# EDUCE- flagging report for spectral data from Brussels, Belgium

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# Measurements details :

Location : Brussels, Belgium Elevation (m): 105 Instrument name : jytot Instrument type : Jobin Yvon, Modified HD10 Wavelength range (nm): 280-550 Lat, Long: 50.7986, 4.3581 Date on which data was extracted : 29.01.02/24.07.02 (1993), 01.02.02/26.06.02 (1994), 04.02.02/25.09.02 (1995), 02.07.02/03.07.02 (1996) 03.07.02/05.07.02/09.07.02 (1997), 23.10.02 (1998), 24.10.02 (1999), 24.10.02/27.10.02/25.10.02 (2000), 26.10.02/27.10.02 (2001). Date on which slit function was extracted/received : 19.07.02 Years of submitted data : 9 complete No spectra (per year) : 28476 (1993), 37140 (1994), 43960 (1995), 43848 (1996), 43580 (1997), 33452 (1998), 33420 (1999), 30112 (2000), 22116 (2001) No spectra (total submitted) : 316104 Slit width (FWHM) (nm) :0.55 SHIC version for analysis : 3 093

**Special comments:** The spike and local shape flag and the start irradiance flag provide rather poor results possibly due to a badly characterised slit function! A re-analysis of the 1993 data with a more recent slit function is included in the appendix, with the main difference between the analysis results being a reduction in the number of undefined errors (i.e. grey flags). Several periods of questionable data appear to exist. The datasets are so large (typically > 15000 irradience spectra per year) that extraction from the database on a single date was not possible with the extraction settings available before November 2002, which introduced small data gaps in some of the datasets (see operator comments below). Therefore, for many years the annual coverage should be 100%.

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**Operator comments:** Some problems exist with submission of the data to the database meaning that the latest submission of data (in flextore format) may not yet be extractable by potential users. Data gaps exist in the QA analysis, these being : a few days in 1995, 1996 and 1997, JD 195-243 (1998) and JD 244-273 (1999).

# Tables of flagging statistics:

<u>1993:</u>



	Green	Yellow	Red	Black	Grey	Cor.	Green	Yellow	Red	Black	Grey	Cor.	Num
flag	%	%	%	%	%	%					-		
Shift1_flagging	24.4	4	1.4	0.1	70.1	0	2205	365	122	11	6332	0	9035
Shift2_flagging	39.9	6.7	2.6	0	50.8	0	3602	609	231	4	4589	0	9035
Start_irradiance_flag	6	33.5	35	24.7	0.8	0	543	3028	3160	2235	69	0	9035
Spike+ local_shape	14.7	35.5	41.8	0.4	0.1	7.5	1439	3465	4078	41	12	730	9765
Transmission_2	94.7	4.7	0.6	0	0	0	8552	427	52	0	4	0	9035

#### **Comments:**

Moderate annual coverage (approximately 60%); medium potential value for use in climatological studies.

Overall data-quality impression : data is of questionable quality, with 59.7% of poor quality and 0.8% having undefined errors for the start\_irradience flag.

A high number of black flags are associated with the start irradience category (with red flags also being high at 35%). This suggests that many of the irradience measurements have erroneous spikes and peaks due to a low signal to noise ratio (with only 6% being green)

Both the shift1 and shift2 flags indicate that the instrument has both some undefined and severe calibration errors for a substantial fraction of the measurements, compared with an extraterrestial spectrum across the entire wavelength region

730 ( <7.2%) spectra with spikes are reported.

The distribution of errors is non uniform across the dataset, with the highest number of black flags occurring during the spring and early summer. Many of the errors are undefined (i.e. grey flags). The entire dataset also has many red flags associated with the measurements.

# <u> 1994:</u>



	Green	Yellow	Red	Black	Grey	Cor.	Green	Yellow	Red	Black	Grey	Cor.	Num
Flag	%	%	%	%	%	%					_		
Shift1_flagging	7.3	1.8	0	0	90.8	0	1061	262	3	0	13147	0	14473
Shift2_flagging	1.8	1	2.5	0	94.6	0	265	146	366	0	13696	0	14473
start_irradiance_flag	4.5	21	40	32	2.5	0	650	3045	5783	4630	365	0	14473
Spike+ local_shape	0.4	21.7	73.3	0.3	2.1	2.3	52	3210	10858	43	310	348	14821
Transmission_2	95	2.8	0.2	0	2	0	13743	410	36	0	284	0	14473

#### **Comments:**

High annual coverage (approximately 90%); high potential value for use in climatological studies.

