NRT M-factor delivery document 18 Oct 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: 12 Oct 2010– 18 Oct 2010
- Prediction: 19 Oct 2010– 25 Oct 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
70c27dfa97705a82a7fb7c8e4e8649f1	SCI_MF1_AXNIFE20101019_105929_20101012_181641_20101014_181641
5db482e4c2f3fe57a7b8a87fbcd6842e	SCI_MF1_AXNIFE20101019_105929_20101013_192540_20101015_192540
ef4b7579f6029eef1758bdb3b4b3e0d1	SCI_MF1_AXNIFE20101019_105929_20101014_185403_20101016_185403
0c1db2889fb9aa8897b22b7cc4e7ceb1	SCI_MF1_AXNIFE20101019_105929_20101015_182226_20101017_182226
a44c05715779c521ae4eb9b0ee9a581f	SCI_MF1_AXNIFE20101019_105929_20101016_193124_20101018_193124
bee853cb45c1c5a4b58ce8f2b40e0ebf	SCI_MF1_AXNIFE20101019_105929_20101017_185947_20101019_185947
6cc8aa00f31cd5714b925411f1bc98e2	SCI_MF1_AXNIFE20101019_105929_20101018_182810_20101020_182810
362c1fc82cc1540f29b0293954ae7e8e	SCI_MF1_AXNIFE20101019_105929_20101019_193709_20101021_193709
5c09cb3eda3bdb796b6d6c12d87ac635	SCI_MF1_AXNIFE20101019_105929_20101020_190532_20101022_190532
6f28c51c2e4506172eaab1cafe5c0e48	SCI_MF1_AXNIFE20101019_105929_20101021_183355_20101023_183355
c545057faa0f4ab057c7e93d1f9606d6	SCI_MF1_AXNIFE20101019_105929_20101022_194254_20101024_194254
85cc69563ec6491d81dc3f6fc0e4cdb9	SCI_MF1_AXNIFE20101019_105929_20101023_191117_20101025_191117
e96055e80715ad1673fb80df4c1fcb86	SCI_MF1_AXNIFE20101019_105929_20101024_183940_20101026_183940
fc4e93be230b1980b5d6fe8a912f6ea8	SCI_MF1_AXNIFE20101019_105929_20101025_194839_20101122_194839

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

validity identifier	M_CAL	M_DL	M_DN
20101012_181641_20101014_181641	meas.	meas.	meas.
20101013_192540_20101015_192540	meas.	meas.	interp.
20101014_185403_20101016_185403	meas.	meas.	interp.
20101015_182226_20101017_182226	meas.	meas.	meas.
20101016_193124_20101018_193124	meas.	meas.	interp.
20101017_185947_20101019_185947	meas.	meas.	interp.
20101018_182810_20101020_182810	meas.	meas.	meas.
20101019_193709_20101021_193709	pred.	pred.	pred.
20101020_190532_20101022_190532	pred.	pred.	pred.
20101021_183355_20101023_183355	pred.	pred.	pred.
20101022_194254_20101024_194254	pred.	pred.	pred.
20101023_191117_20101025_191117	pred.	pred.	pred.
20101024_183940_20101026_183940	pred.	pred.	pred.
20101025_194839_20101122_194839	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	1.0054	1.3310	1.0137	0.9993	0.9838	1.0029	1.4000	OK
2	1.0016	1.0046	1.0067	1.0006	1.0015	1.0022	1.0200	OK
3	1.0005	1.0010	1.0018	1.0001	1.0000	1.0006	1.0100	OK
4	1.0006	1.0005	1.0021	1.0002	1.0001	1.0009	1.0100	OK
5	1.0010	1.0012	1.0032	1.0004	1.0002	1.0015	1.0120	OK
6	1.0019	1.0018	1.0031	1.0005	1.0003	1.0016	1.0100	OK
7	1.0006	1.0018	1.0026	–	–	–	1.0070	OK
8	1.0021	1.0038	1.0033	–	–	–	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 11 Oct 2010, therefore M_{t_0} is taken from the m–factor file `SCI_MF1_AXNIFE20101012_095552_20101011_184818_20101013_184818` .

