NRT M-factor delivery document 28 Nov 2011

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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: 22 Nov 2011– 28 Nov 2011
- Prediction: 29 Nov 2011– 05 Dec 2011

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
2e6f4c75bfb8ddba6d9184fa1033b56d	SCI_MF1_AXNIFE20111129_081258_20111122_193022_20111124_193022
52f28ed76c347a763262e3b713420345	SCI_MF1_AXNIFE20111129_081258_20111123_185337_20111125_185337
dbbef5b1d69810a9a7d21c89ff84b2b1	SCI_MF1_AXNIFE20111129_081258_20111124_181651_20111126_181651
7e1a0f7c913ba177c555f5c0c60e1549	SCI_MF1_AXNIFE20111129_081258_20111125_192020_20111127_192020
3122348a9feb370cb4309be744b4c823	SCI_MF1_AXNIFE20111129_081258_20111126_184334_20111128_184334
f4fee4beb665ae47d17d7e899dfdbd32	SCI_MF1_AXNIFE20111129_081258_20111127_180649_20111129_180649
fdcfd9fcf7b4c9e6f18f4e8f4eebdb20	SCI_MF1_AXNIFE20111129_081258_20111128_191017_20111130_191017
df365e8b6fb55c42b737980f4013ceb6	SCI_MF1_AXNIFE20111129_081258_20111129_183332_20111201_183332
fd472064d3df788508a28f33c89fd6ee	SCI_MF1_AXNIFE20111129_081258_20111130_193700_20111202_193700
65c0cff1e09187c1b6caec0d4c1d627e	SCI_MF1_AXNIFE20111129_081258_20111201_190015_20111203_190015
55dc4274aa6e8d47a9754db33f638fa4	SCI_MF1_AXNIFE20111129_081258_20111202_182329_20111204_182329
2e68ae4c08451a6587842c7530d4d48f	SCI_MF1_AXNIFE20111129_081258_20111203_192658_20111205_192658
1b57e26b305ba001665fa6cf5050585c	SCI_MF1_AXNIFE20111129_081258_20111204_185012_20111206_185012
819f3b584ed705749c75219b50f28fb6	SCI_MF1_AXNIFE20111129_081258_20111205_181327_20120102_181327

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

validity identifier	M_CAL	M_DL	M_DN
20111122_193022_20111124_193022	meas.	meas.	meas.
20111123_185337_20111125_185337	meas.	meas.	interp.
20111124_181651_20111126_181651	meas.	meas.	interp.
20111125_192020_20111127_192020	meas.	meas.	interp.
20111126_184334_20111128_184334	meas.	meas.	meas.
20111127_180649_20111129_180649	meas.	meas.	pred.
20111128_191017_20111130_191017	meas.	meas.	pred.
20111129_183332_20111201_183332	pred.	pred.	pred.
20111130_193700_20111202_193700	pred.	pred.	pred.
20111201_190015_20111203_190015	pred.	pred.	pred.
20111202_182329_20111204_182329	pred.	pred.	pred.
20111203_192658_20111205_192658	pred.	pred.	pred.
20111204_185012_20111206_185012	pred.	pred.	pred.
20111205_181327_20120102_181327	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	1.0087	1.1644	1.1466	1.0013	0.9503	0.9620	1.1700	OK
2	1.0021	1.0621	1.0440	1.0008	0.9825	0.9883	1.0700	OK
3	1.0011	1.0179	1.0110	1.0000	0.9963	0.9986	1.0200	OK
4	1.0007	1.0027	1.0016	1.0000	0.9992	1.0006	1.0100	OK
5	1.0010	1.0016	1.0013	1.0002	0.9995	1.0007	1.0120	OK
6	1.0014	1.0011	1.0012	0.9996	0.9998	1.0003	1.0100	OK
7	1.0013	1.0014	1.0013	–	–	–	1.0070	OK
8	1.0025	1.0052	1.0042	–	–	–	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 21 Nov 2011, therefore M_{t_0} is taken from the m–factor file `SCI_MF1_AXNIFE20111122_075953_20111121_182654_20111123_182654` .

