AATSR Cycle Report
Cycle # 17

02 June 2003, 21:59:29 orbit 6568
07 July 2003, 21:59:29 orbit 7068

Scene acquired over Egypt on 26 July 2003
RGB combination of 1.6u, 0.87u, 0.67u bands

22221522

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1 THE CYCLIC REPORT #17

1.1 Acronyms and abbreviations

AATSR	Advanced Along Track Scanning Radiometer
CR	Cyclic Report
DMOP	Detailed Mission Operation Plan
DMS	Data Management System
EN-UNA-YYYY/#	Envisat Unavailability (plus year and number)
ESOC	European Space Operation Center
IECF	Instrument Engineering and Calibration Facilities
IPF	Instrument Processing Facilities
NRT	Near Real Time
OCM	Orbit Control Manoeuvre
PDS	Payload Data Segment
PMC	Payload Management Computer
SPR	Software Problem Reporting
SW	Software
VISCAL	Visible Calibration

The AATSR list of acronyms and abbreviation is in the following site:
http://envisat.esa.int/dataproducts/aatsr/CNTR5-1.htm#eph.aatsr.glossary.acronabbr:nrt

1.2 Summary

Cyclic number: 17
Cycle Start Time: 02-JUN-2003, 21:59:29 orbit stop: 6568
Cycle Stop Time: 07-JUL-2003, 21:59:29 orbit stop: 7068

The main activities during the cycle have been the following

- No changing in the version of AATSR processor for Level0 and in the IPF version for the Level1 and Level2
- The visible calibration coefficients data (ATS_VC1_AX) are changed regularly during the cycle. These VC1 files are being used within the time criteria set for NRT processing. Off-line data processing is expected to take place within 2 weeks of acquisition. When this is the case the VC1 file used should be +/- 1 day from the date of acquisition (i.e. within specification). If off-line data are generated before 2 weeks from acquisition, this may not be achieved.
- The data acquisition for the Level0 has been of 97.9% of the whole period, for the Level1 of the 97.2% of the whole period.

- Calibration activities: The AATSR visible channels are in good agreement with the corresponding MERIS channels but are measuring significantly higher than ATSR-2. There are several possible explanations for the differences that are being investigated which include, pre-launch calibration error, incorrect assumptions about sites, degradation of the calibration system, stray light.
- Validation activities: No validation updates during that cycle.

1.3 Software version and Auxiliary files version

1.3.1 Software version

AATSR processor for Level0; version: PFHS/5.22
AATSR IPF for Level1 and Level2; version: AATSR/05.55

DOCUMENTATION Applicable: PO-RS-MDA-GS-2009 Is. 3 Rev. F

1.3.2 Auxiliary file version

This is the list of AATSR auxiliary files.

- ***Browse Product Look-up Data (ATS_BRW_AX)***
- ***L1b Characterization Data (ATS_CH1_AX)***
- ***Cloud Look-up Table Data (ATS_CL1_AX)***
- ***General Calibration Data* (ATS_GC1_AX)**
- ***AATSR Instrument Data* (*ATS_ INS_AX*)**
- ***Visible Calibration Coefficients Data (ATS_VC1_AX)***
- ***Level1B Processing Configuration Data (ATS_PC1_AX)***
- ***Level2 Processing Configuration Data (ATS_PC2_AX)***
- ***SST Retrieval Coefficients Data (ATS_SST_AX)***

In this section will be reported the list of the auxiliary files changed in the cycle and for each file will be specified the date and the reason of the changing.
Will be also reported the list of the latest filename for every auxiliary file currently in use by the PDS.

