

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 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 Jul 2010– 12 Jul 2010
- Prediction: 13 Jul 2010– 19 Jul 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
6b768f139b72a536db57ffcee7204d01	SCI_MF1_AXNIFE20100713_093834_20100706_193710_20100708_193710
6e1a7fc0b0d5201d7aaa7dc64ce094ec	SCI_MF1_AXNIFE20100713_093834_20100707_190533_20100709_190533
12ea5f8800dd43c1db92a457165ce08a	SCI_MF1_AXNIFE20100713_093834_20100708_183356_20100710_183356
f67fa65471f4840a76e9c59d67208f2f	SCI_MF1_AXNIFE20100713_093834_20100709_194254_20100711_194254
bad0461b9e3ebd2051111e865bec1d35	SCI_MF1_AXNIFE20100713_093834_20100710_191117_20100712_191117
5705b618de443597b7cace1e3b1b80f3	SCI_MF1_AXNIFE20100713_093834_20100711_183940_20100713_183940
ad85f44c322ebfb8ac109b21114175ea	SCI_MF1_AXNIFE20100713_093834_20100712_194839_20100714_194839
625fc709499528c7565c7308030da34a	SCI_MF1_AXNIFE20100713_093834_20100713_191702_20100715_191702
a9104954e9d75c07cb0e8eec6622cc7c	SCI_MF1_AXNIFE20100713_093834_20100714_184525_20100716_184525
ea5d159d112e5c1442471fd03b16cf98	SCI_MF1_AXNIFE20100713_093834_20100715_181348_20100717_181348
2fd611a0d298f7b0e6fa80ef589f23df	SCI_MF1_AXNIFE20100713_093834_20100716_192247_20100718_192247
fb65d4fbc626f5edd2bc9e17d8959b75	SCI_MF1_AXNIFE20100713_093834_20100717_185110_20100719_185110
cf47231ea828794c302cb7fa52ec3d04	SCI_MF1_AXNIFE20100713_093834_20100718_181933_20100720_181933
24e5bfa57a8c7205da2efc78572a3cc0	SCI_MF1_AXNIFE20100713_093834_20100719_192832_20100816_192832

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

validity identifier	M.CAL	M.DL	M.DN
20100706_193710_20100708_193710	meas.	meas.	interp.
20100707_190533_20100709_190533	meas.	meas.	interp.
20100708_183356_20100710_183356	meas.	meas.	interp.
20100709_194254_20100711_194254	meas.	meas.	interp.
20100710_191117_20100712_191117	meas.	meas.	interp.
20100711_183940_20100713_183940	meas.	meas.	meas.
20100712_194839_20100714_194839	meas.	meas.	pred.
20100713_191702_20100715_191702	pred.	pred.	pred.
20100714_184525_20100716_184525	pred.	pred.	pred.
20100715_181348_20100717_181348	pred.	pred.	pred.
20100716_192247_20100718_192247	pred.	pred.	pred.
20100717_185110_20100719_185110	pred.	pred.	pred.
20100718_181933_20100720_181933	pred.	pred.	pred.
20100719_192832_20100816_192832	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	1.0124	1.0092	1.0123	1.0010	1.0041	1.0018	1.0400	OK
2	1.0023	1.0067	1.0031	1.0010	1.0024	1.0006	1.0200	OK
3	1.0008	1.0023	1.0007	1.0002	1.0005	1.0000	1.0100	OK
4	1.0006	1.0008	1.0006	1.0001	1.0003	1.0003	1.0100	OK
5	1.0017	1.0013	1.0015	1.0005	1.0003	1.0002	1.0120	OK
6	1.0016	1.0012	1.0015	1.0006	1.0000	1.0003	1.0100	OK
7	1.0021	1.0023	1.0016	–	–	–	1.0070	OK
8	1.0017	1.0020	1.0016	–	–	–	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 05 Jul 2010, therefore M_{t_0} is taken from the m-factor file SCI_MF1_AXNIFE20100706_120337_20100705_182811_20100707_182811 .

