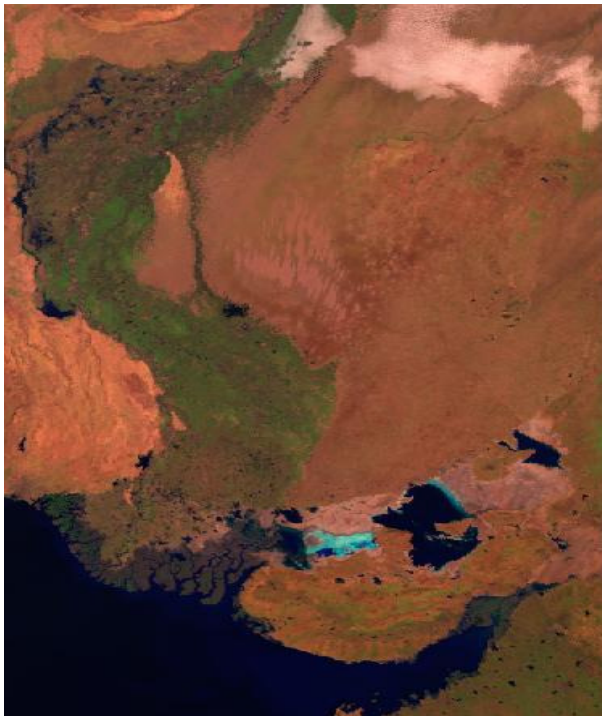
ENVISAT - AATSR

CYCLIC REPORT #98

	START	END
DATE	26TH DECEMBER 2010	25TH JANUARY 2011
TIME	21:59:10	21:59:53
ORBIT #	46136	46567



This subset from a Level 1B product acquired on 1st January 2011 shows the Indus River basin in southern Pakistan. The Indus River dolphin is found here: a subspecies that has very little eyesight, and is one of the world's rarest mammals. This RGB image is composed of data from the 1.6, 0.87 and 0.55 micron channels for the nadir view.

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A P P R O V A L

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C H A N G E R E C O R D

ISSUE: 1 REVISION: 0

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AATSR CYCLIC REPORT # 98

1 INTRODUCTION

The AATSR Cyclic Report is distributed by the AATSR IDEAS team to keep the AATSR community informed of any modification regarding instrument performances, the data production chain and the results of calibration and validation campaigns at the end of each Envisat 2010+ cycle, which consists of 431 complete orbits over the course of 30 days.

This document is available online at: http://earth.esa.int/pcs/envisat/aatsr/reports/cyclic/

1.1 Acronyms and Abbreviations

AATSR	Advanced Along Track Scanning Radiometer
APC	Antenna Pointing Controller
CR	Cyclic Report
DDS	Data Dissemination System
DMOP	Detailed Mission Operation Plan
DMS	Data Management System
EN-UNA-YYYY/#	Envisat Unavailability (plus year and number)
ESOC	European Space Operation Centre
HSM	High Speed Multiplexer
IDEAS	Instrument Data quality Evaluation and Analysis Service
IECF	Instrument Engineering and Calibration Facilities
IPF	Instrument Processing Facilities
LUT	Look Up Table
MPS	Mission Planning Schedule
NRT	Near Real Time
OCM	Orbit Control Manoeuvre
OBDH	On-board Data Handling
PDS	Payload Data Segment
PMC	Payload Management Computer
RAL	Rutherford Appleton Laboratory
SPR	Software Problem Reporting
SSR	Solid State Recorder
SW	Software
VISCAL	Visible Calibration

The AATSR list of acronyms and abbreviations is available at the following site:
http://envisat.esa.int/dataproducts/aatsr/CNTR5.htm#eph.aatsr.glossary

2 SUMMARY

Cyclic Report: 98

Cycle Start: 26th December 2010, 21:59:10 Orbit #: 46136

Cycle End: 25th January 2011, 21:59:53 Orbit #: 46567

The main activities during the cycle have been as follows:

- **ESRIN downtimes and delays**

  04 January 2011: Envisat NRT dissemination delay due to a software problem; normal service resumed 05 January 2011.

  EOLI-SA was unavailable on 18 January 2011 from 09:00 to 10:30 CET due to server maintenance and on 25 January 2011 due to planned network maintenance.

- **Kiruna downtimes and delays**

  There were no downtimes or delays during this cycle.

- **Unavailabilities**

  There were a number of Artemis/Envisat unavailabilities affecting NRT data during the cycle: 26 December 2010: 22:08:51 to 22:21:02z; 03 January 2011: 15:42:43 to 15:45:03z; 09 January 2011: 07:45:36 to 12:09:35z; 12 January 2011: 17:03:40 to 23:21:56z; 13 January 2011: 22:11:48 to 22:58:00z. All data have been recovered.

- **BPZ dissemination via the DDS**

  From 23 December 2010, the AATSR Browse BPZ products from ESRIN ceased to be disseminated on the DDS, and BPZ products from Kiruna will be switched off in early 2011.

- **Visible Calibration (VC1) auxiliary files**

  There was disruption to the loading and dissemination of VC1 auxiliary files during this cycle. Many NRT products used an extended-range VC1 file this period, which is deemed acceptable for NRT data; see Section 3.2.1.1 for details of missing or delayed VC1 files.

  However, some consolidated data also used extended-range VC1 files over this period of VC1 disruption and the previous one in November 2010. A list of affected products is being compiled with the intention of reprocessing them using more appropriate VC1 files.

- **AATSR Technical note published**

  An AATSR technical note, describing how to retrieve the original instrument pixel coordinates and the measurement time from AATSR data, has been produced by the AATSR Expert Support Laboratory and can be obtained from the ESA Earth Observation Library and the AATSR PCS website
  http://envisat.esa.int/earth/www/category/index.cfm?fcategoryid=34
  http://earth.eo.esa.int/pcs/envisat/aatsr/articles/

- **Mini-commissioning after the Envisat 2010+ change of orbit**

  Following the orbit manoeuvres, a mini-commissioning phase took place to ensure the quality of the AATSR data in the new orbit configuration. This included the routine quality control activities, as well as some more in-depth checks of selected data products. Particular emphasis was placed on assessing the geolocation performance of AATSR data. The Cal/Val and ESL teams also conducted specific investigations.

