

NRT M-factor delivery document

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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 06.01.

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: 18 Nov 2008– 24 Nov 2008
- Prediction: 25 Nov 2008– 01 Dec 2008

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
2825c1a24517c1d288e5dbc6b9acd3eb	SCI_MF1_AXNIFE20081124_225529_20081118_193711_20081120_193711
4e5fbcca23a6c941d1b7cddb4520629c	SCI_MF1_AXNIFE20081124_225529_20081119_190534_20081121_190534
08d59aed1113178908c53461219bfff7	SCI_MF1_AXNIFE20081124_225529_20081120_183357_20081122_183357
94505e9ddaf40807a9052882fc8ccdc4	SCI_MF1_AXNIFE20081124_225529_20081121_194256_20081123_194256
a52b3cc0ad0baa1f8d49909c7dbb4dc6	SCI_MF1_AXNIFE20081124_225529_20081122_191119_20081124_191119
9a53005d72cc8d570d9e614ed2fcd6b8	SCI_MF1_AXNIFE20081124_225529_20081123_183942_20081125_183942
4fdd1ef996f8dc20d9b20e1e52620e4d	SCI_MF1_AXNIFE20081124_225529_20081124_194841_20081126_194841
aba31d2b8e9fb04b1ad9417beda00fca	SCI_MF1_AXNIFE20081124_225529_20081125_191704_20081127_191704
944dff1cf393d530feee8e6539561314	SCI_MF1_AXNIFE20081124_225529_20081126_184527_20081128_184527
e66d3e8ae2142a555ccb82ca79396e5a	SCI_MF1_AXNIFE20081124_225529_20081127_181350_20081129_181350
299ade262626ce8b4501db676277268a	SCI_MF1_AXNIFE20081124_225529_20081128_192249_20081130_192249
f8f4a0cd4b80ed63607c873dcb0b7299	SCI_MF1_AXNIFE20081124_225529_20081129_185112_20081201_185112
f20a5a4707893ad231fcada1eb84678a	SCI_MF1_AXNIFE20081124_225529_20081130_181935_20081202_181935
fa202d2a3cf8b060a6e04a60bee369f1	SCI_MF1_AXNIFE20081124_225529_20081201_192833_20081229_192833

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

validity identifier	M.CAL	M.DL	M.DN
20081118_193711_20081120_193711	meas.	meas.	interp.
20081119_190534_20081121_190534	meas.	meas.	interp.
20081120_183357_20081122_183357	meas.	meas.	meas.
20081121_194256_20081123_194256	meas.	meas.	pred.
20081122_191119_20081124_191119	meas.	meas.	pred.
20081123_183942_20081125_183942	meas.	meas.	pred.
20081124_194841_20081126_194841	pred.	pred.	pred.
20081125_191704_20081127_191704	pred.	pred.	pred.
20081126_184527_20081128_184527	pred.	pred.	pred.
20081127_181350_20081129_181350	pred.	pred.	pred.
20081128_192249_20081130_192249	pred.	pred.	pred.
20081129_185112_20081201_185112	pred.	pred.	pred.
20081130_181935_20081202_181935	pred.	pred.	pred.
20081201_192833_20081229_192833	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. SCIA-MACHY 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			limit	status
	M_CAL	M_DL	M_DN	M_CAL	M_DL	M_DN		
1	1.0080	1.0129	1.0085	1.0012	1.0036	1.0017	1.0400	OK
2	1.0016	1.0043	1.0026	1.0006	1.0010	1.0010	1.0200	OK
3	1.0005	1.0011	1.0018	1.0001	0.9998	1.0011	1.0100	OK
4	1.0005	1.0010	1.0021	1.0000	0.9998	1.0015	1.0100	OK
5	1.0005	1.0013	1.0018	0.9999	0.9996	1.0011	1.0120	OK
6	1.0010	1.0018	1.0018	0.9999	0.9998	1.0007	1.0100	OK
7	0.9997	0.9987	1.0007	–	–	–	1.0070	OK
8	1.0011	1.0009	1.0019	–	–	–	1.0120	OK

certain limit l :

$$M_{ratio,t} = \frac{M_t}{M_{t_0}} \quad \text{with} \quad M_{ratio,i} < l \quad \text{and} \quad \frac{1}{M_{ratio,i}} < l \quad (1)$$

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 17 Nov 2008, therefore M_{t_0} is taken from the m-factor file `SCI MF1 AXNIFE20081118.124300.20081117.182812.20081119.182812`.

