New products in the (A)ATSR archive

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Overview

• Introduction
• ENVISAT format products
  – New v2.0 data products
  – Coverage
  – Progress with post-2001 ATSR-2 data
• Data access
  – NEODC, ESA
  – MERCI
• L2P
  – Processor
  – Product content
  – Archive
  – NRT service
Introduction

- **(A)ATSR Archive**
  - 3 missions, 1 dataset
  - Common format
    - ENVISAT format products available for all 3 missions
    - Enables onward processing & analysis using common software
  - Joint provision of data access
    - ESA & NEODC
  - Formal agreement btw parties to achieve common aim
    - DEFRA, ESA, NERC, University of Leicester, RAL
- **Aim**
  - Consistent SST record covering 17 year period including mission overlaps
  - Brightness Temperature
  - Land Surface Temperature
(A)ATSR Missions

**ATSR-1**
- Development
- Start: 1984
- Calibration: Summer 1989
- Launch: 17 July 1991
- Nominal Operations End: June 1996
- ERS-1 Fails: 10 March 2000

**ATSR-2**
- Development
- Start: 1990
- Calibration: December 1992
- Data from: July 1995
- ERS-2 Gyro Failure: January 2001
- ERS-2 Tape recorder failure: June 2003

**AATSR**
- Development
- Start: 1994
- Calibration: December 1997 & 1998
- Data from: July 2002
- 2013?
Archive Product Processor

- ATSR-1/2 processing

  Legacy Processing from tape (sadist)

  Raw data

  UBT products

  ENVISAT-style products

  "Raw" data (bulk media)

  Archive Product Processor

  ATSR-1/2

  Level 1b

  Level 2

  New UBT processor (linux)

  AATSR

  Level 1b

  Level 2

  Multi-mission archive processing

  (A)RC

  …
ENVISAT-format products

- Version 2.0 data
  - AATSR Operational Processor
    - Last update July 2007 (IPF v6.01)
  - Complete reprocessing of AATSR by ESA
  - Updates to RAL Archive Product Processor
  - Reprocessing of data from ATSR-1, ATSR-2 missions by RAL
Version 2.0 data

- SST archive “uniform” across all (A)ATSR missions.
- Improved LST
  - Additional cloud tests (land)
- Alignment of APP with AATSR OP
- Some issues with v1.1 ATSR-1/2 L2 products resolved
  - Confidence flag
  - MDS size non-multiple of 32
Current product availability: ATSR-1 v2.0
Current product availability:
ATSR-2 v2.0

AT2_TOA_1P 20080904

1995
1996
1997
1998
1999
2000
2001
2002

Priority 2
In progress
Priority 1
Planned
Done
Current product availability:

AATSR v2.0

ATS_TOA_1P 20080904
ATSR-2 mission (post gyro failure)

- January – July 2001
  - Variety of attitude control states (~5)
  - More stable by March 2001
  - Emulation of Fine Pointing Mode (FPM)
    - Steps
      » FPM correction
      » Yaw correction
FPM correction

• Modification to L1b processor
  – Implementation of FPM correction
  – Followed by Yaw correction
Improved
Forward, before
Forward, FPM
Forward, FPM + YSM
Nadir, before
Nadir, FPM
Nadir, FPM + YSM

Improved
Made worse!
FPM correction

• Imperfect correction
  – Correction sometimes degrades the data
    • Difficult to apply selectively
  – Choice between
    • Uncorrected data
    • Imperfectly corrected data
Access

- NEODC Archive
  - Generic access methods
    - FTP & HTTP
  - Helpdesk
    - Advice
    - Custom data requests

- ESA Aspects
  - Reprocessing
  - MERCI
ESA Archive

• Identical to NEODC data
  – Regular check that aligned.

• Version 2.0 – ATSR-1, ATSR-2 and AATSR all processed with consistent version
  – (A)ATSR (from reprocessing) all available
Reprocessing

- All (A)ATSR data from 23rd July 2002 until 23rd July 2007
- Started October 2007, completed May 2008
- Required transfer of L0 from Kiruna to UK-MM-PAF including new consolidated data.
- L1 and L2 distributed on LTO-3 and put onto MERCI server.
- Data from July 2007 to February 2008 also distributed after correction of orbit number in header.
Reprocessing Summary

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total L0 available to be reprocessed</td>
<td>25312</td>
<td></td>
</tr>
<tr>
<td>Number of L1 products successfully reprocessed</td>
<td>25158</td>
<td>99.4%</td>
</tr>
<tr>
<td>Number of L1 products not reprocessed</td>
<td>98</td>
<td>78 possibly to be recovered.</td>
</tr>
<tr>
<td>Number of L2/Browse products not reprocessed</td>
<td>56 (45+11)</td>
<td>Under investigation</td>
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Reprocessing issues

• Review of data for October/November 2002.
• Review of overlap between consolidated products.
• Summary of AATSR mission to be made available. By orbit.
(A)ATSR data servers