  The final report was submitted to ESA on 24 January 2011; the summary conclusions of the report were:

  AATSR successfully executed the planned operations during the ENVISAT mission extension orbit lowering manoeuvres and is continuing with routine operations as usual. There are no changes to the operations scenario.

  The performance of the instrument subsystems was recorded over the duration of the manoeuvres and the trends analysed. The following subsystems were monitored:

  - Scan Mechanism
  - Cooler Performance
  - Blackbody Temperature Stability
  - IR Channel Performance
  - Visible Channel Performance

  The assessment of the trends revealed that the subsystems were not affected by the manoeuvres and the performance is nominal.

  In the longer term, as ENVISAT drifts away from its nominal orbit track, we may expect to see some variations on the illumination of the VISCAL system and also the thermal trends. These will be evaluated as part of the ongoing monitoring of the instrument performance.

  The quality of AATSR data products was also rigorously assessed, and the conclusion is that the AATSR Level 1 and Level 2 products continue to be of good quality, with no anomalies or differences observed during examination of data from after the orbit lowering manoeuvres

  Examination of the colocation of the nadir and forward views showed no evidence of any change from previous phase.

  The geolocation of AATSR data after the orbit lowering was checked and found to be comparable to the performance seen prior to the manoeuvres.

  The initial validation findings indicate that there has been no change in SST data quality as a result of the lowering of the Envisat orbit height.

  Therefore it can be concluded that the ENVISAT orbit lowering has not resulted in a degradation of AATSR instrument performance and operations, nor has it impacted upon the data quality of the AATSR products. Looking forwards, there are no causes for concern and no reason why AATSR should not be expected to continue nominal operations.

- **AATSR Visible and Short-Wave Infrared Channels Long-Term Drift**

  The following message, prepared on behalf of ESA and the AATSR Quality Working Group, has been distributed to AATSR users:

  The VIS-SWIR channels are calibrated via an on-board diffuser-based VISCAL system. The calibration of this unit is primarily traced to the pre-launch calibrations that were performed at RAL (PO-RP-RAL-AT-023 Issue 2). In-flight monitoring of the long-term calibration stability is performed by use of stable desert and ice targets (Smith D.L. and Poulsen C.A., 2008 *Proceedings of MERIS/AATSR Workshop*). Based on these measurements, three modifications to the AATSR VIS-SWIR calibration processing have been implemented by the operational processing since the launch of ENVISAT in 2002:

  - 14 December 2004 - 1.6um non-linearity correction introduced (PO-TN-RAL-AT-0540)
  - 29 November 2005 - Exponential Drift Correction is applied to VC1 files (PO-TN-RAL-AT-0542)
  - 18 December 2006 - Thin Film Drift Correction is introduced to VC1 files (PO-TN-RAL-AT-0552)

  Users should be aware that improved corrections are available and need to be applied in order to obtain the best radiometric calibration.

  Detailed information including tools for removing existing drift corrections and applying the values from the improved correction, along with instructions on how to use them, is available from: http://www.aatsrops.rl.ac.uk/EDSX/OtherInfo/

  If you have any questions or queries relating to this, or any other AATSR matter, then please contact the ESA Earth Observation Helpdesk via http://earth.esa.int/contactus or by sending an e-mail with your query to mailto:EOHelp@esa.int

3 SOFTWARE & AUX FILE VERSION CONFIGURATION

3.1 Software Version

AATSR IPF for Level 1 and Level 2: Version 6.03

AATSR L2P Processor: Version 1.5.

3.2 Auxiliary Files

AATSR processing uses the following auxiliary files:

- Browse Product Lookup Data (ATS_BRW_AX)
- L1b Characterisation Data (ATS_CH1_AX)
- Cloud Lookup Table Data (ATS_CL1_AX)
- General Calibration Data (ATS_GC1_AX)
- AATSR Instrument Data (ATS_INS_AX)
- Visible Calibration Coefficients Data (ATS_VC1_AX)
- L1b Processing Configuration Data (ATS_PC1_AX)
- L2 Processing Configuration Data (ATS_PC2_AX)
- SST Retrieval Coefficients Data (ATS_SST_AX)
- LST Land Surface Temperature Coefficients Data (ATS_LST_AX)

Because the PC1 file contains the orbit period, two versions now need to be maintained after the mission extension orbit manoeuvres.

The latest filename for each auxiliary file in use in the PDS is as follows:

Product name
ATS_BRW_AXVIEC20020123_072338_20020101_000000_20200101_000000
ATS_CH1_AXVIEC20070720_093530_20020301_000000_20200101_000000
ATS_CL1_AXVIEC20101015_104659_20020301_000000_20200101_000000
ATS_GC1_AXVIEC20070720_093834_20020301_000000_20200101_000000
ATS_INS_AXVIEC20070720_094014_20020301_000000_20200101_000000
See below for VC1 files
ATS_LST_AXVIEC20101018_094830_20020301_000001_20200101_000000
ATS_PC1_AXVIEC20101015_101827_20020301_000000_20101021_235959
ATS_PC1_AXVIEC20101015_100604_20101022_000000_20200101_000000
ATS_PC2_AXVIEC20020123_074151_20020101_000000_20200101_000000
ATS_SST_AXVIEC20051205_102103_20020101_000000_20200101_000000

Table 3-1 Latest auxiliary files currently in use by the PDS

3.2.1 STATUS OF DAILY VISIBLE CALIBRATION FILES

3.2.1.1 VC1 File Availability

The following daily reflectance channel calibration files were not available during this cycle:

Date	Validity range		Comments
	From	To	
27/12/2010	26/12/2010	02/01/2011	An extended validity range file (20/12/10-20/01/11) was provided
31/12/2010	30/12/2010	06/01/2011	
03/01/2011	02/01/2011	09/01/2011	
08/01/2011	07/01/2011	14/01/2011	
10/01/2011	09/01/2011	16/01/2011	
11/01/2011	10/01/2011	17/01/2011	
13/01/2011	12/01/2011	19/01/2011	
14/01/2011	13/01/2011	20/01/2011	
15/01/2011	14/01/2011	21/01/2011	
17/01/2011	16/01/2011	23/01/2011	
19/01/2011	18/01/2011	25/01/2011	
21/01/2011	20/01/2011	27/01/2011	

Table 3-2 Unavailable VC1 files

3.2.2 STATUS OF OTHER AUXILIARY FILES

No auxiliary files changed during this cycle.

