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: 29 Jun 2010– 05 Jul 2010
- Prediction: 06 Jul 2010– 12 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
15ba3cfeeba170fc74b8525af143191f	SCI_MF1_AXNIFE20100706_120337_20100629_181641_20100701_181641
90bf8de6794013fde74a6b9725092c03	SCI_MF1_AXNIFE20100706_120337_20100630_192540_20100702_192540
b791dcf269a1b8d0731d4026470ae576	SCI_MF1_AXNIFE20100706_120337_20100701_185403_20100703_185403
942aa7452ad0b9999e56ae0a7175f720	SCI_MF1_AXNIFE20100706_120337_20100702_182226_20100704_182226
42d6fed0a4ecd8ef88115c7ee866a34b	SCI_MF1_AXNIFE20100706_120337_20100703_193125_20100705_193125
0b5f0daab5bd80d9801eed82622fadb3	SCI_MF1_AXNIFE20100706_120337_20100704_185948_20100706_185948
a7534327ee92180c004e57bfe6ce8637	SCI_MF1_AXNIFE20100706_120337_20100705_182811_20100707_182811
c0cdd1a707136dba8d638a3cd9f79051	SCI_MF1_AXNIFE20100706_120337_20100706_193710_20100708_193710
5646322f7224579740dbfd348b2911e4	SCI_MF1_AXNIFE20100706_120337_20100707_190533_20100709_190533
f63a1ed5ef520aa0e1bbf929d4e1f99a	SCI_MF1_AXNIFE20100706_120337_20100708_183356_20100710_183356
091818f10699406d3ba6c9ec19d3ae4d	SCI_MF1_AXNIFE20100706_120337_20100709_194254_20100711_194254
449eb572f393f0726acca4ec97d0e685	SCI_MF1_AXNIFE20100706_120337_20100710_191117_20100712_191117
d2e9a8a97c444471550e51f85ec1d80e	SCI_MF1_AXNIFE20100706_120337_20100711_183940_20100713_183940
44f74f7fbc95b7817160ea89e21594e0	SCI_MF1_AXNIFE20100706_120337_20100712_194839_20100809_194839

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

validity identifier	M_CAL	M_DL	M_DN
20100629_181641_20100701_181641	meas.	meas.	meas.
20100630_192540_20100702_192540	meas.	meas.	interp.
20100701_185403_20100703_185403	meas.	meas.	interp.
20100702_182226_20100704_182226	interp.	meas.	interp.
20100703_193125_20100705_193125	meas.	meas.	meas.
20100704_185948_20100706_185948	meas.	meas.	pred.
20100705_182811_20100707_182811	meas.	meas.	pred.
20100706_193710_20100708_193710	pred.	pred.	pred.
20100707_190533_20100709_190533	pred.	pred.	pred.
20100708_183356_20100710_183356	pred.	pred.	pred.
20100709_194254_20100711_194254	pred.	pred.	pred.
20100710_191117_20100712_191117	pred.	pred.	pred.
20100711_183940_20100713_183940	pred.	pred.	pred.
20100712_194839_20100809_194839	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	1.0022	1.0124	1.0061	1.0005	1.0046	1.0012	1.0400	OK
2	1.0026	1.0082	1.0053	1.0012	1.0030	1.0019	1.0200	OK
3	1.0014	1.0023	1.0014	1.0003	1.0007	1.0002	1.0100	OK
4	1.0010	1.0009	1.0007	1.0004	1.0004	0.9998	1.0100	OK
5	1.0019	1.0017	1.0016	1.0011	1.0008	1.0006	1.0120	OK
6	1.0015	1.0017	1.0019	1.0005	1.0007	1.0011	1.0100	OK
7	1.0184	1.0072	1.0155	–	–	–	1.0200	OK
8	1.0025	1.0024	1.0021	–	–	–	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 28 Jun 2010, therefore M_{t_0} is taken from the m–factor file `SCI_MF1_AXNIFE20100629_034209_20100628_184818_20100630_184818` .