Only the ATS_VC1_AX file is expected to change regularly. These VC1 files are being used within the time criteria set for NRT processing. Off-line data processing is expected to take place within 2 weeks of acquisition. When this is the case the VC1 file used should be +/- 1 day from the date of acquisition (i.e. within specification). If off-line data are generated before 2 weeks from acquisition, this may not be achieved. **(1)**

Product name	Start validity	Reason of changing
ATS_VC1_AXVIEC2003	June, 06, 09, 11, 12, 18, 19, 23, 24, 26, 27 July, 01, 04, 07	(1)

Tab 1.3.2.1: Auxiliary files list changed during the period

Product name
ATS_BRW_AXVIEC20020123_072338_20020101_000000_20200101_000000
ATS_CH1_AXVIEC20021114_113144_20020301_000000_20070801_235959
ATS_CL1_AXVIEC20020123_073044_20020101_000000_20200101_000000
ATS_GC1_AXVIEC20020123_073430_20020101_000000_20200101_000000
ATS_INS_AXVIEC20021029_124019_20020301_000000_20030731_235959
ATS_VC1_AXVIEC20030707_132536_20030705_073948_20030712_073948
ATS_PC1_AXVIEC20030430_211727_20020301_000000_20070801_235959
ATS_PC2_AXVIEC20020123_074151_20020101_000000_20200101_000000
ATS_SST_AXVIEC20020123_074408_20020101_000000_20200101_000000

Tab 1.3.2.2: Latest auxiliary files currently in use by the PDS

1.4 PDS status

1.4.1 Instrument Unavailability

No instrument unavailability during this period.

1.4.2 Level0 data acquisition and Level1b processing status

In this chapter will be reported the Level0 missing and the data unavailability not planned in the period.
Only the Level1b data not processed starting from the corresponding Level0 will be reported.
The figure below shows the Level0 data missing measurements (yellow line) and the Level1 data not processed starting from the corresponding Level0 (red line).

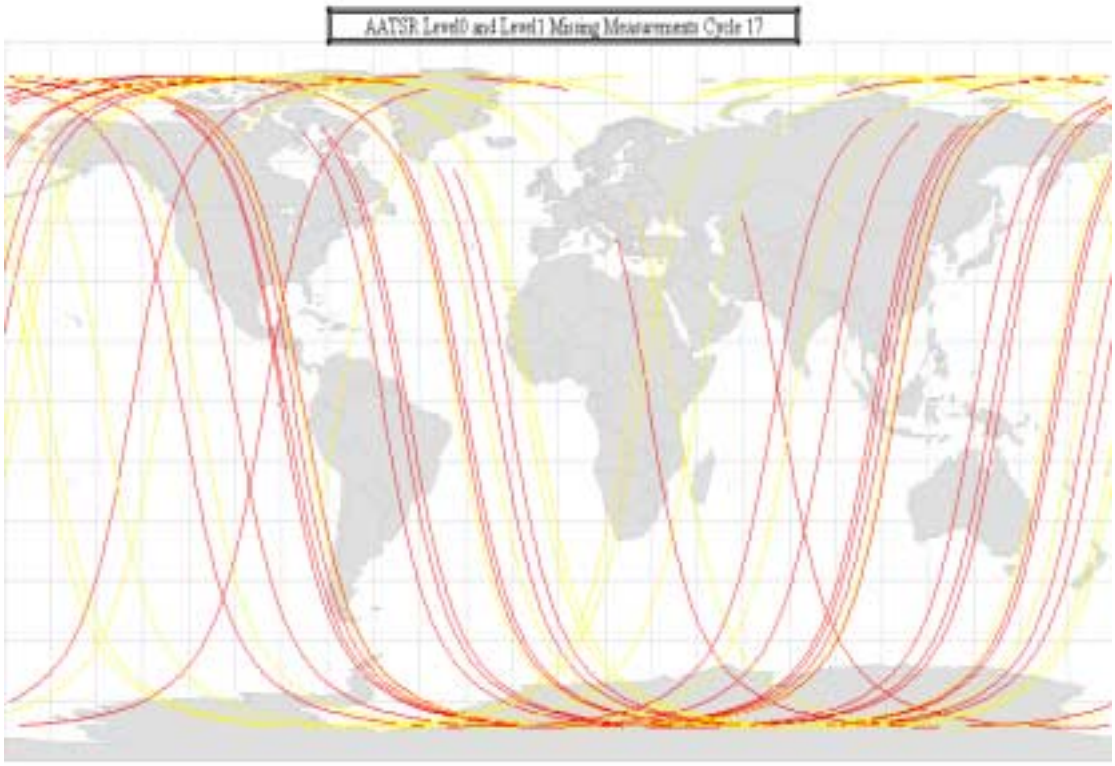

Figure 1.5.1: Missing measurements during cycle 17.
Yellow line: Level0 missing (unknown missing)
Red lines: Level1 missing

The total number of missing data is equivalent to 9 orbits on 501 (1.9%).
The Level0 data was available the 97.9% of the time during the cycle.
The Level1b data was available the 97.2% of the time during the cycle.
The following tables show the list of Level0 and Level1 lack of data.

