NRT M-factor delivery document 12 Dec 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: 06 Dec 2011– 12 Dec 2011
- Prediction: 13 Dec 2011– 19 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
dee47f8d56bf23a7fb3504f54419dd9d	SCI_MF1_AXNIFE20111213_081206_20111206_191655_20111208_191655
b075f83dcd80569bf3f4126a15dc8188	SCI_MF1_AXNIFE20111213_081206_20111207_184010_20111209_184010
63ca867968d9551c8fb608d7151e3f59	SCI_MF1_AXNIFE20111213_081206_20111208_180324_20111210_180324
7d2cdcd27d83606d93760269b2936263	SCI_MF1_AXNIFE20111213_081206_20111209_190653_20111211_190653
b3f3fec2a1e80938caefddde8998ccd0	SCI_MF1_AXNIFE20111213_081206_20111210_183007_20111212_183007
84d11acf2a702b7c068cec83ca0dae2a	SCI_MF1_AXNIFE20111213_081206_20111211_193336_20111213_193336
f3ae1442adeafa1e6c7714d32aabb5aa	SCI_MF1_AXNIFE20111213_081206_20111212_185650_20111214_185650
35fa63f33b54eca76306be2422b12360	SCI_MF1_AXNIFE20111213_081206_20111213_182005_20111215_182005
0befcc69c2bf4afd0cb2bbf8b7dc3694	SCI_MF1_AXNIFE20111213_081206_20111214_192333_20111216_192333
9805b9d092bc991c897146b9009837dc	SCI_MF1_AXNIFE20111213_081206_20111215_184648_20111217_184648
000c4b638396a46a445cef39b5804e3f	SCI_MF1_AXNIFE20111213_081206_20111216_181002_20111218_181002
3ff6bab9396c0bfb61b1b9ac161ba7b0	SCI_MF1_AXNIFE20111213_081206_20111217_191331_20111219_191331
0d564f7f0cbb878e0d2a79bc71edc9a4	SCI_MF1_AXNIFE20111213_081206_20111218_183645_20111220_183645
85f7124c49206cbcf2f9b3c810bcc085	SCI_MF1_AXNIFE20111213_081206_20111219_194014_20120116_194014

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

validity identifier	M_CAL	M_DL	M_DN
20111206_191655_20111208_191655	meas.	meas.	interp.
20111207_184010_20111209_184010	meas.	meas.	meas.
20111208_180324_20111210_180324	meas.	meas.	interp.
20111209_190653_20111211_190653	meas.	meas.	meas.
20111210_183007_20111212_183007	meas.	meas.	pred.
20111211_193336_20111213_193336	meas.	meas.	pred.
20111212_185650_20111214_185650	meas.	meas.	pred.
20111213_182005_20111215_182005	pred.	pred.	pred.
20111214_192333_20111216_192333	pred.	pred.	pred.
20111215_184648_20111217_184648	pred.	pred.	pred.
20111216_181002_20111218_181002	pred.	pred.	pred.
20111217_191331_20111219_191331	pred.	pred.	pred.
20111218_183645_20111220_183645	pred.	pred.	pred.
20111219_194014_20120116_194014	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	1.0161	1.1517	1.1347	1.0025	0.9538	0.9674	1.1600	OK
2	1.0031	1.0555	1.0440	1.0003	0.9833	0.9869	1.0600	OK
3	1.0010	1.0171	1.0140	0.9995	0.9957	0.9960	1.0200	OK
4	1.0009	1.0035	1.0035	0.9998	0.9986	0.9987	1.0100	OK
5	1.0014	1.0014	1.0021	1.0001	0.9998	0.9989	1.0120	OK
6	1.0027	1.0014	1.0017	0.9995	1.0003	0.9988	1.0100	OK
7	1.0020	1.0009	1.0008	–	–	–	1.0070	OK
8	1.0031	1.0041	1.0034	–	–	–	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 05 Dec 2011, therefore M_{t_0} is taken from the m–factor file `SCI_MF1_AXNIFE20111206_082406_20111205_181327_20111207_181327` .

