

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: 07 Feb 2012– 13 Feb 2012
- Prediction: 14 Feb 2012– 20 Feb 2012

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
09b309445bbf7261e756cc977e93cb65	SCI_MF1_AXNIFE20120214_044457_20120207_190631_20120209_190631
7de16dff14c22dca715960d915129344	SCI_MF1_AXNIFE20120214_044457_20120208_182945_20120210_182945
8d302946f19b057c41621e0bf653d95e	SCI_MF1_AXNIFE20120214_044457_20120209_193314_20120211_193314
c350d741e603ce746a43a51f9bbac294	SCI_MF1_AXNIFE20120214_044457_20120210_185628_20120212_185628
e31f00f7caa056ea17ed19c44b933e51	SCI_MF1_AXNIFE20120214_044457_20120211_181943_20120213_181943
28a47a48150bb0d64f0c8bc6bf183ef4	SCI_MF1_AXNIFE20120214_044457_20120212_192311_20120214_192311
7d919997f8d4b18702eb6e7b1a61f9bf	SCI_MF1_AXNIFE20120214_044457_20120213_184626_20120215_184626
fc4803765aaa0f3d391f7afa79881214	SCI_MF1_AXNIFE20120214_044457_20120214_180940_20120216_180940
7d0bd0dde1456c376bd4252ae3acd5a3	SCI_MF1_AXNIFE20120214_044457_20120215_191309_20120217_191309
2e4d35903b46f8e2e4846ed75c4c2715	SCI_MF1_AXNIFE20120214_044457_20120216_183623_20120218_183623
5299da60ffb0b582492ff568a47af61b	SCI_MF1_AXNIFE20120214_044457_20120217_193952_20120219_193952
b056264e3dc970844e8be55655e4301b	SCI_MF1_AXNIFE20120214_044457_20120218_190306_20120220_190306
af7ae5ad3e9fe2ccbedb1063acfef398	SCI_MF1_AXNIFE20120214_044457_20120219_182621_20120221_182621
ead34f39c9835660fa1e41cae8c1f8d4	SCI_MF1_AXNIFE20120214_044457_20120220_192949_20120319_192949

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

validity identifier	M.CAL	M.DL	M.DN
20120207_190631_20120209_190631	meas.	meas.	meas.
20120208_182945_20120210_182945	meas.	meas.	meas.
20120209_193314_20120211_193314	meas.	meas.	meas.
20120210_185628_20120212_185628	meas.	meas.	meas.
20120211_181943_20120213_181943	meas.	meas.	meas.
20120212_192311_20120214_192311	meas.	meas.	meas.
20120213_184626_20120215_184626	meas.	meas.	pred.
20120214_180940_20120216_180940	pred.	pred.	pred.
20120215_191309_20120217_191309	pred.	pred.	pred.
20120216_183623_20120218_183623	pred.	pred.	pred.
20120217_193952_20120219_193952	pred.	pred.	pred.
20120218_190306_20120220_190306	pred.	pred.	pred.
20120219_182621_20120221_182621	pred.	pred.	pred.
20120220_192949_20120319_192949	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	1.0057	1.0330	1.0273	1.0002	0.9914	0.9940	1.0400	OK
2	1.0020	1.0087	1.0037	1.0010	0.9983	1.0002	1.0200	OK
3	1.0017	1.0029	1.0024	1.0005	0.9999	1.0006	1.0100	OK
4	1.0011	1.0007	1.0027	1.0004	1.0002	1.0001	1.0100	OK
5	1.0018	1.0019	1.0021	1.0007	1.0009	1.0003	1.0120	OK
6	1.0024	1.0021	1.0019	1.0008	1.0011	1.0005	1.0100	OK
7	1.0020	1.0003	1.0016	–	–	–	1.0070	OK
8	1.0024	1.0015	1.0022	–	–	–	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 06 Feb 2012, therefore M_{t_0} is taken from the m-factor file SCI_MF1_AXNIFE20120207_044352_20120206_180302_20120208_180302 .