UTC Start: start time of the missing acquisition.
UTC Stop: stop time of the missing acquisition.
Duration: duration of the missing acquisition.
Orbit Start: absolute orbit start of the missing acquisition.
Orbit Stop: absolute orbit stop of the missing acquisition.
Comment: reason of the missing acquisition.

UTC Start	UTC Stop	Duration (sec)	Orbit Start	Orbit Stop
10-JUN-03 18:05:39	10-JUN-03 19:42:08	5789	6680	6681
11-JUN-03 14:19:04	11-JUN-03 14:51:01	1917	6692	6692
12-JUN-03 20:22:16	12-JUN-03 20:26:21	245	6710	6710
13-JUN-03 06:36:12	13-JUN-03 08:18:38	6146	6716	6717
23-JUN-03 08:05:01	23-JUN-03 09:42:48	5867	6860	6861
23-JUN-03 21:16:40	23-JUN-03 23:01:35	6295	6868	6869
03-JUL-03 07:53:25	03-JUL-03 09:29:44	5779	7003	7004
04-JUL-03 22:13:08	04-JUL-03 23:57:54	6286	7026	7027

06-JUL-03 04:31:48	06-JUL-03 06:13:19	6091	7044	7045
06-JUL-03 21:09:10	06-JUL-03 21:37:56	1726	7054	7054
06-JUL-03 21:40:56	07-JUL-03 00:35:26	10470	7054	7056
07-JUL-03 02:18:18	07-JUL-03 03:59:23	6065	7057	7058

Tab 1.5.1: ATS_NL__0P missing data during cycle 17

UTC Start	UTC Stop	Duration (sec)	Orbit Start	Orbit Stop
09-JUN-03 22:03:06	09-JUN-03 23:36:58	5632	6668	6669
12-JUN-03 03:48:52	12-JUN-03 05:23:17	5665	6700	6701
13-JUN-03 04:57:35	13-JUN-03 06:36:11	5916	6715	6716
18-JUN-03 02:18:20	18-JUN-03 03:57:50	5970	6785	6786
22-JUN-03 00:11:11	22-JUN-03 01:42:29	5487	6841	6842
24-JUN-03 02:31:13	24-JUN-03 04:08:15	5822	6871	6872
27-JUN-03 15:58:57	27-JUN-03 17:25:34	5197	6922	6923
28-JUN-03 18:44:01	28-JUN-03 20:13:33	5372	6938	6939
30-JUN-03 02:42:58	30-JUN-03 04:14:11	5473	6957	6958
30-JUN-03 22:45:15	01-JUL-03 00:18:10	5575	6969	6970
03-JUL-03 02:48:51	03-JUL-03 04:20:00	5469	7000	7001
03-JUL-03 22:50:52	04-JUL-03 02:06:10	11718	7012	7014
04-JUL-03 23:57:54	05-JUL-03 01:34:58	5824	7027	7028
05-JUL-03 21:45:40	05-JUL-03 23:19:31	5631	7040	7041

Tab 1.5.2: ATS_TOA__1P missing data during cycle 17

1.5 Quality Control

1.5.1 Monitoring of parameters

***JITTER**:*
The average scan-mirror jitter rate throughout this cycle was very close to 0.0 jitters/sec.

***SENSOR TEMPERATURE**:*
All sensors maintained their nominal orbital and seasonal values.

***VISCAL**:*
Reflectance channel calibration files (ATS_VC1_AX) are available for everyday of the cycle. Nominal viscal characteristics were observed throughout the cycle.