4 PDS STATUS

4.1 Instrument Unavailability

There were no losses of AATSR data due to instrument unavailabilities during the cycle.

4.2 L0 Data Acquisition and L1B Processing Status

Week		Orbit		Availability (s)			Availability (%)		
#	Dates	Start	Stop	Inst Unav	L0 gaps	L1 gaps	Instrument	L0	L1
1	December 26, 2010	46136	46222	0	0	0	100.00%	100.00%	100.00%
2	January 01, 2011	46222	46308	0	0	1997	100.00%	100.00%	99.61%
3	January 07, 2011	46308	46395	0	0	0	100.00%	100.00%	100.00%
4	January 13, 2011	46395	46481	0	0	0	100.00%	100.00%	100.00%
5	January 19, 2011	46481	46567	0	0	0	100.00%	100.00%	100.00%

Table 4-1 Instrument and data unavailability weekly summary for cycle 98

The instrument was available for 100.00% of the time during the cycle.
The L0 data were available for 100.00% of the time during the cycle.
The L1B data were available for 99.92% of the time during the cycle.

There were no L0 data missing from this cycle.

The following L1B data were missing from this cycle:

UTC Start	UTC Stop	Duration (s)	Orbit Start	Orbit End
07/01/2011 03:21	07/01/2011 03:55	1997	46297	46297

Table 4-2 ATS_TOA_1P missing data during cycle 98

4.2.1 ORBITS AFFECTED BY POOR DATA QUALITY

The information reported in Section 4.2 does not consider the quality of the data, only whether or not it is available.

During this cycle, the following orbits contained frames suffered from bad/missing telemetry:

- 46249 (4th January 2011)

4.3 L0 and L1B Backlog Processing Status

There is no update available on the status of backlog processing.

5 DATA QUALITY CONTROL

5.1 Monitoring of Instrument Parameters

5.1.1 JITTER

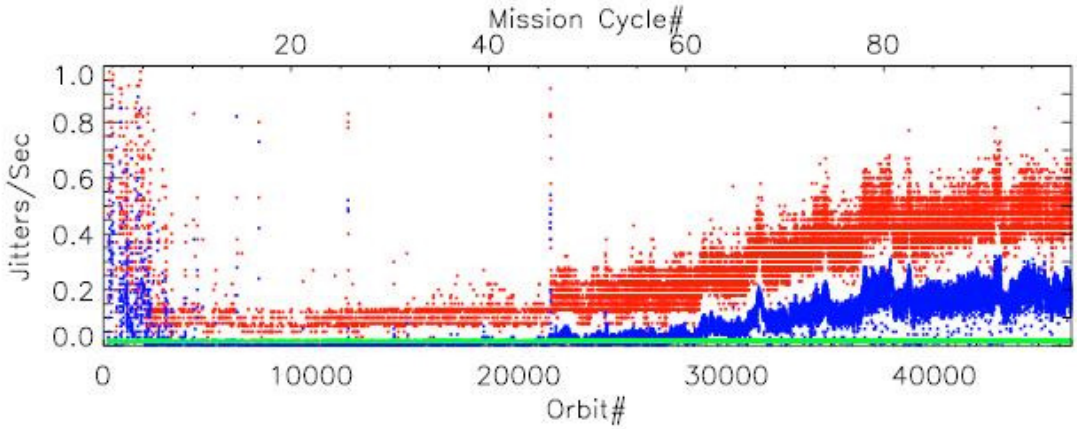

Figure 5-1 Jitter trend from mission start

The plot shows the jitter-trend since the start of the mission, against both orbit-number and cycle-number. The mean jitter-rate (per-orbit) is shown in blue and the maximum rate per orbit in red. The green horizontal line shows the nominal mean jitter-level achieved for much of the mission.

The jitter plot shows the mean jitter-rate deteriorating somewhat during this cycle.

5.1.2 SENSOR TEMPERATURE

The detector temperature plots for Cycle 98 can be found at:
http://www.aatsrops.rl.ac.uk/EDSX/CyclePlots/DetTemps98.pdf

Detector temperatures have remained nominal during routine operations.

5.1.3 VISCAL

NRT calibration quality for the AATSR reflectance channels has been maintained throughout the cycle. The list of "orbital" VC1 files delivered for this cycle can be found at:
http://www.aatsrops.rl.ac.uk/EDSX/CyclePlots/VC1-98.txt

5.1.4 NEΔT

Information on the NEΔT for the last four reporting periods is given below. There has been no significant difference in performance

	Hot BB T = 302.11K		Cold BB T = 263.53K	
	Count	**NEΔT (mK)**	**Count**	**NEΔT (mK)**
12µm	1.59	32.9	1.20	34.6
11µm	1.52	30.8	1.12	33.3
3.7µm	2.53	31.4	1.22	74.7

Table 5-1 NEΔT information for 26 December 2010 (cycle 97)

	Hot BB T = 302.42K		Cold BB T = 263.83K	
	Count	**NEΔT (mK)**	**Count**	**NEΔT (mK)**
12µm	1.57	32.5	1.21	34.8
11µm	1.52	30.8	1.13	33.5
3.7µm	2.55	32.0	1.23	75.7

Table 5-2 NEΔT information for 26 November 2010 (cycle 96)

	Hot BB T = 301.04K		Cold BB T = 262.00K	
	Count	**NEΔT (mK)**	**Count**	**NEΔT (mK)**
12µm	1.64	34.3	1.21	35.2
11µm	1.53	31.1	1.12	33.8
3.7µm	2.49	30.8	1.20	74.1

Table 5-3 NEΔT information for 20 October 2010 (cycle 94)

	Hot BB T = 300.78K		Cold BB T = 261.48 K	
	Count	**NEΔT (mK)**	**Count**	**NEΔT (mK)**
12µm	1.61	33.9	1.19	35.1
11µm	1.51	31.0	1.11	33.8
3.7µm	2.45	31.1	1.18	75.8

Table 5-4 NEΔT information for 13 September 2010 (cycle 93)

5.2 User Rejections

There were no user rejections during this cycle.