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

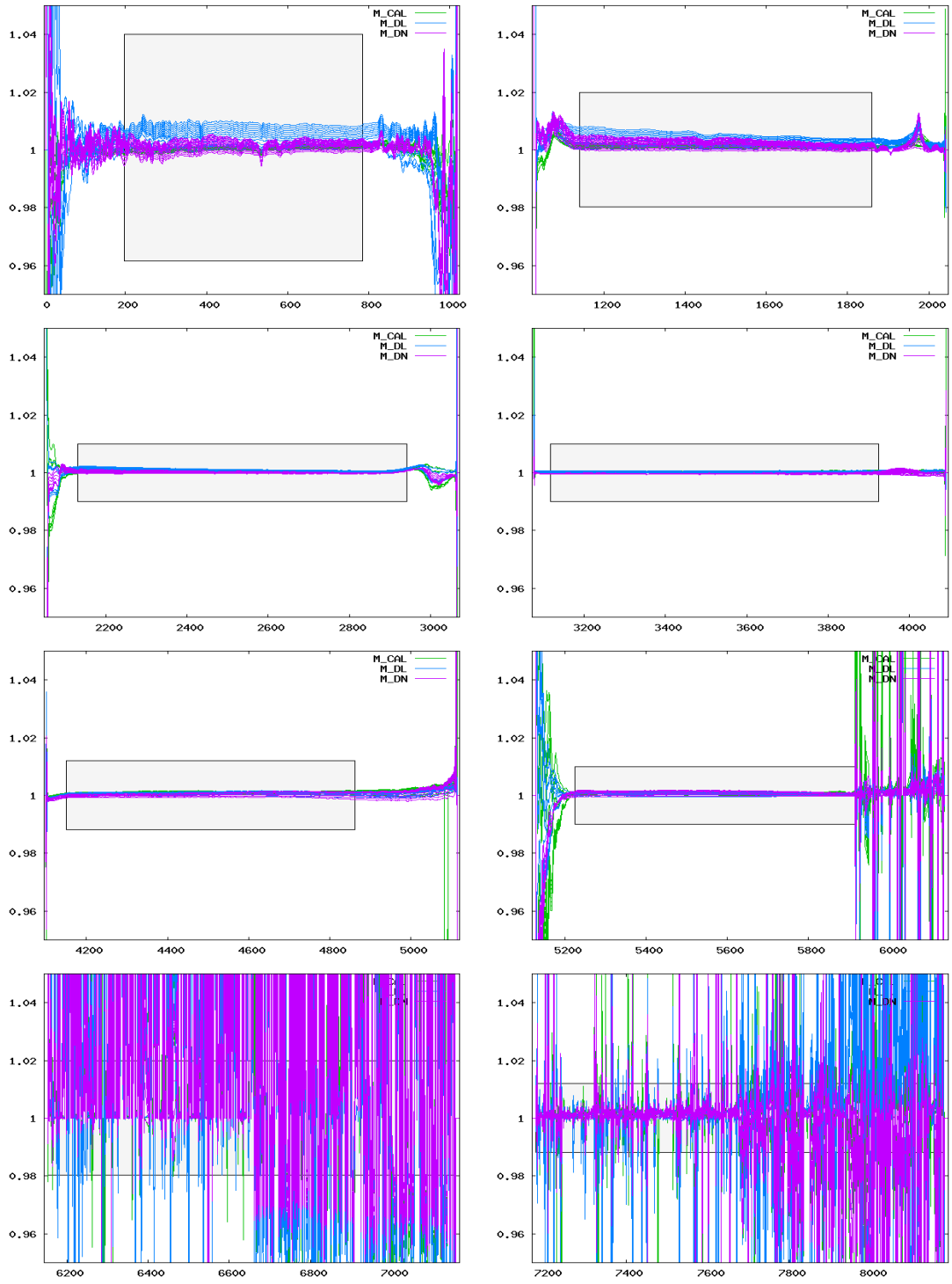

Figure 1: Ratio of delivered m-factors (29 Jun 2010– 12 Jul 2010) to the corresponding m-factor of the previous delivery day (28 Jun 2010). The grey boxes visualize the maximum ratio allowed.