***TOTAL NOISE**:*
Total noise in the thermal infrared channels, as represented by the standard deviation of the black-body signal in each channel, was nominal throughout the cycle.

Total noise in the reflectance channels was also nominal throughout the cycle.

NEΔT: none

1.5.2 Users Rejection

No user complaints during this cycle.

1.5.3 Software Problem Reporting. Potential impact

In this section will be described the SPR open with the potential impact on the data quality, and the SPR closed.

1.5.3.1 SPR open

In this section will be reported the list of SPRs.

- *Empty SST % Cloud Coverage 50KM*

  In Level2 AR product (averaged product) Sea Surface Temperature (SST) the cloud coverage percentage is set to 0 for the 50KM cells. The cloud top temperature fields in the 50 km AST cell records are also in error. It does not happen for the 30arc minute cells.

- *Empty child product*

  Some child products extracted from Level1b (TOA) product has unexpected exceptional values in the data set.

- *RAL SPR 15*

  - The Operational Processor sets the Record Quality Indicator incorrectly.
  - It is unclear whether or not the processors should omit MDS records in granules for which the attachment flag is set.

- *SPR 16* (RAL)
  Missing VISCAL GADS in L1b IPF products.

- An observation about the change to the null value for dsr_time used in the AST and Meteo products.

- The NDVI in the 50 km AST cell records is not consistent with the 30 arc minute cell values from the same region. This turns out to be because an incorrect exception value is being used for the mean NDVI and for the standard deviation of NDVI in the 50 km AST cell records.

The value -1 is being used in place of the correct exception value of -19999. Thus although the NDVI data is correct where it is valid, the incorrect exception value means that invalid NDVI values in the 50 km cells could be mistaken for valid data.

1.5.3.2 SPR closed

No SPR closed during the cycle

1.6 Calibration / Validation activities and results

1.6.1 Calibration

A study has been in progress to compare the top-of-atmosphere reflectances for desert and ice targets measured by the AATSR VNIR channels, with those measured by ATSR-2 and MERIS.

The desert sites used have been selected for uniformity over large area, long-term stability, and low incidence of clouds.

AATSR GBTR child products (typically 512 x 512km scenes) are generated for each area of interest and downloaded manually from the UK-PAC as they become available. The products are then processed to detect the presence of clouds over the area of interest, and, if none are present the average top-of-atmosphere reflectances are calculated for the site and saved to a file for future processing.

The MERIS reflectances are obtained using the output of the METRIC tool. At the time of writing 370 METRIC HDF products were downloaded from the MERIS calibration site providing 11 coincident measurements with the AATSR data processed. Figure 1 shows the AATSR 0.56µm, 0.67µm and 0.87µm reflectances compared with the corresponding MERIS channel 5, 7 and 13 reflectances.