5.3 Software Problem Reporting

This section describes the new and open SPRs, their potential impact on the data quality, and any SPRs that have been closed.

5.3.1 EXISTING SPRS THAT ARE STILL OPEN

The following SPRs are still open:

Wrong REF_DOC in MPH of AATSR products
NA-PR-10-05334
As a result of the AMALFI-2 pilot project, it has been discovered that the REF_DOC field in the MPH of AATSR products is different from the product specification name.
1) The REF_DOC should follow "AA-BB-CCC-DD-EEEE_V/I", 23 characters where AA-BB-CCC-DD-EEEE is the ESA standard document number and V/I is the volume/issue.
2) The referenced product spec is still 3/K. whilst the one applicable, and also referenced in the SRN of 6.03 is 4/A.

AATSR Child Products contain insufficient number of ADS records
NA-PR-08-03912
The number of ADS records present in AATSR child products is insufficient for processing of the entire product. Users are currently advised to order products of at least 1 granule longer to obtain all required ADS records. Excluding the SQADS and the scan pixel x and y ADS, the DPM requires that for AATSR full resolution products, the number of records in the ADS shall be one greater than the number of MDS granules in the product. Child products are currently produced with a number of ADS records equal to the number of MDS granules in the product. In the case of the SQADS, this is sampled only every 512 rows, rather then every 32, so in order to provide coverage for every granule in a child product, the number of SQADS records strictly required depends on the length of the child product and where the child product starts in relation to the 512 record boundaries. Parent products by definition start on a 512 record boundary, but child products need not. If we define a product segment of 512 consecutive rows (=16 granules) as a frame, then the number of SQADS records required in the child product is equal to the number of frames overlapped by the child product. For the case of the Scan Pixel x and y ADS, the records represent instrument scans, not image rows. There is no simple algorithm to define the number of records from the parent product that should be included in the child product.

AATSR Consolidated Products
NA-PR-08-03952
The AATSR Flight Operations and Data Plan (FODP), PO-PL-ESA-AT-0152, Issue 2 Revision 5 dated 22 November 2001 defines the meaning of "consolidated" in Appendix B.1 as follows: "… time-ordered, no overlap nor data gap except when the instrument is not operated …", and for Level 0 there should be sufficient overlap

only so that the higher level products can be chopped "… ANX to ANX …". The FODP is part of the high level agreement between ESA and Defra and so can be taken as the definitive requirement for AATSR products. We would like to enquire as to the current definition applied to consolidated products and ask that a change be proposed and the impact of such a change evaluated.

Update to AATSR Child product generation requirements
NA-PR-08-04015
The 'Child Product Generation Requirements' on pages 520-521 of the document 'PDS Technical Specification for Maintenance and Evolution' (PO-RF-CSF-GS-20437) currently reads:
"For time extraction, for each data set in the parent product, the time stamp of the DSRs shall be compared to that of the requested start time (t0) segment. The first DSR extracted from each data set to form the new child data set is the one with a time stamp immediately preceding or equal to t0. The last DSR extracted from each DS is the one immediately preceding t1."
To ensure that a sufficient number of Auxiliary Data Set Records are present in AATSR child products, the requirement should be changed to read as follows:
"For time extraction, for each data set in the parent product, the time stamp of the DSRs shall be compared to that of the requested start time (t0) segment. The first DSR extracted from each data set to form the new child data set is the one with a time stamp immediately preceding or equal to t0. The last DSR extracted from each DS is the one immediately preceding t1.
For AATSR data, the last ADS DSR extracted from each DS is the one whose time label is equal to or greater than t1 provided such a DSR exists, otherwise the last ADS DSR in the product."

5.3.2 NEW SPRS SINCE THE LAST CYCLIC REPORT

No new SPRs have been opened since the last Cyclic Report.

5.3.3 CLOSED SPRS

No SPRs have been closed since the last Cyclic Report.

5.4 Monthly Level 3 Product

The following plots have been generated from the available Meteo products acquired in December 2010. This consists of 514 products taken from orbits 45763 to 46208. Figure 5-3, Figure 5-4, Figure 5-5 and Figure 5-6 show the SST average in dual and nadir views, the standard deviation and the number of contributory orbits for December 2010. Please note we are not able to provide individual colour scales at this time, however the scheme used is given in Figure 5-2, and the data ranges of each plot are specified in the accompanying caption.

Figure 5-2 This is the colour scheme used for the following plots, running linearly from left to right with increasing magnitude.