Overall data-quality impression : data is of questionable quality, with 73.6% of poor quality and 2.1% having undefined errors for the spike and local shape flag.

A high number of black flags are associated with the start irradience category (with red flags also being high at 40%). This suggests that many of the irradience measurements have erroneous spikes and peaks due to a low signal to noise ratio (with only 4.5% being green)

Both the shift1 and shift2 flags indicate that the instrument has some undefined calibration errors for almost the entire dataset, compared with an extraterrestial spectrum across the entire wavelength region. The performance is worse than last year for the UVA region.

348 (2.3%) spectra with spikes are reported.

The distribution of errors is non uniform across dataset, with the highest number of black flags occurring during the summer. Most of the errors are undefined (i.e. grey flags). The entire dataset also has many red flags associated with the measurements.

# <u> 1995:</u>



	Green	Yellow	Red	Black	Grey	Cor.	Green	Yellow	Red	Black	Grey	Cor.	Num
Flag	%	%	%	%	%	%					-		
Shift1_flagging	8.3	0.6	0	0	91.1	0	1279	94	1	0	14100	0	15474
Shift2_flagging	22.7	2.2	1.7	0	73.4	0	3516	336	258	0	11364	0	15474
Start_irradiance_flag	6.7	23.1	32.9	35.1	2.2	0	1038	3567	5084	5438	347	0	15474
Spike+ local_shape	1	26.6	67.7	1.4	0.2	3.2	164	4249	10813	218	30	506	15980
Transmission_2	97.1	2.4	0.5	0	0.1	0	15018	371	73	0	12	0	15474

#### **Comments:**

Full annual coverage (> 96%); excellent potential value for use in climatological studies.

Overall data quality impression : the data is of questionable quality, with 69.1% of poor quality and 0.2% having undefined errors for the spike and local shape flag.

A high number of black flags are associated with both the start irradience and spike and local shape categories (with red flags also being high at 33% and 67.7%, respectively). This suggests that many of the irradience measurements have erroneous spikes and peaks due to a low signal to noise ratio (with only 6.7% being green).

Both the shift1 and shift2 flags indicate that the instrument has undefined calibration errors for both the UVA and UVB for almost the entire dataset, compared with an extraterrestial spectrum across the entire wavelength region

506 (3.2%) spectra with spikes are reported.

The distribution of errors is non-uniform across dataset, with the more grey flags occuring before julian day 243. The number of black flags slowly also increases between the start of the year and this day. Some instrumental adjustment occurs after JD 243, which results in less undefined flags.

# <u> 1996:</u>



	Green	Yellow	Red	Black	Grey	Cor.	Green	Yellow	Red	Black	Grey	Cor.	Num
Flag	%	%	%	%	%	%					_		
Shift1_flagging	30	0.4	0	0	69.6	0	4641	60	0	0	10749	0	15450
Shift2_flagging	84.6	4.8	0.2	0	10.5	0	13063	737	27	0	1623	0	15450
start_irradiance_flag	3.5	28.1	40.7	26.1	1.5	0	546	4346	6286	4034	238	0	15450
Spike+ local_shape	4.4	36.7	56.3	0.2	0	2.3	703	5806	8903	31	7	369	15819
Transmission_2	98.2	1.4	0.4	0	0	0	15166	221	56	0	7	0	15450

#### **Comments:**

Full annual coverage (>97%); excellent potential value for use in climatological studies.

Overall data quality impression : the data is of questionable quality, with 66.8% of poor quality and 1.5% having undefined errors for the start irradience flag.

A high number of black flags are associated with the start irradience flag (with red flags also being high at nearly 41%). This suggests that many of the irradience measurements have erroneous spikes and peaks due to a low signal to noise ratio (with only 3.5% being green). However, this is an improvement on the previous few years data.

Both the shift1 and shift2 flags indicate that the instrument is badly calibrated for almost the entire dataset, compared with an extraterrestial spectrum across the entire wavelength region

369 (2.3%) spectra with spikes are reported.

The distribution of errors is fairly uniform across the entire dataset, with the number of grey flags being considerably less than the previous year and an increase in the number of green flags.