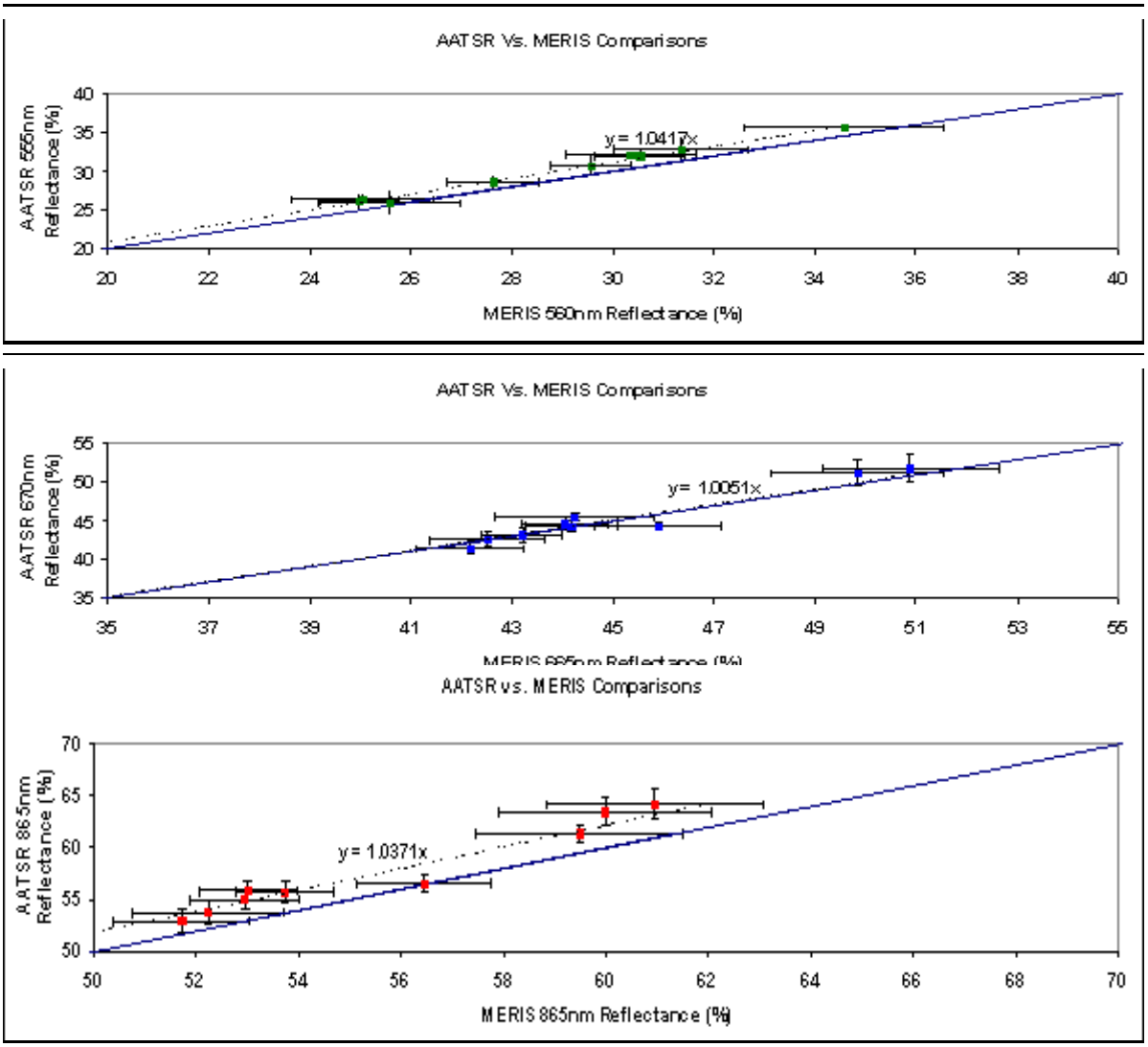

Figure 1: AATSR vs. MERIS top-of-atmosphere reflectances for desert targets.

The plot shows fairly good agreement between AATSR and MERIS with the ratio of AATSR to MERIS reflectances R_{AATSR}/R_{MERIS} = 1.041 (560nm), 1.001 (660nm), 1.037 (870nm). This result is consistent with the early result of Delwart and Goryl 2002.

The comparison of AATSR with ATSR-2 was made using the archive of ATSR-2 reflectances over desert sites obtained for the mission up to January 2000. Here, the AATSR nadir and along-track TOA reflectances are compared with the corresponding ATSR-2 BRDF for the same view and solar geometry. The results of this comparison with all the AATSR data processed up to March 2003 show clear differences between AATSR and ATSR-2 (Figure 2).