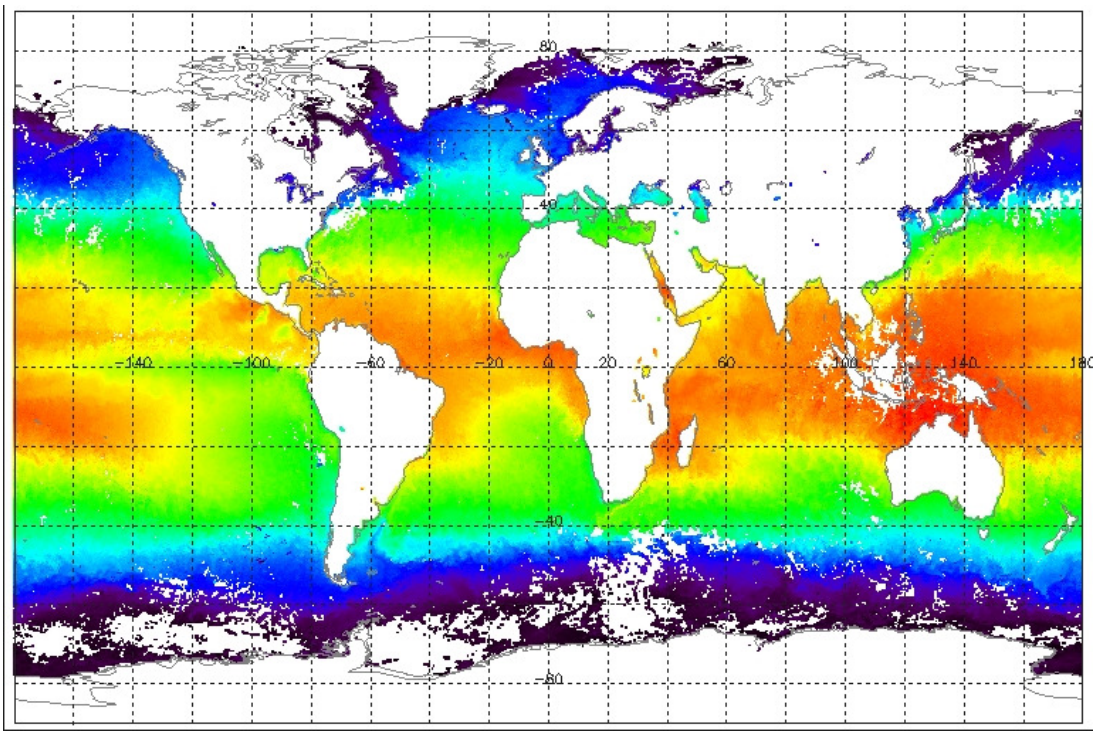

Figure 5-3 Monthly average Dual View SST, with a range of 270 - 305 Kelvin for December 2010

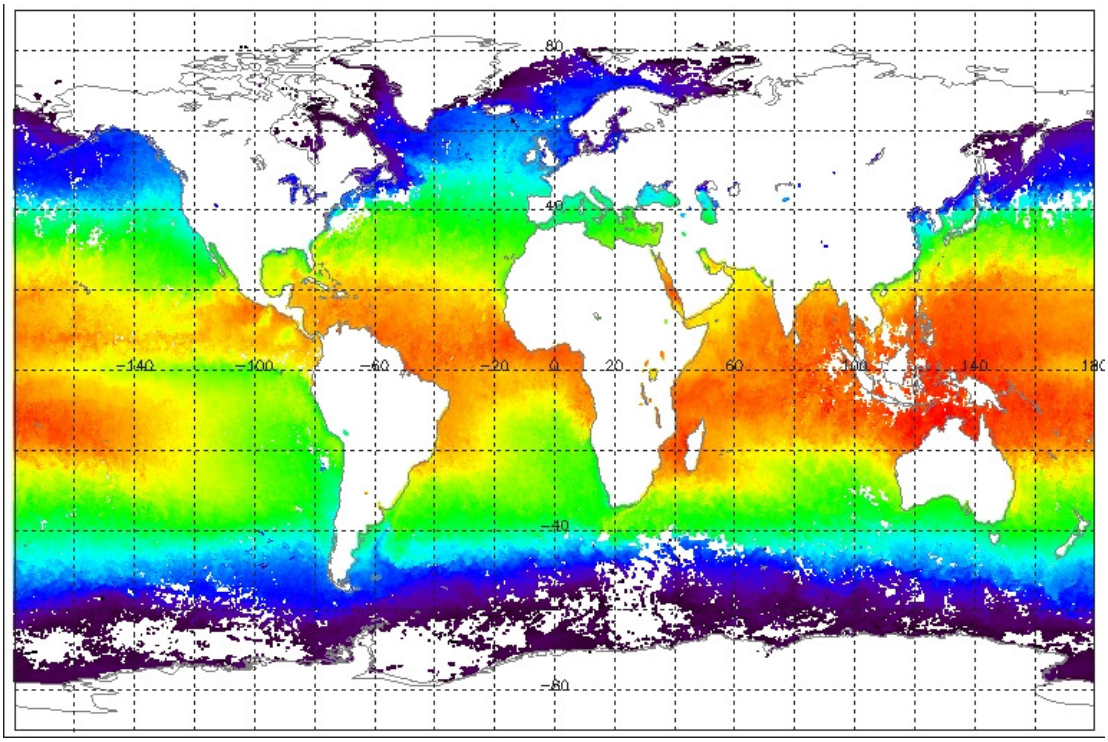

Figure 5-4 Monthly average Nadir SST, with a data range of 270 - 305 Kelvin for December 2010

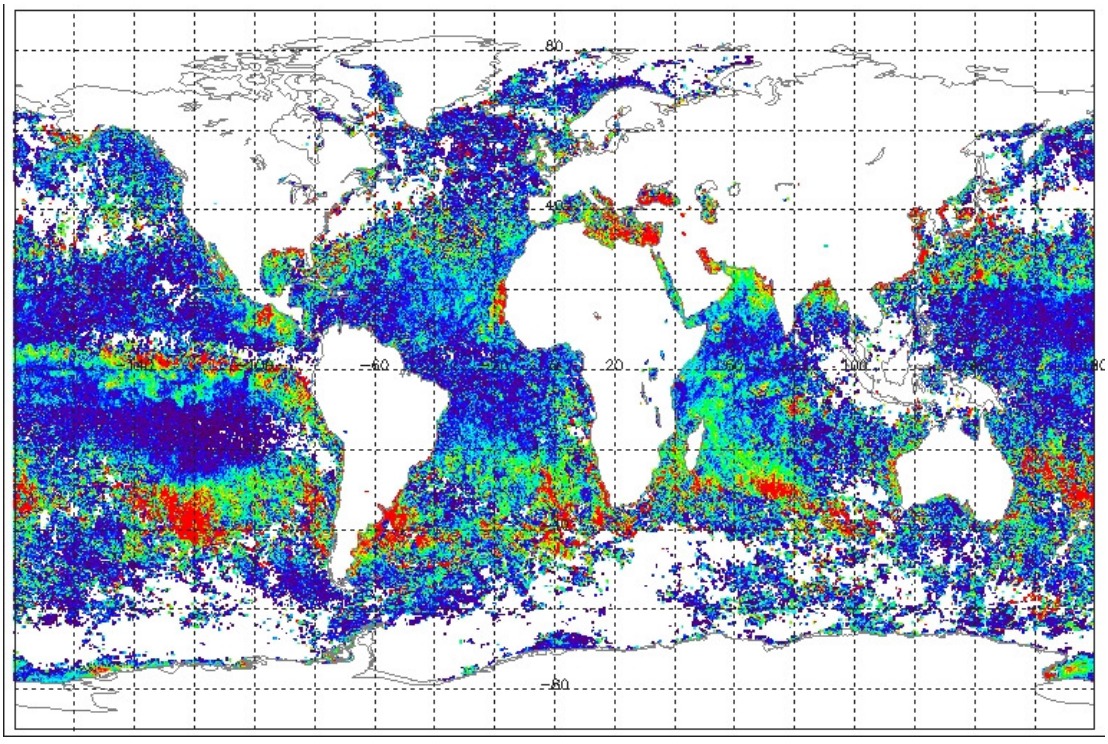

Figure 5-5 Standard deviation of the monthly average SST with a colour key range of 0 to 2.0 K, and a maximum value of 8.3 K for December 2010