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

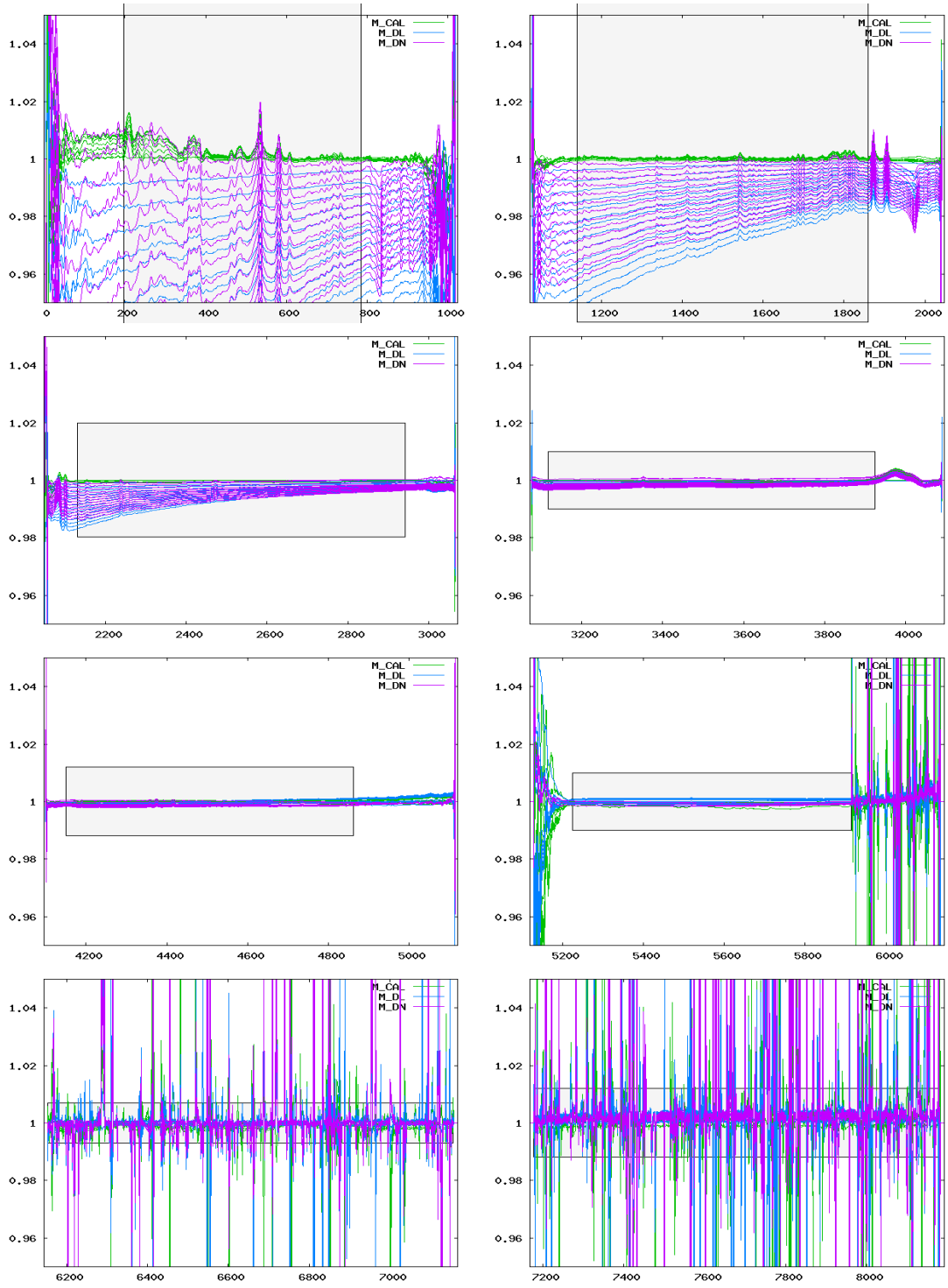

Figure 1: Ratio of delivered m-factors (06 Dec 2011– 19 Dec 2011) to the corresponding m-factor of the previous delivery day (05 Dec 2011). The grey boxes visualize the maximum ratio allowed.