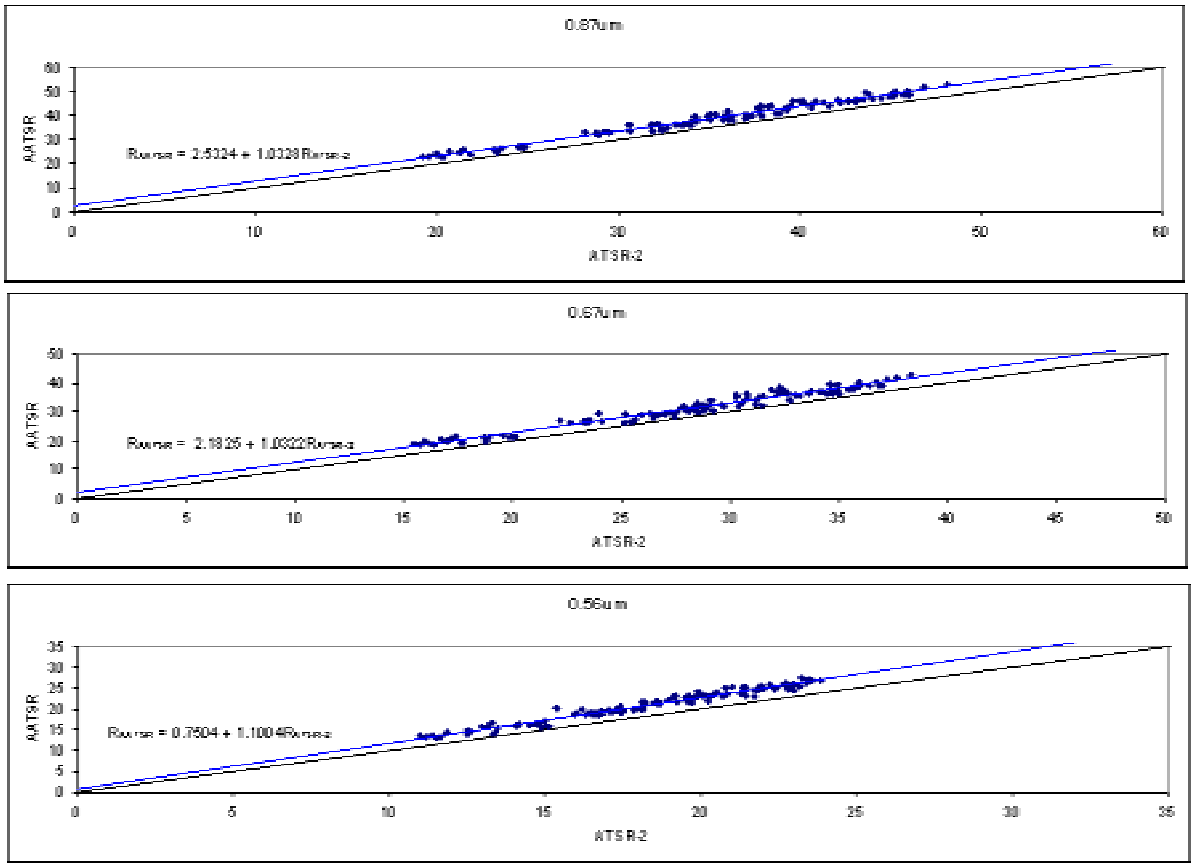

Figure 2: Comparison between AATSR top-of-atmosphere reflectance and the corresponding ATSR-2 desert target BRDF.

The results show that the AATSR reflectance channels are measuring consistently ~ 10% higher than those for ATSR-2.

In addition to the desert targets, the Greenland ice cap has also been used to compare AATSR and ATSR-2. As with the desert targets, the assumptions are that the Greenland ice cap is radiometrically stable over a long period and is uniform over a large area. However, because of the latitude (70°N), the site is only useful during the summer months (May-July) when the solar zenith is less than 70°.

In this report we present a direct comparison of the AATSR and ATSR-2 VNIR channels over Greenland. Figure 3 shows an AATSR GBTR over Greenland for 1st May 2003 and the ATSR-2 GBT taken 30 minutes later. After filtering out cloudy pixels, the comparison of the nadir view pixels for clear ice show that the AATSR VNIR channels are significantly higher than for ATSR-2 (Figure 4). This result is consistent with the results from the desert site.

Figure 3: AATSR and ATSR-2 GBTs for Greenland on 1st May 2003.