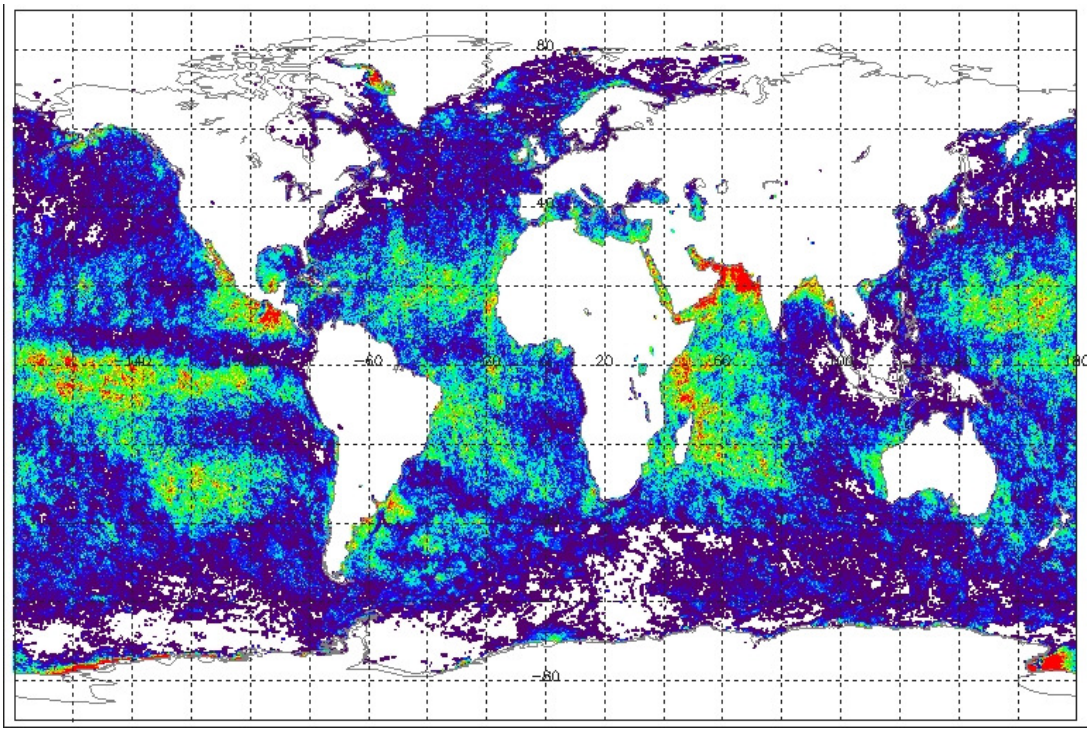

Figure 5-6 Number of contributory orbits to the calculation of the SST, with a colour key range of 0 to 10, and a maximum value of 30, for December 2010

6 CALIBRATION/VALIDATION ACTIVITIES & RESULTS

6.1 Calibration

No calibration results were reported during this cycle.

6.2 Validation

6.2.1 CYCLE 98

The Met Office has validated the AATSR dual-view SST data using the global network of *in situ* drifting buoy SST data, the results for Cycle 98 being shown in Figure 6-1. The updated SST coefficients released in December 2005 were used in the AATSR SST retrievals.

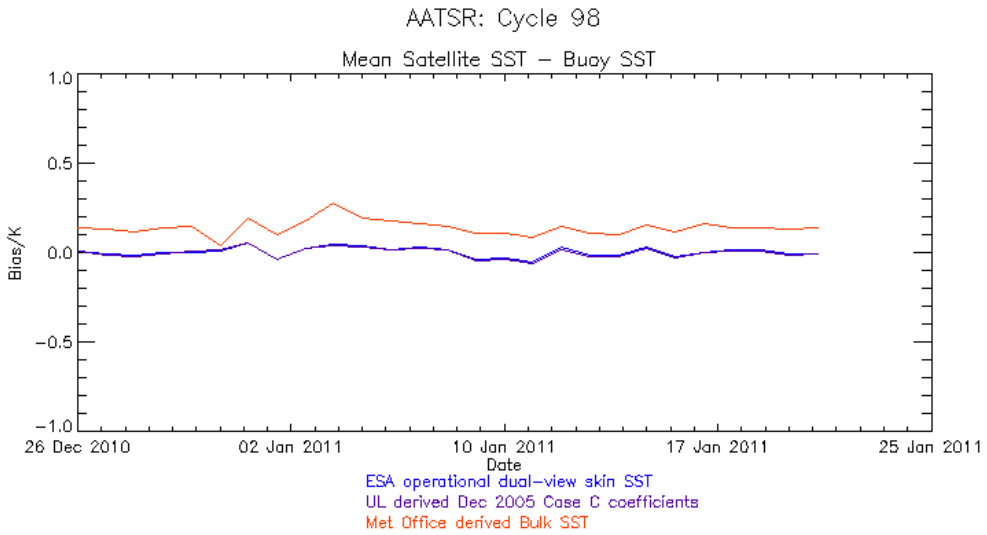

Figure 6-1 Comparison of daily mean difference between 10´ AATSR SST values and in situ drifting buoy SST for Cycle 98. Data provided by the Met Office.

During cycle 98, there were 1320 night time match-ups, with a mean (UL derived dual-view skin SST minus buoy SST) of -0.04 K, standard deviation 0.25 K, and a mean (dual-view depth SST minus buoy SST) of +0.09 K, standard deviation 0.23 K. A total of 1165 daytime match-ups were found, with a mean (UL derived dual-view skin SST minus buoy SST) of +0.04 K, standard deviation 0.30 K, and a mean (dual-view depth SST minus buoy SST) of +0.18 K, standard deviation 0.29 K. As these data are comparisons of a single point buoy measurement against a much larger spatially averaged value they are not a true indicator of AATSR's accuracy and are used to show consistency of data quality between cycles.

