NRT M-factor delivery document 23 Aug 2010

Klaus Bramstedt, ife Bremen

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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: 17 Aug 2010– 23 Aug 2010
- Prediction: 24 Aug 2010– 30 Aug 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
9dd58ceeed32592dffc7e1fb3588a60e	SCI_MF1_AXNIFE20100824_034241_20100817_191702_20100819_191702
ff106080e625c615a7668ebde743a624	SCI_MF1_AXNIFE20100824_034241_20100818_184525_20100820_184525
8e056d045bc466ddf4b1e8047485bc5a	SCI_MF1_AXNIFE20100824_034241_20100819_181348_20100821_181348
1f39908e4132b4880a3e3a6d1f71d94e	SCI_MF1_AXNIFE20100824_034241_20100820_192247_20100822_192247
b39d87ba504bca7c9a545ddffa011159	SCI_MF1_AXNIFE20100824_034241_20100821_185110_20100823_185110
b6bff0bc6bf8133a4318d49368dc706a	SCI_MF1_AXNIFE20100824_034241_20100822_181933_20100824_181933
c0dabfbde7578e9c0b54e1975a7e434c	SCI_MF1_AXNIFE20100824_034241_20100823_192832_20100825_192832
5a415ef80fa436829ed6cfcfbfce7a67	SCI_MF1_AXNIFE20100824_034241_20100824_185655_20100826_185655
3f208737ee7a716743ebf3af935f2c87	SCI_MF1_AXNIFE20100824_034241_20100825_182518_20100827_182518
69e183504a07a130e3b21cf6ceda8144	SCI_MF1_AXNIFE20100824_034241_20100826_193417_20100828_193417
01c4c929856e2ee448f40ee808ba7c7d	SCI_MF1_AXNIFE20100824_034241_20100827_190240_20100829_190240
eb4db407247165f22c1cbed92ddbb55a	SCI_MF1_AXNIFE20100824_034241_20100828_183103_20100830_183103
cc94b673a1714ec2de281e0052c76ffd	SCI_MF1_AXNIFE20100824_034241_20100829_194002_20100831_194002
aa7b98803ee916584d7f579fb3bee046	SCI_MF1_AXNIFE20100824_034241_20100830_190825_20100927_190825

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

validity identifier	M_CAL	M_DL	M_DN
20100817_191702_20100819_191702	meas.	meas.	interp.
20100818_184525_20100820_184525	meas.	meas.	meas.
20100819_181348_20100821_181348	meas.	meas.	interp.
20100820_192247_20100822_192247	meas.	meas.	interp.
20100821_185110_20100823_185110	meas.	meas.	interp.
20100822_181933_20100824_181933	meas.	meas.	meas.
20100823_192832_20100825_192832	pred.	meas.	pred.
20100824_185655_20100826_185655	pred.	pred.	pred.
20100825_182518_20100827_182518	pred.	pred.	pred.
20100826_193417_20100828_193417	pred.	pred.	pred.
20100827_190240_20100829_190240	pred.	pred.	pred.
20100828_183103_20100830_183103	pred.	pred.	pred.
20100829_194002_20100831_194002	pred.	pred.	pred.
20100830_190825_20100927_190825	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	1.0114	1.0162	1.0156	1.0006	1.0055	1.0016	1.0400	OK
2	1.0023	1.0077	1.0030	1.0009	1.0028	1.0009	1.0200	OK
3	1.0006	1.0018	1.0028	1.0001	1.0004	1.0013	1.0100	OK
4	1.0007	1.0006	1.0033	1.0002	1.0002	1.0023	1.0100	OK
5	1.0008	1.0016	1.0027	1.0002	1.0006	1.0017	1.0120	OK
6	1.0020	1.0026	1.0025	1.0004	1.0013	1.0010	1.0100	OK
7	1.0010	1.0006	1.0029	–	–	–	1.0070	OK
8	1.0006	1.0015	1.0031	–	–	–	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 16 Aug 2010, therefore M_{t_0} is taken from the m–factor file `SCI_MF1_AXNIFE20100817_034300_20100816_194839_20100818_194839` .

