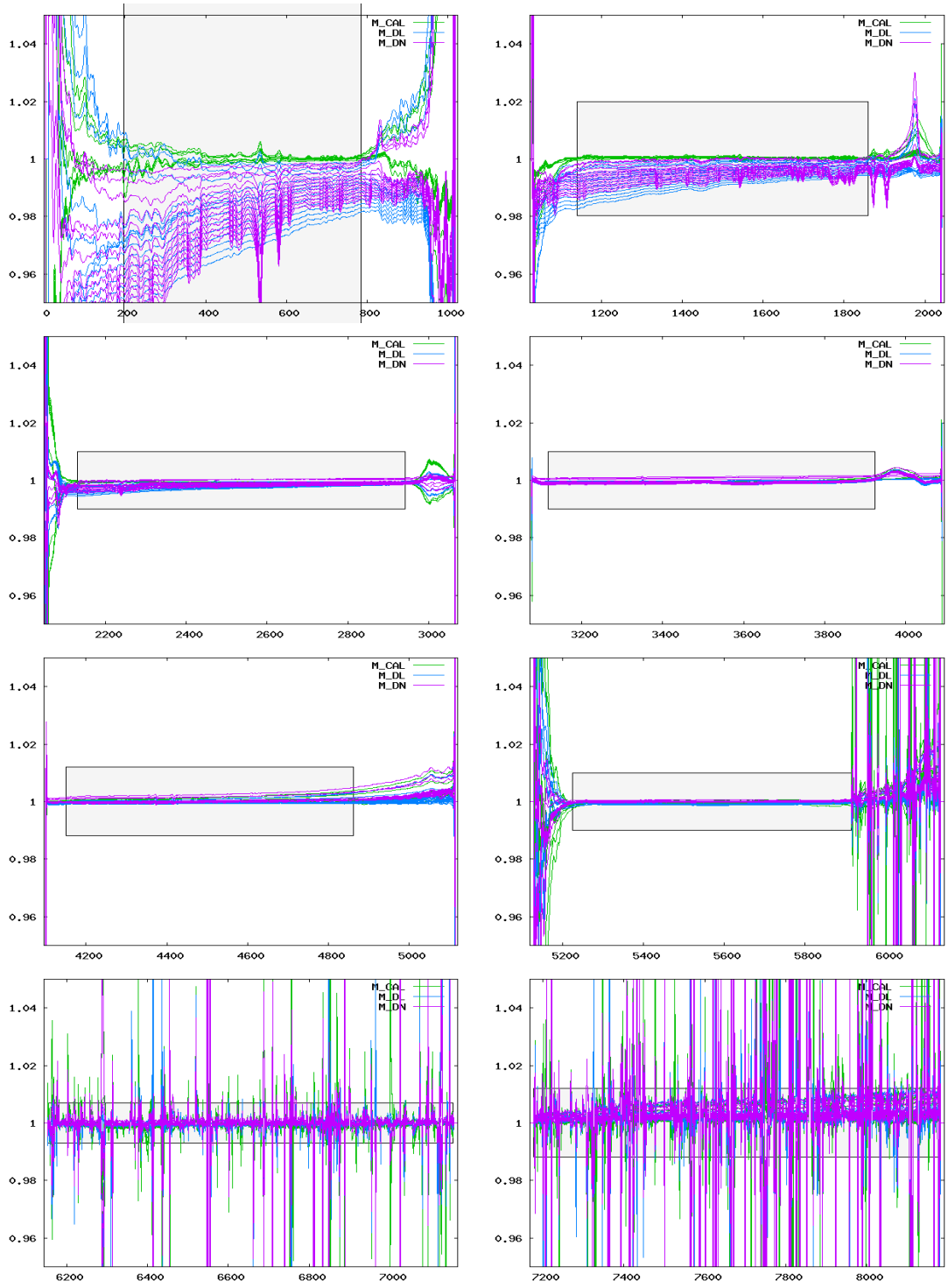

Figure 1: Ratio of delivered m-factors (24 Jan 2012– 06 Feb 2012) to the corresponding m-factor of the previous delivery day (23 Jan 2012). The grey boxes visualize the maximum ratio allowed.