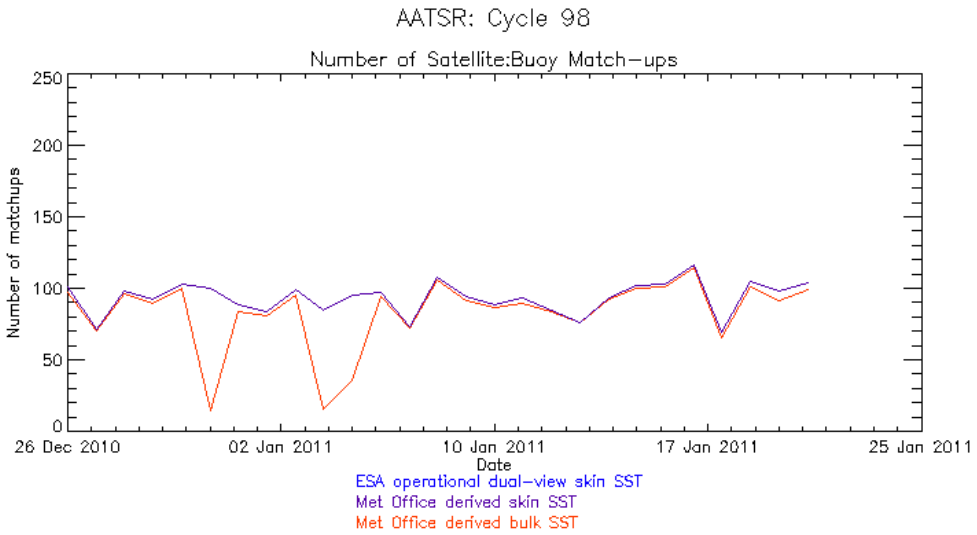

Figure 6-2 Plot of daily number of match-ups between 10´ AATSR SST values and *in situ* buoy SST for Cycle 98. Data provided by the Met Office.

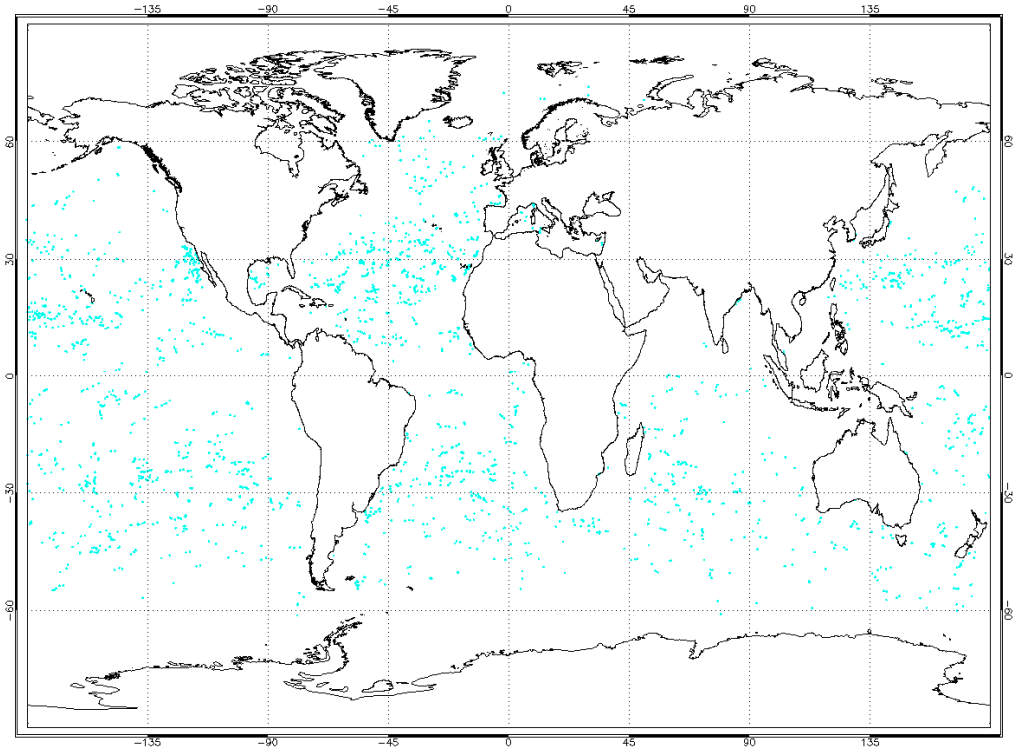

Figure 6-3 Map showing global distribution of match-ups between 10´ AATSR SST values and *in situ* buoy SST for Cycle 98. The cyan dots indicate a match-up to a drifting buoy. Data provided by the Met Office.

6.2.2 CYCLE 97

The Met Office has validated the AATSR dual-view SST data using the global network of *in situ* drifting buoy SST data, the results for Cycle 97 being shown in Figure 6.4. The updated SST coefficients released in December 2005 were used in the AATSR SST retrievals.

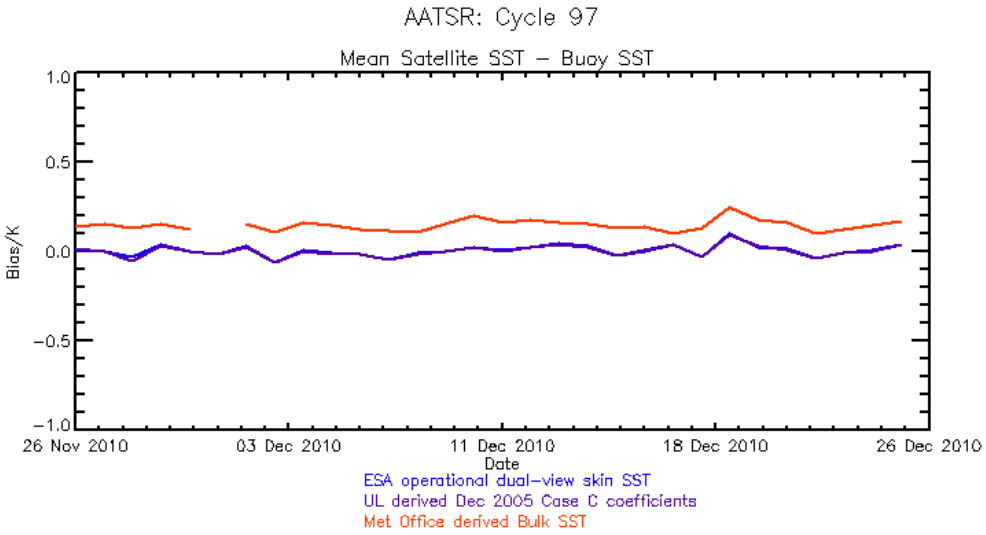

Figure 6-4 Comparison of daily mean difference between 10´ AATSR SST values and in situ drifting buoy SST for Cycle 97. Data provided by the Met Office.