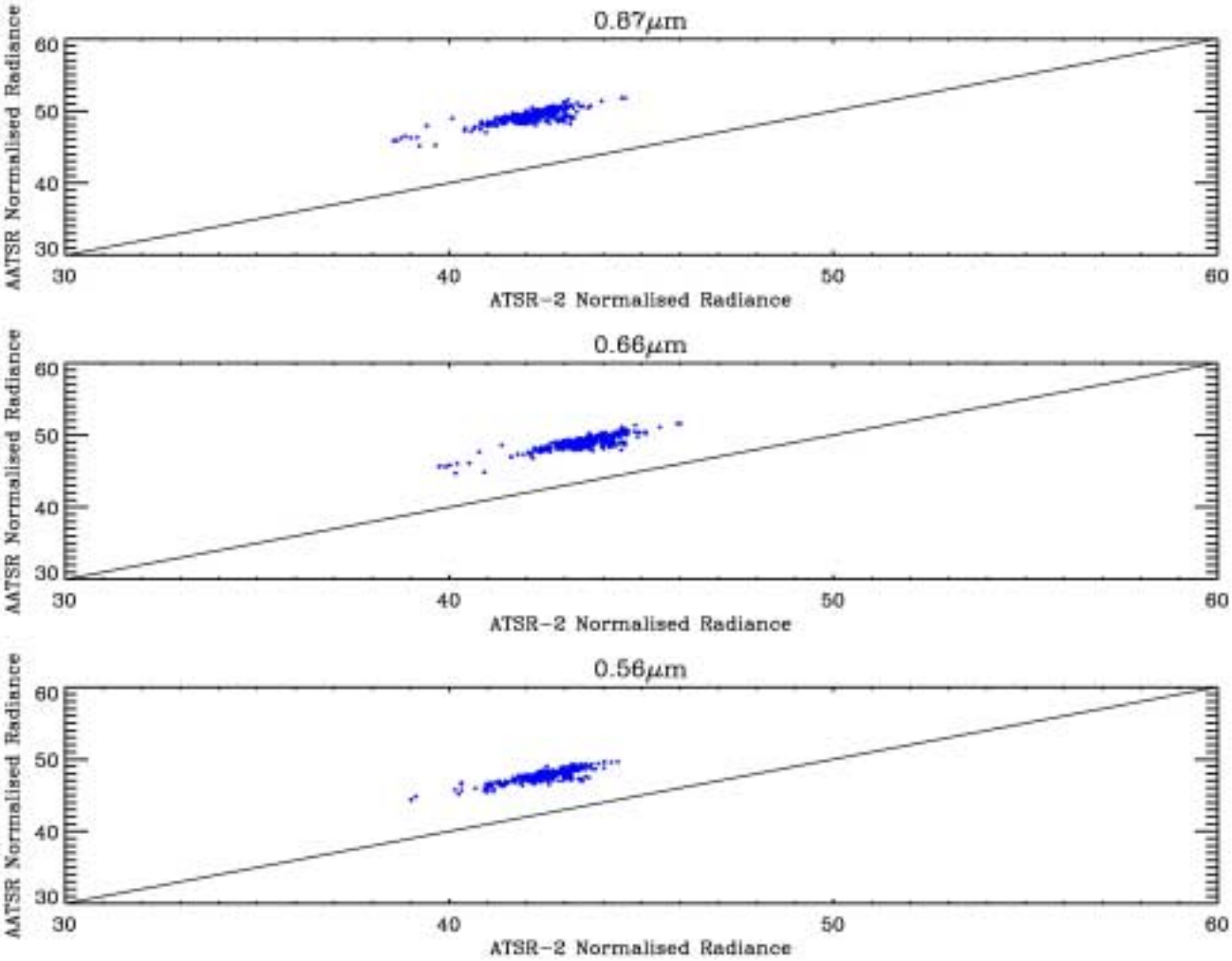

Figure 4: AATSR vs. ATSR-2 normalised top-of-atmosphere radiances for Greenland on 1st May 2003.

To conclude, the AATSR visible channels are in good agreement with the corresponding MERIS channels but are measuring significantly higher than ATSR-2. There are several possible explanations for the differences that are being investigated which include, pre-launch calibration error, incorrect assumptions about sites, degradation of the calibration system, stray light.

1.6.2 Validation

No validation updates during that cycle.

1.7 General information

A calibration meeting will be held at London on July 11. The status of the vicarious calibration and comparison with MERIS will be presented.

A MERIS/AATSR Validation Team meeting will be held at ESRIN on October 20-24. The results from the validation team will be presented.