1997:



	Green	Yellow	Red	Black	Grey	Cor.	Green	Yellow	Red	Black	Grey	Cor.	Num
Flag	%	%	%	%	%	%					-		
Shift1_flagging	16.4	0	0	0	83.5	0	2582	2	0	0	13117	0	15701
Shift2_flagging	95.2	0.9	0	0	3.9	0	14951	138	2	0	610	0	15701
start_irradiance_flag	24.7	20.2	22	32.7	0.4	0	3882	3169	3458	5135	57	0	15701
Spike+ local_shape	0.1	15.3	81.6	0.2	1.8	1	21	2429	12935	30	286	158	15859
Transmission_2	96.5	1.5	0.2	0	1.8	0	15148	240	33	0	280	0	15701

#### **Comments:**

Full annual coverage (> 95%); excellent potential value for use in climatological studies.

Overall data quality impression : data is of questionable quality, with 81.8% of poor quality and 1.8% having undefined errors for the spike and local shape flag.

A high number of black flags occur in the start irradience category (with red flags also being high at 22%).

The shift1 flag indicates that the instrument has undefined calibration errors in the UVB region for almost the entire dataset, compared with an extraterrestial spectrum across the entire wavelength region. The calibration in the UVA region has improved markedly compared to all the previous years datasets, although still has a few undefined errors.

158 (1.0%) spectra with spikes are reported.

The distribution of errors is fairly uniform across the entire dataset, with the number of grey flags being less than the previous year and also a slight increase in the number of green flags.

# <u> 1998:</u>



	Green	Yellow	Red	Black	Grey	Cor.	Green	Yellow	Red	Black	Grey	Cor.	Num
	%	%	%	%	%	%							
Flag													
Shift1_flagging	16.9	0	0	0	83.1	0	2242	0	0	0	11052	0	13294
Shift2_flagging	96.8	0.4	0	0	2.8	0	12863	53	2	0	376	0	13294
start_irradiance_flag	27.7	22.7	22.9	26.1	0.6	0	3682	3021	3049	3468	74	0	13294
Spike+ local_shape	0	12.3	86.7	0.2	0	0.8	2	1650	11613	23	6	105	13399
Transmission_2	97.9	1.7	0.3	0	0	0	13018	231	45	0	0	0	13294

#### **Comments:**

High annual coverage (approximately 85%); high potential value for use in climatological studies.

Overall data quality impression : data is of questionable quality, with 86.9% of poor quality for the spike and local shape flag.

A high number of black flags associated with the start irradience flag (with red flags also being high at 23%). There are no green flags for the spike and local shape flag indicating distorted irradience spectra.

The shift1 flag indicates that the instrument has undefined calibration errors in the UVB region for almost the entire dataset, compared with an extraterrestial spectrum across the entire wavelength region. The calibration in the UVA region seems to be satisfactory.

105 (0.8%) spectra with spikes are reported.

The distribution of errors is fairly uniform across the entire dataset, with the number of black flags being higher during the summer.

### <u> 1999:</u>



	Green	Yellow	Red	Black	Grey	Cor.	Green	Yellow	Red	Black	Grey	Cor.	Num
_	%	%	%	%	%	%							
Flag													
Shift1_flagging	19.5	0	0	0	80.4	0	2838	5	0	0	11694	0	14537
Shift2_flagging	97.1	0.8	0	0	2.1	0	14120	114	0	0	303	0	14537
start_irradiance_flag	22.7	20.7	22.6	33.4	0.5	0	3299	3012	3291	4856	79	0	14537
Spike+ local_shape	0.2	29	70.6	0.1	0	0.2	31	4218	10275	8	5	26	14563
Transmission_2	98.7	1.1	0.2	0	0	0	14347	162	28	0	0	0	14537

#### **Comments:**

High annual coverage (approximately 90%); high potential value for use in climatological studies.

Overall data quality impression : data is of questionable quality, with 70.7% of poor quality for the spike and local shape flag.

A high number of black flags are associated with the start irradience category (with red flags also being high at 21%). There are very few green flags for the spike and local shape flag indicating distorted irradience spectra.

The shift1 flag indicates that the instrument has undefined calibration errors in the UVB region for almost the entire dataset, compared with an extraterrestial spectrum. The calibration in the UVA region seems to be fairly good.

26 (0.2%) spectra with spikes are reported.

The distribution of errors is fairly uniform across the entire dataset, with the number of black flags being higher during the summer. No significant change from the previous year.

