



MEMORANDUM

From :	IDEAS AATSR QC Team	Document Ref :	IDEAS-VEG-OQC-MEM-1158
To :	AATSR Users	Date :	09 May 2013
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SUBJECT : User Note for the Third AATSR Reprocessing

This User Note gives details for the planned reprocessing of AATSR data.

Introduction

The third full reprocessing for AATSR data is under way; it is anticipated that the full reprocessed (A)ATSR archive will be released mid-2013.

Outlined here are the processing updates that have been put in place for the AATSR reprocessing, and the expected scientific improvements that should be seen by the users once the reprocessing is completed.

The AATSR Product Specification has been updated to Issue 4/B to reflect the changes in the Envisat-format products. This is available [from the ESA library](#)

Further details of the reprocessing, the improvements and the quality control to be applied to the reprocessed data are given in [1].

Full reprocessings are also planned for ATSR-1 and ATSR-2; details for these two instruments will be included in a separate User Note.

Processing Chain Updates

Table 1 presents a summary of the processor and static auxiliary data file (ADF) updates that will take place for the AATSR reprocessing.

Table 1. Processor and static ADF updates for the AATSR reprocessing

Item	Updated version to be used in the Third AATSR Reprocessing
IPF Processor	6.05
SST ADF	ATS_SST_AXVIEC20120615_110212_20020301_000000_20200101_000000
CH1 ADF	ATS_CH1_AXVIEC20120615_105541_20020301_000000_20200101_000000
CL1 ADF	ATS_CL1_AXVIEC20120618_144125_20020301_000000_20200101_000000
PC1 ADFs	ATS_PC1_AXVIEC20120618_153111_20020301_000000_20101022_000000 ATS_PC1_AXVIEC20120618_154211_20101022_000000_20200101_000000
DEM ADF	AUX_DEM_AXVIEC20091201_000000_20020321_000000_20200101_000000

Note that the contents of the DEM ADF have not changed. It has simply been re-released with a validity range spanning the whole Envisat mission.

In addition to the static files shown in Table 1, new dynamic auxiliary files will also be used:

- **Visible Calibration VC1 files** (ATS_VC1_AX): a complete dataset for the entire mission has been generated and will be used; these are a new generation of VC1 files and contain the measured long-term drift correction.
- **Orbit State Vector OSV files** (DOR_VOR and AUX_FRO): the reprocessing will preferentially use the DOR_VOR dataset, which is more complete and is of higher resolution than the operationally used AUX_FRO files.

Users may note that the Processing Stage Flag contained within the product name and MPH will be incremented from R to U, for example:

ATS_TOA_1PUUPA20120308_005911_000065273112_00246_52415_4499.N1

Expected Scientific Improvements

- SST retrievals contained within the L2 NR product will be improved via the use of updated SST coefficients (SST ADF). These coefficients have been supplied by the (A)ATSR Reprocessing for Climate (ARC) project, and include a temperature-dependent emissivity and updated spectroscopy. Use of the new coefficients gives a reduction in SST nighttime global biases from < 0.11 K to < 0.02 K, when compared with ship and drifting buoy measurements. Regional biases are also improved [2].
- An improved and consistent calibration will be implemented for the reflectance channels (555 nm, 660 nm, 865 nm and 1600 nm): accurate correction for the long-term drift throughout the mission will be applied via the use of the new calibration auxiliary files (VC1 dataset). Vicarious inter-comparisons against similar sensors using stable desert and ice sites show the visible channel accuracy to be < 3% [3].
- Cloud identification will be improved due to the changes in the cloud test auxiliary file (CL1 ADF); a case study of 12 regions where cloud had previously not been identified, showed that use of the new CL1 ADF succeeded in correctly masking the cloudy areas in 9 of those 12 cases [4].
- The collocation displacement between the nadir and forward views will be improved via the use of the new L1B characterisation file (CH1 ADF): an average misalignment of 1 pixel across track and 2 pixels along track has been improved such that the views are now collocated to within 1 pixel.
- The absolute nadir geolocation accuracy will also be improved via the use of the new L1B characterisation file (CH1 ADF): a systematic offset of 1 pixel along track and 1 pixel across track has been removed.

L2P/L3U Products

The existing L2P archive will be replaced with L2P (and L3U) data generated by a new processor, which has been based upon the ARC processor. Whereas the previous L2P processor, in simple terms, repackaged the Envisat L2 NR product and added some ancillary information, this new processor applies its own algorithm to generate SSTs from the Level 1B data.

The L3U product is an entirely new product for AATSR and will contain the ARC L2P dataset remapped onto a regular lat/lon grid.

The L2P and L3U reprocessing will be run independently of the AATSR reprocessing but aims to follow a similar schedule; full details will be contained in a separate User Note.

Official Release of Reprocessed Data

Once all parties involved in quality control are satisfied that the AATSR reprocessed dataset is as complete as possible and the quality assessment has been completed, a recommendation will be made by the AATSR Quality Working Group that it is ready for release.

ESA will inform the users of the official release of the reprocessed data; this will also include the final report on the QC of the data. All things having proceeded as expected, this shall cover the ATSR-1, ATSR-2 and AATSR data in all formats, meaning that users will have access to an improved, near-continuous dataset of accurate SSTs spanning 20 years.

It is anticipated that the full (A)ATSR archive will be released mid-2013.

References

- [1] O'Hara, S. *et al.* (2012) Quality control and reprocessing of AATSR data. In *Proc. Sentinel-3 OLCI/SLSTR and MERIS/(A)ATSR Workshop*, ESRIN, Frascati, Italy, 15-19 Oct. 2012.
- [2] Embury, O. and Corlett, G. K. (2010) AATSR SST retrieval: updated retrieval coefficients based on ARC project findings, UL-SST-P04, Issue 1A, dated 15/11/2010.
- [3] Smith, D.L. and Cox, C.V. (2013) (A)ATSR solar channel on-orbit radiometric calibration. *Geoscience and Remote Sensing, IEEE Transactions on*, **51**, 1370-1382. <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6414625&isnumber=6469257>
- [4] Cox, C. (2012) ESL Support Presentation to the 24th AATSR QWG, February 2012.