• Access to (A)ATSR data set available via ftp and via MERCI
• MERCI: web-based interface allowing users to search for data for a particular region for a particular time period. Early 2009.
• FTP access earlier (November 2008).
• Bandwidth restricted to protect operational network.
• Current MERCI users will have same usernames for ftp access.
• Whole data set available on LTO4 tapes.
• Approx 100 media (all three missions)
MERCI Functionality

- Registration.
- Search and download including ftp.
- Child product extraction.
- Statistics (flags, bands).
- QL, TN including preview of bands ‘on the fly’.
- Sub-setting (Spatial and by Band).
- Write SQADS in child-generator.
- Multiple file selection, full orbit download, AOI for specific time periods.
L2P project overview

• To define an ESA L2P product

• To produce and maintain an archive of L2P products for all ATSR data across all ATSR missions. (archive mode)

• To provide an operational L2P service to follow on from DUE Medspiration service. (NRT mode)
Consortium members

• **SpaceConneXions**
  - Overall project management

• **NEODC / RAL**
  - Production of the L2P software and the (A)ATSR L2P archive, and support for the installation of the L2P software at the UK-MM-PAF

• **University of Leicester**
  - Refinement of GHRSST-PP Single Sensor Error Statistics (SSES) and production of a full SSES database

• **Met. Office.**
  - Provision of ancillary data and verification of the SSESs and L2P product
Aim of Project

To promote greater use of (A)ATSR data as a reference data set for seasonal forecasting and climate research, whilst also supporting the development of a successor of the successful DUE Medspiration service as part of the GMES Marine Core Services (MCS) MyOcean project.
Origin

- Originally requested by the International GHRSST-PP Science Team at the 6th GHRSST-PP workshop in 2005,
- To provide a simplified and easily readable “user product” covering the entire (A)ATSR record from 1991.
- The proposal to process the entire (A)ATSR record to L2P format was put to and approved by the (A)ATSR Science Advisory Group on 31st January 2006.
- Supports the RAN project and GCOS SST/SI working group plan to use the (A)ATSR data set as a reference SST for reanalysis activities from 1992 to the present day, once the quality and accuracy of the (A)ATSR L2P archive has been established (in particular, verification of the SSES).
Description of Project

Medspiration

L2P Software Porting
  SSES and Ancillary Data Production
  Existing L2P Software and documentation
  MDB (initial) SSES definition

Initial MDB and SSES Production
  (A)ATSR SSES
  Initial MDB (ATSR -1, ATSR -2, AATSR)

Ancillary Data Production
  Initial Ancillary Data

Marine Core Services
  HR DDS
  MDB Production
  MDB (future operations)

New L2P Software

NRT L2P Production
  SSES Production
  ESA NRT Service

RAN L2P Production
  (A)ATSR Archive
  SSES Production
  UK-PAC and NEODC

ESA and Defra/NERC/CSIRO Users

L2P (NRT)

Ancillary Data Production
  Initial Ancillary Data

L2P (RAN)
L2P Product content

• GHRSSST-PP L2P product
  – SST “copied” from L2 gridded product (ATS_NR__2P for AATSR)
    • Applying GHRSSST rules for masking etc
  – Insert ancillary data
    • Local wind speed
    • Sea ice fraction
    • Surface solar irradiance
    • (No AOD or climatology at present)
  – SSES
    • (A)ATSR-appropriate quality assessment of each pixel
  – Metadata
The Three Modes

• NRT production. UK-MM-PAF
• Archive production approx one month after acquisition. UK-MM-PAF
• Reprocessing. UK-MM-PAF or NEODC
• ESA Product.
• NetCDF V3 (GDS V1.7)
• Built considering future change to NetCDF V4 (GDS V2.0)
Archive Production

- Backlog production of L2P including SSES for all three missions for all data.
- Expected complete end of 2008
- Excluded ATSR-2 post June 2003 (ERS-2 on-board tape recorder failure). To be added later.
- Archive production proposed to be active UK-MM-PAF 2008Q4 for all AATSR data
- Approximately two weeks after acquisition.
NRT Processing

• NRT production to be active 2008Q4 to overlap with end of L2P production from Medspiration.

• NRT products available at UK-MM-PAF 20 minutes after generation at NRT Stations.
Data Access

- Data available via ftp from UK-MM-PAF.
- Archived and NRT
- NRT remain on-line for one year as per Medspiration (tbd)
- Delivery methods.
  - ftp (username/password) including ftp push.
  - Needs EOLI registration. ESA will initiate bit T&Cs have to be signed by users.
Summary

- New v2.0 (A)ATSR products
- New L2P product with SSES
- ESA product
- NRT and archive processing
- Covers data for all ATSR-1, ATSR-2 and AATSR with same processing algorithm
- High quality dataset
- Further developments in the future.