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

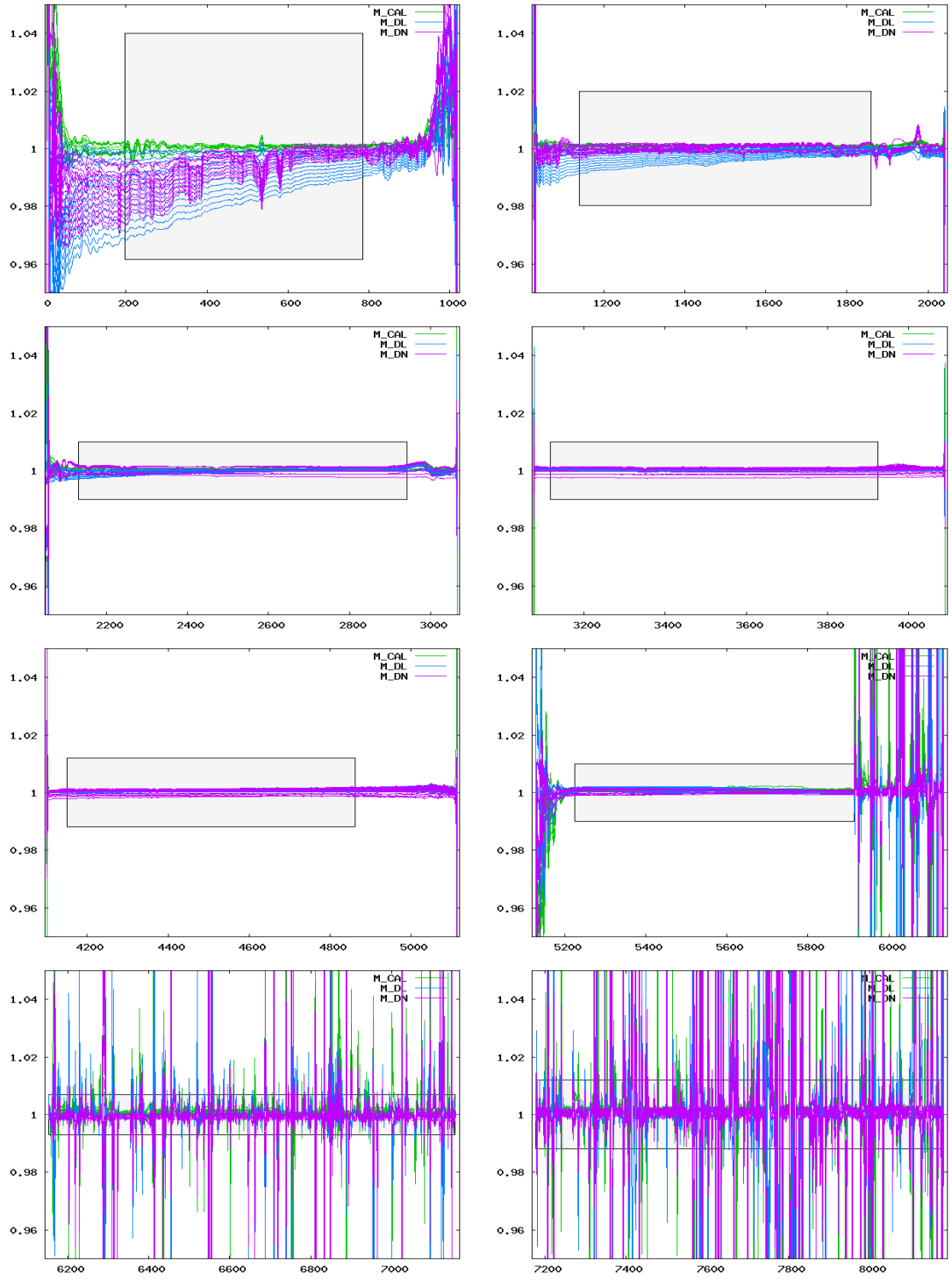


Figure 1: Ratio of delivered m-factors (07 Feb 2012– 20 Feb 2012) to the corresponding m-factor of the previous delivery day (06 Feb 2012). The grey boxes visualize the maximum ratio allowed.