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

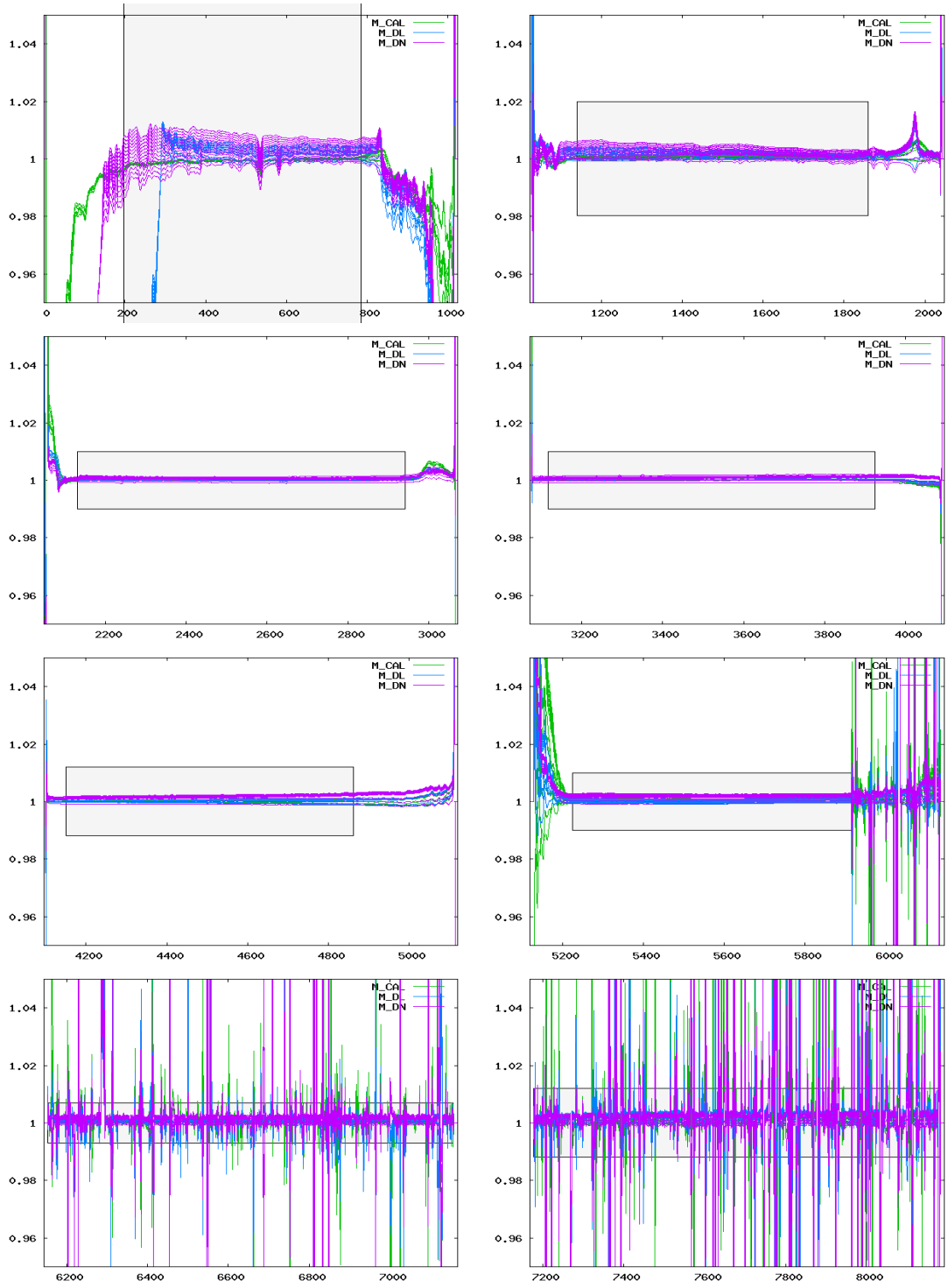

Figure 1: Ratio of delivered m-factors (12 Oct 2010– 25 Oct 2010) to the corresponding m-factor of the previous delivery day (11 Oct 2010). The grey boxes visualize the maximum ratio allowed.