During cycle 97, there were 1478 night time match-ups, with a mean (UL derived dual-view skin SST minus buoy SST) of -0.02 K, standard deviation 0.24 K, and a mean (dual-view depth SST minus buoy SST) of +0.11 K, standard deviation 0.22 K. A total of 1244 daytime match-ups were found, with a mean (UL derived dual-view skin SST minus buoy SST) of +0.04 K, standard deviation 0.28 K, and a mean (dual-view depth SST minus buoy SST) of +0.20 K, standard deviation 0.28 K. As these data are comparisons of a single point buoy measurement against a much larger spatially averaged value they are not a true indicator of AATSR's accuracy and are used to show consistency of data quality between cycles.

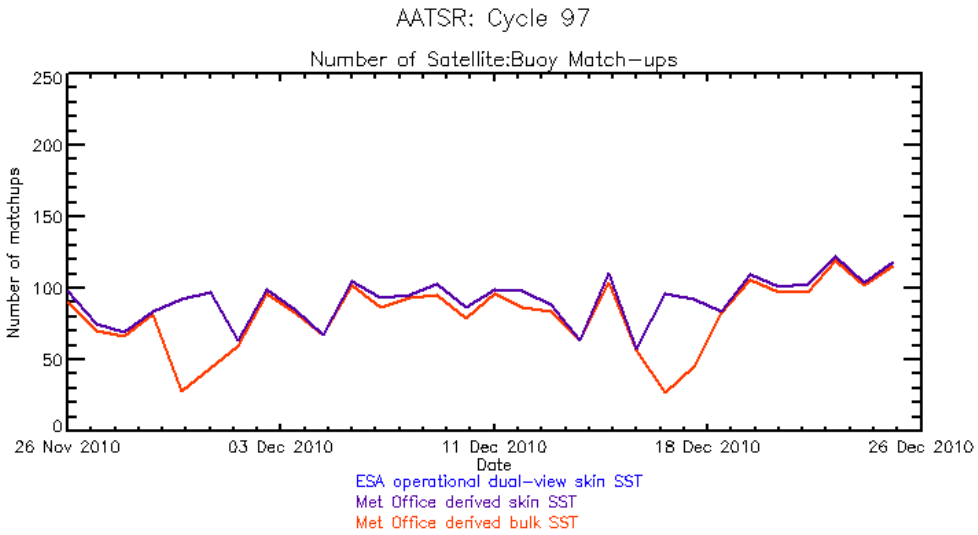

Figure 6-5 Plot of daily number of match-ups between 10´ AATSR SST values and *in situ* buoy SST for Cycle 97. Data provided by the Met Office.

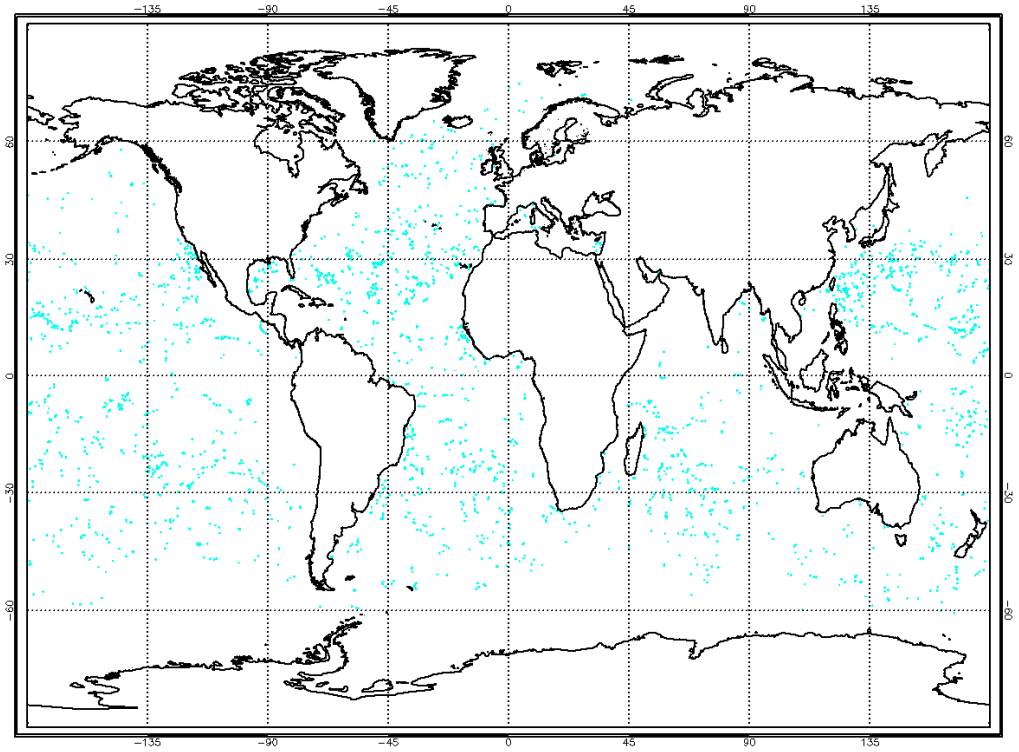

Figure 6-6 Map showing global distribution of match-ups between 10´ AATSR SST values and *in situ* buoy SST for Cycle 97. The cyan dots indicate a match-up to a drifting buoy. Data provided by the Met Office.

7 DISCLAIMERS

No new disclaimers have been issued during this cycle.