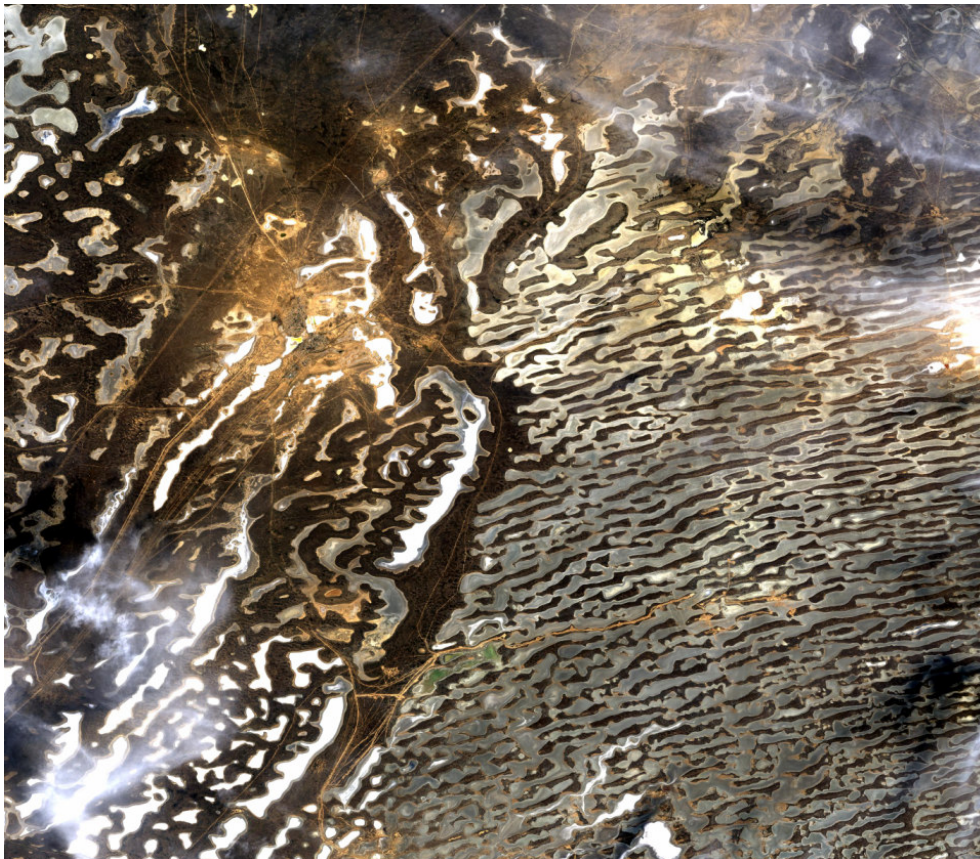


ADEN ALOS AVNIR-2 CYCLIC REPORT
CYCLIC REPORT #23
25 OCTOBER 2008 TO 10 DECEMBER 2008



This RGB composite AVNIR-2 image, taken from frame 2640 of orbit 12869 shows the part of the Caspian Depression in the Atyrau province of Kazakhstan, located in the West of the country in the Northeast region of the Caspian Sea.

prepared by/ <i>préparé par</i>	IDEAS Optical Team
reference/ <i>référence</i>	AVNIR2_CR_23_081025_081210
issue/ <i>édition</i>	1
Revision/ <i>révision</i>	0
date of issue/ <i>date d'édition</i>	22 December 2008
status/ <i>état</i>	
Document type/ <i>type de document</i>	Technical Note
Distribution/ <i>distribution</i>	

A P P R O V A L

Title <i>Titre</i>	ADEN ALOS AVNIR-2 Cyclic Report – Cycle 23	issue 1 <i>issue</i>	revision 0 <i>revision</i>
-----------------------	--	-------------------------	-------------------------------

author <i>auteur</i>	IDEAS Optical Team	date <i>date</i>	22 December 2008
-------------------------	--------------------	---------------------	---------------------

approved by <i>approuvé par</i>		date <i>date</i>	
------------------------------------	--	---------------------	--

C H A N G E L O G

reason for change / <i>raison du changement</i>	issue/ <i>issue</i>	revision/ <i>revision</i>	date/ <i>date</i>
Initial Issue	1	0	22 December 2008