# 2000:



	Green	Yellow	Red	Black	Grey	Cor.	Green	Yellow	Red	Black	Grey	Cor.	Num
	%	%	%	%	%	%					_		
Flag													
Shift1_flagging	21.9	0	0	0	78.1	0	3481	2	0	0	12424	0	15907
Shift2_flagging	96.9	0.6	0	0	2.6	0	15410	88	2	0	407	0	15907
start_irradiance_flag	25.4	26.2	25.8	22.3	0.4	0	4036	4165	4098	3552	56	0	15907
Spike+ local_shape	0.5	34	65.4	0	0	0.1	74	5415	10414	2	2	9	15916
Transmission_2	97.9	1.8	0.3	0	0	0	15565	289	51	0	2	0	15907

#### **Comments:**

Full annual coverage (approximately 100%); excellent potential value for use in climatological studies.

Overall data-quality impression : data is of questionable quality, with 65.4% of poor quality for the spike and local shape flag.

A high number of black flags are associated with the start irradience category (with red flags also being high at 24%). There are very few green flags for the spike and local shape flag indicating distorted irradience spectra.

The shift1 flag indicates that the instrument is badly calibrated in the UVB for almost the entire dataset, compared with an extraterrestial spectrum across the entire wavelength region. The calibration in the UVA region seems to be satisfactory.

9 (0.1%) spectra with spikes are reported.

The distribution of errors is fairly uniform across the entire dataset, with the number of black flags being higher during the summer. No significant change from the previous year.

# **2001:**



	Green	Yellow	Red	Black	Grey	Cor.	Green	Yellow	Red	Black	Grey	Cor.	Num
	%	%	%	%	%	%							
Flag													
Shift1_flagging	11.1	0	0	0	88.9	0	1764	1	0	0	14108	0	15873
Shift2_flagging	91.1	1.6	0	0	7.3	0	14454	257	2	0	1160	0	15873
start_irradiance_flag	19.6	19.8	25.3	35	0.2	0	3106	3150	4016	5562	39	0	15873
Spike+ local_shape	1	47.8	51.1	0	0	0.1	154	7587	8125	4	3	14	15887
Transmission_2	98.1	1.6	0.3	0	0	0	15577	254	40	0	2	0	15873

#### **Comments:**

Full annual coverage (approximately 100%); excellent potential value for use in climatological studies.

Overall data quality impression: data is of questionable quality, with 60.3% of poor quality and 0.2% having undefined errors for the start irradience flag.

A high number of black flags are associated with the start irradience flag (with red flags also being high at 25.3%). There are very few green flags for the spike and local shape flag indicating distorted irradience spectra.

The shift1 flag indicates that the instrument is badly calibrated in the UVB for almost the entire dataset, compared with an extraterrestial spectrum across the entire wavelength region. The calibration in the UVA region seems to be average (the calibration is worse compared to some of the previous year).

14 (0.1%) spectra with spikes are reported.

The distribution of errors is fairly uniform across the entire dataset, with the number of black flags being higher during the summer. No significant change from the previous year.

# <u>Appendix :</u> 1993:



	Green	Yellow	Red	Black	Grey	Cor.	Green	Yellow	Red	Black	Grey	Cor.	Num
Flag	%	%	%	%	%	%							
Shift1_flagging	30	16.2	3.8	0.8	49.1	0	2715	1466	345	70	4439	0	9035
Shift2_flagging	44.4	9.7	11.7	0.3	33.8	0	4014	879	1055	30	3057	0	9035
Start_irradiance_flag	6.2	35.9	38.1	19.2	0.6	0	564	3245	3443	1732	51	0	9035
Spike+ local_shape	16.6	40.4	35.4	0.3	0.1	7.3	1613	3938	3451	26	7	708	9743
Transmission_2	94.7	4.7	0.6	0	0	0	8558	421	52	0	4	0	9035

#### Comments:

Moderate annual coverage (approximately 60%); medium potential value for use in climatological studies.

Overall data quality impression : data is of questionable quality, with 57.3% of poor quality and 0.6% having undefined errors for the start\_irradience flag. The number of black flags decreases compared to the results using the old slit function.

A high number of black flags are associated with the start irradience category (with red flags also being high at 38%). This suggests that many of the irradience measurements have erroneous spikes and peaks due to a low signal to noise ratio (with only 6% being green)

Both the shift1 and shift2 flags indicate that the instrument has both some undefined and severe calibration errors for a substantial fraction of the measurements, compared with an extraterrestial spectrum. A significant fraction of grey flags have been redistributed as a consequence of using the new slit function.

708 (<7.3%) spectra with spikes are reported (a reduction of 22 spectra compared to analysis with the old slit function).

The distribution of errors is similar to the previous analysis woth the old slit function, with the exception that many of the undefined errors (i.e. grey flags) between Julian Days 85 and 190 are redistributed into the other flagging colours. The entire dataset still also has many red flags associated with the measurements.