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 Slijkhuis, 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

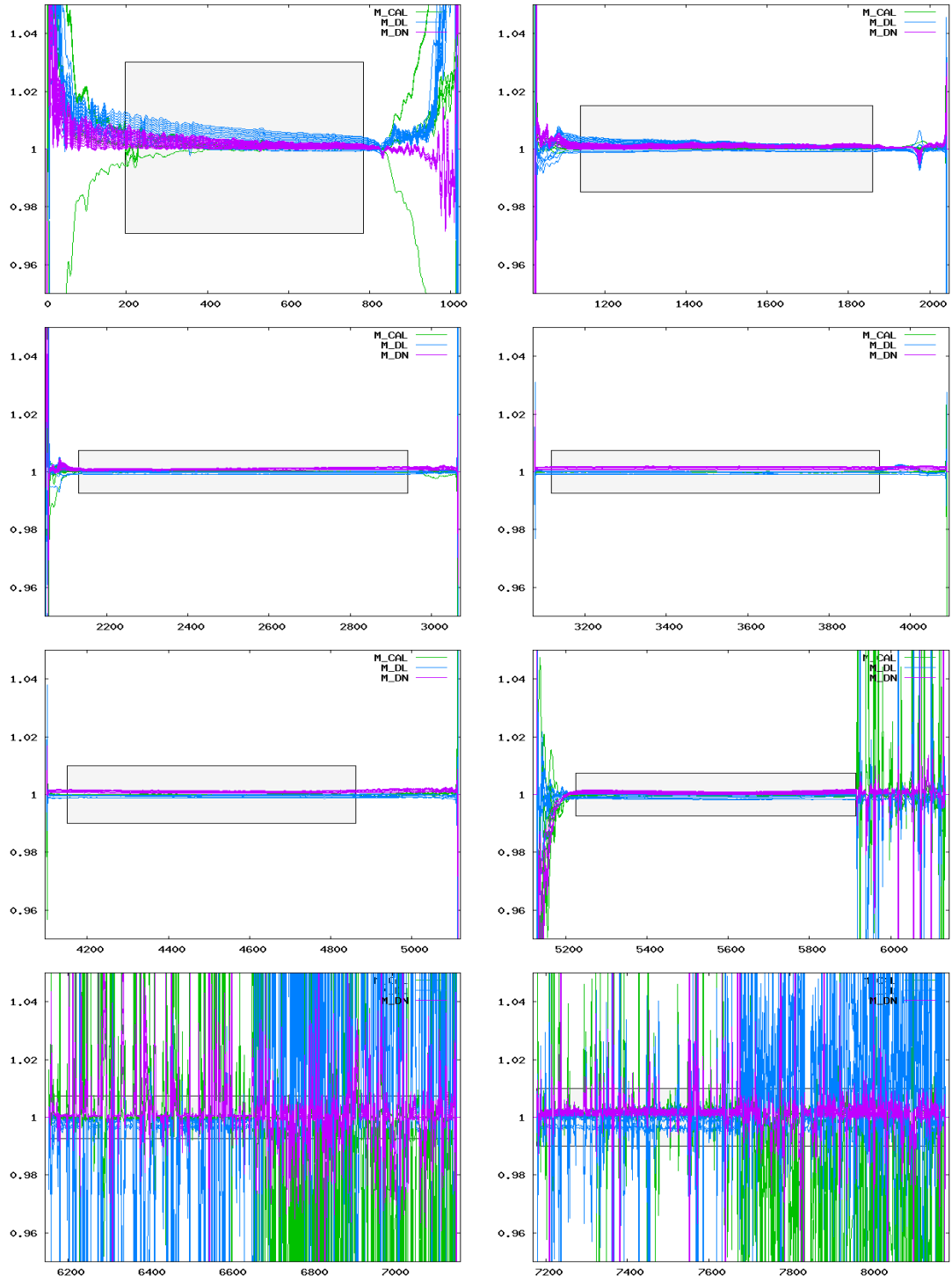


Figure 1: Ratio of delivered m-factors (18 Nov 2008– 01 Dec 2008) to the corresponding m-factor of the previous delivery day (17 Nov 2008). The grey boxes visualize the maximum ratio allowed.