T A B L E O F C O N T E N T S

AVNIR-2 CYCLIC REPORT # 23	1
1 INTRODUCTION	1
1.1 Acronyms and Abbreviations	1
1.2 Reference Documents	2
1.3 Background information	2
2 SUMMARY	3
3 SOFTWARE & AUX FILE VERSION CONFIGURATION	4
4 PDS STATUS	5
4.1 Planned Instrument Unavailability	5
4.2 Unplanned Instrument Unavailability	5
4.3 Current Platform Status	5
4.4 Upcoming Instrument Unavailability	5
4.5 ADEN PDS Unavailability	5
4.6 Periods of missing precision orbit data	6
4.7 Periods of missing precision attitude data	6
4.8 Periods lacking Yaw steering	6
4.9 JAXA Observation Strategy	6
4.10 Artefact repositories	6
5 DATA QUALITY CONTROL	7
5.1 Instrument Related Anomalies	7
5.2 Processor Related Anomalies	7
5.3 Daily Report Issues	7
5.3.1 MISSING data FROM BANDS	7
5.4 Visual Inspection Report Issues	8
5.5 User Information	8
6 CALIBRATION/VALIDATION ACTIVITIES & RESULTS	8
6.1 Product geolocation - 1B2R products	8
6.2 Cross calibration with ETM+	9
7 DISCLAIMERS	14
8 EVENTS	15
8.1 Past Events:	15

APPENDIX A	DATASET FOR L1B2 PERFORMANCE MONITORING.....	17
APPENDIX B	PRODUCT SPECIFICATION.....	18
APPENDIX C	INSTRUMENT ANOMALIES	19
APPENDIX D	PROCESSOR UPDATE SUMMARY	21

AVNIR-2 CYCLIC REPORT # 23

1 INTRODUCTION

The AVNIR-2 Cyclic Report is distributed by the IDEAS AVNIR-2 QC team to keep the AVNIR-2 community informed of any modifications regarding quality control, instrument performance, the data production chain and the results of calibration and validation campaigns at the end of each ALOS cycle, which represents 671 orbits, or 46 days.

The AVNIR-2 instrument is part of the Japanese JAXA ALOS mission and its products are received and processed via ESA's ADEN ground segment across Europe. This is done through an agreement between JAXA and ESA, where ALOS is classed as an ESA Third Party Mission, for which it is responsible for data reception and product dissemination across the European and African regions. A series of quality checks are undertaken in order to assess the ground segment, the instrument performance and the product quality.

Checks are currently made on a weekly (header parameters, PDS status) or bi-monthly (visual report) basis to have a constant view on the mission status. The cyclic report presents the results of the analysis for the different part of the chain, from satellite to end-product.

This document is available online at:
<http://earth.esa.int/pcs/alos/avnir/reports/cyclic/>

1.1 *Acronyms and Abbreviations*

ADEN	ALOS Data European Node
ALOS	Advanced Land Observing Satellite
AVNIR-2	Advanced Visible and Near Infra-red Radiometer Type-2
CEOS	Committee on Earth Observation Satellites
EO Help	Earth Observation Help Desk
GCP	Ground Control Points
IDEAS	Instrument Data quality Evaluation and Analysis Service
JAXA	Japan Aerospace Exploration Agency
OCM	Orbit Control Manoeuvre
PCS	Product Control Service
PDS	Payload Data Segment
PI	Principal Investigator
PRISM	Panchromatic Remote-sensing Instrument Stereo Mapping
QC	Quality Control
SPPA	Sensor Performance Products Algorithms
TOA	Top of Atmosphere

1.2 Reference Documents

- RD.1 ALOS/AVNIR-2 Level 1 product format description Rev J - October, 2006 JAXA (NEB 00016)
- RD.2 Bouvet M., Goryl. P., Santer R., Chander G., Saunier S, Preliminary radiometric calibration assessment of ALOS AVNIR-2 IGARSS 2007 proceedings
- RD.3 Saunier S., Goryl. P et al, The contribution of ESA to the ALOS PRISM / AVNIR-2 commissioning phase IGARSS 2007 proceedings
- RD.4 Saunier S., Goryl P, Final calibration / Validation report AVNIR-2 Instrument Issue 1 Rev 0 – July 2007
- RD.5 Saunier S., Chander G., Goryl P. et al. Radiometric, Geometric and Image Quality Assessment of the ALOS AVNIR-2 and PRISM sensors. 2008
- RD.6 Saunier S., IDEAS Team, ALOS PRISM & AVNIR2 Data, ADEN Product Quality Status. 2008.
http://www.gael.fr/eoqc/alos_optical_mission/GAEL_PRES_003-ALOS-RHODES-QC.VF_exportable.pdf

1.3 Background information

The AVNIR-2 instrument is an optical instrument on board the ALOS mission built by the Japanese Space Agency (JAXA).