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

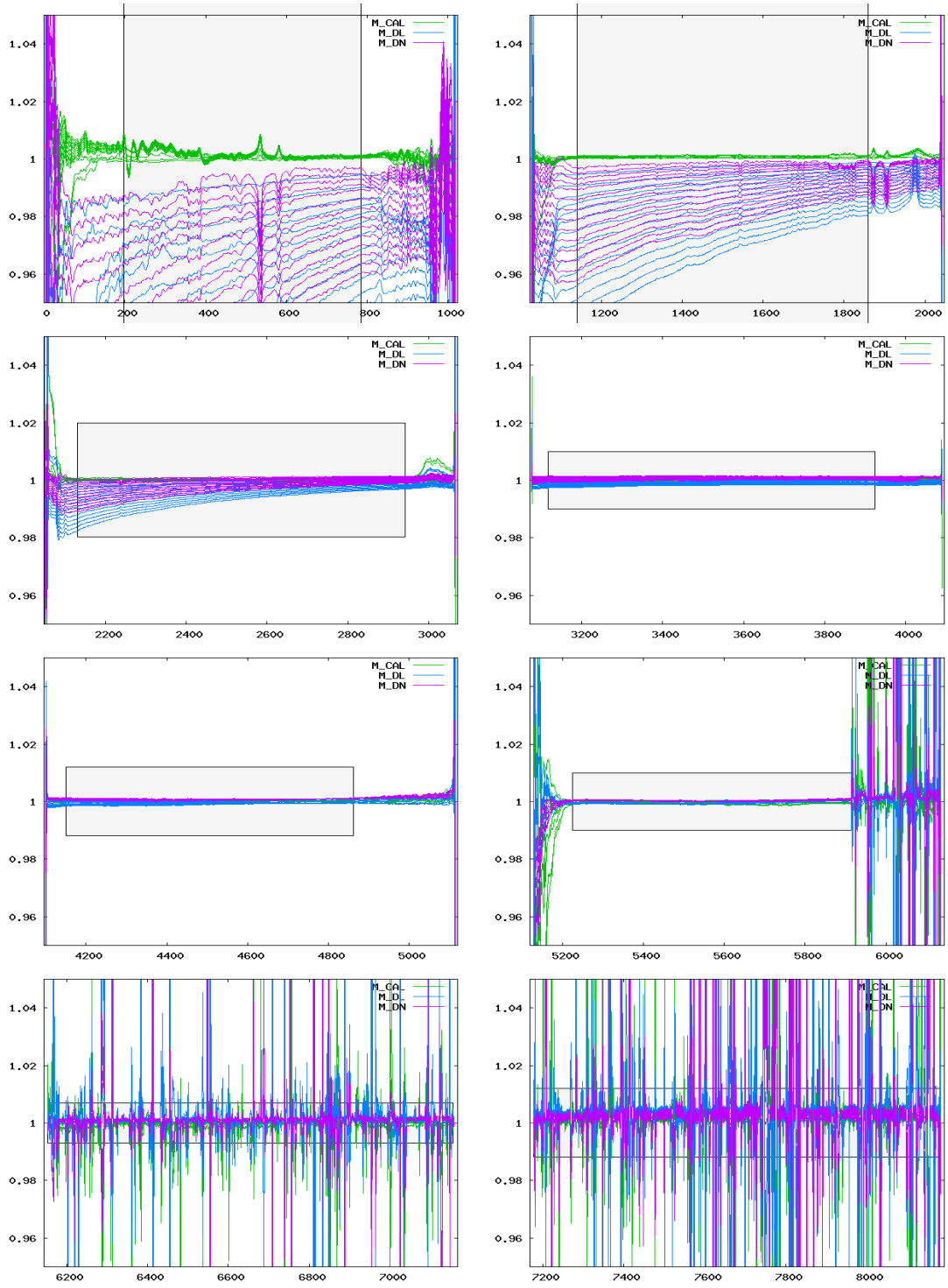

Figure 1: Ratio of delivered m-factors (22 Nov 2011– 05 Dec 2011) to the corresponding m-factor of the previous delivery day (21 Nov 2011). The grey boxes visualize the maximum ratio allowed.