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

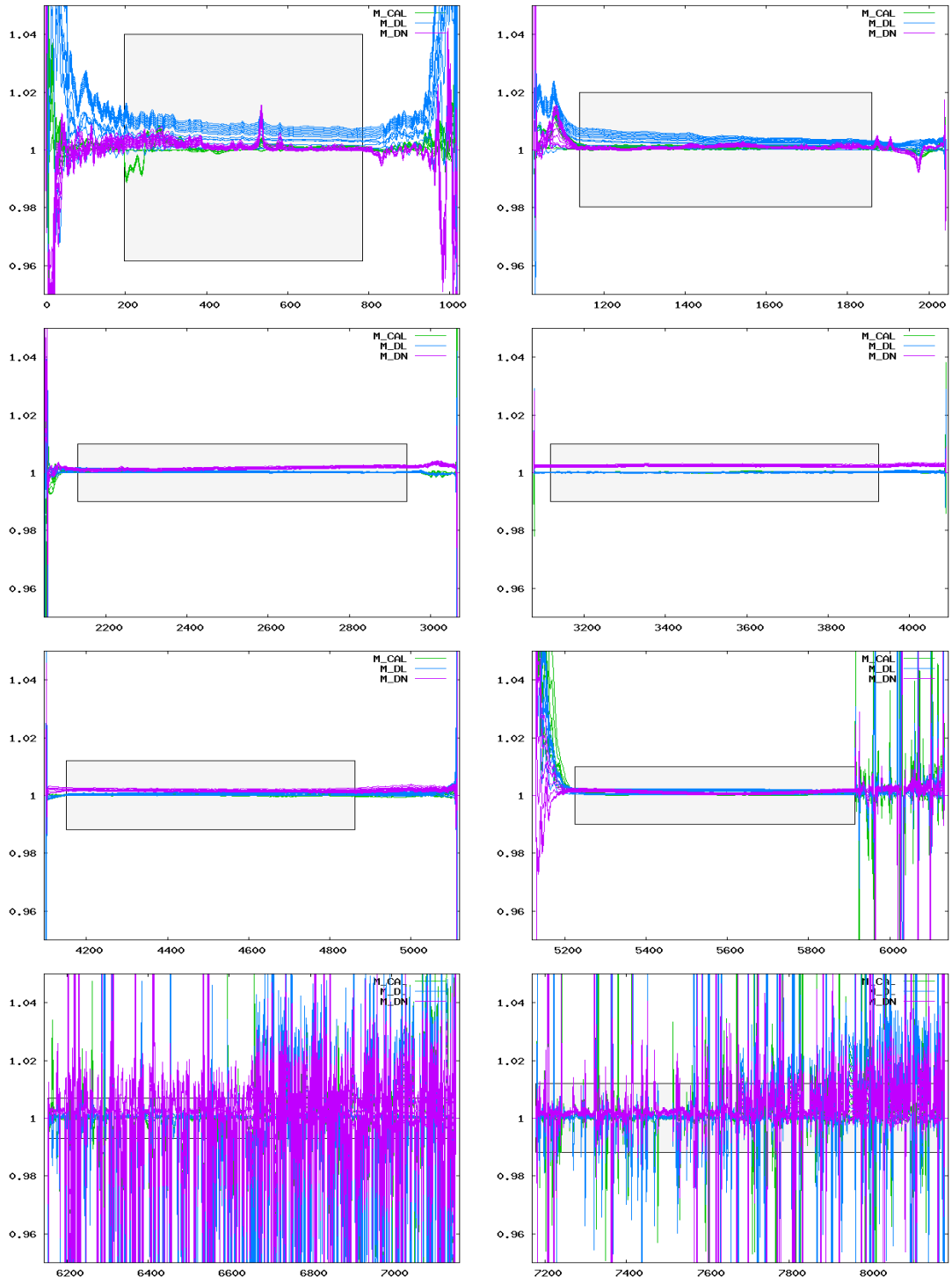

Figure 1: Ratio of delivered m-factors (17 Aug 2010– 30 Aug 2010) to the corresponding m-factor of the previous delivery day (16 Aug 2010). The grey boxes visualize the maximum ratio allowed.