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

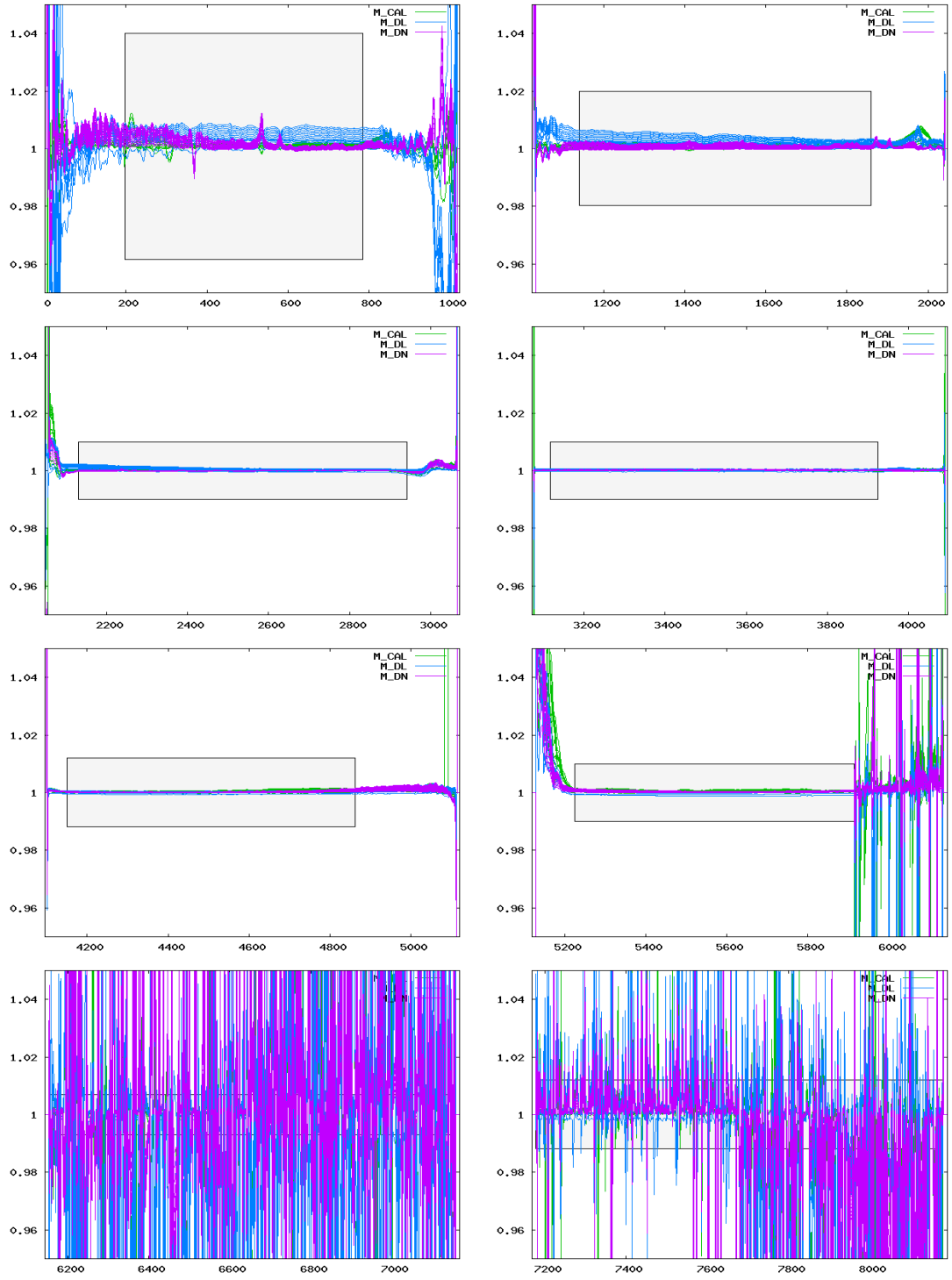


Figure 1: Ratio of delivered m-factors (06 Jul 2010– 19 Jul 2010) to the corresponding m-factor of the previous delivery day (05 Jul 2010). The grey boxes visualize the maximum ratio allowed.