The ALOS mission has its data produced and disseminated through geographical nodes. The European node (ADEN) was set up and is operated by ESA through the Tromso, Matera, Mas Palomas and Frascati ground stations. As a third party mission (TPM), only the ground segment and data processing are dealt with by ESA, the platform being the responsibility of the owner: JAXA. Each node operates their ground segment independently and shares results with JAXA when required.

The ADEN team is responsible for the operation and maintenance of the node that receives data acquired over Europe and North Africa. The ADEN team took part in the Cal/Val activities during the ALOS commissioning phase (January to October 2006). The methodologies used and results obtained are documented (RD.3 and RD.4) and made available to the user through the site:
<http://earth.esa.int/object/index.cfm?fobjectid=3738>

As part of the ADEN operations, a series of quality checks are undertaken in order to assess the ground segment and instrument performance and the product quality for products requested by European users. Checks are currently made on a weekly basis (header parameters, PDS status) to have a constant view on the mission status.

2 SUMMARY

Cyclic Report: 23

Cycle Start: 25 October 2008

Cycle End: 10 December 2008

The main issues during the cycle have been as follows:

- **Processor Version**

Current AVNIR-2 processor version: 4.05

See Section 3 for install dates of ADEN processors.

- **User Documentation**

Two documents, relevant to the quality of AVNIR-2 data at ADEN, have been produced by the QC Team:

RD. 5 - Radiometric, Geometric and Image Quality Assessment of the ALOS AVNIR-2 and PRISM sensors

Sebastien Saunier, Gyanesh Chander, Philippe Goryl, Richard Santer, Marc Bouvet, Bernard Collet, Aboubakar Mambimba, Sultan Kocaman

RD. 6 - ALOS PRISM & AVNIR2 Data, ADEN Product Quality Status

IDEAS AVNIR-2 and PRISM Teams

http://www.gael.fr/eoqc/alos_optical_mission/GAEL_PRES_003-ALOS-RHODES-QC.VF_exportable.pdf

3 SOFTWARE & AUX FILE VERSION CONFIGURATION

Current Optical Processor Version	ESRIN	Matera	Tromso
4.05	09/01/08	14/02/08	18/06/08

Table 3-1 AVNIR-2 Processing Versions

A history of the ADEN optical processor release notes will be made available on the ALOS ADEN PCS website, location: <http://earth.esa.int/pcs/alos/avnir/userinfo/>

A summary of the updates made to version 4.05 of the optical processor is given in Appendix D.

4 PDS STATUS

Please note; the major source of information for this document is the ALOS monthly report provided by JAXA. The monthly reporting timescale means that data concerning events conducted within this cycle may not be available at the time of writing. In this event, information will be included in the next cyclic report.

Instrument information provided by JAXA during the period 25/10/2008 to 30/11/2008 is reported on in this document.

4.1 *Planned Instrument Unavailability*

For the periods described in Table 4-1, JAXA has announced planned instrument unavailability. Exact times of the periods are not available.

From (UT)		To (UT)		Reason
Date	Time	Date	Time	
Nov. 15 th 2008	-	Nov. 15 th 2008	-	OCM
Nov. 29 th 2008	-	Nov. 29 th 2008	-	OCM

Table 4-1 Planned instrument unavailability

4.2 *Unplanned Instrument Unavailability*

None reported during this cycle.

4.3 *Current Platform Status*

Information on the platform provided by JAXA:

Current platform status: Normal.

4.4 *Upcoming Instrument Unavailability*

For the periods described in Table 4-2, JAXA has announced planned instrument unavailability.

From (UT)		To (UT)		Reason
Date	Time	Date	Time	
None				

Table 4-2 Upcoming instrument unavailability

4.5 *ADEN PDS Unavailability*

None reported during this cycle.

4.6 *Periods of missing precision orbit data*

For the periods described in Table 4-3, JAXA has announced that precision orbit data is missing.

From (UT)		To (UT)		Reason
Date	Time	Date	Time	
Oct. 31 st 2008	20:14:00	Oct. 31 st 2008	21:18:00	OCM
Nov. 15 th 2008	08:29:00	Nov. 15 th 2008	09:33:00	OCM

Table 4-3 Missing Precision Orbit Data

4.7 *Periods of missing precision attitude data*

For the periods described in Table 4-4, JAXA has announced that precision attitude data is missing.

From (UT)		To (UT)		Reason
Date	Time	Date	Time	
None				

Table 4-4 Missing Precision Attitude Data

4.8 *Periods lacking Yaw steering*

For the periods described in Table 4-5, JAXA has announced that Yaw steering was not available.

From (UT)		To (UT)		Reason
Date	Time	Date	Time	
None				

Table 4-5 No Yaw steering

4.9 *JAXA Observation Strategy*

The JAXA observation strategy can be found at:
<http://www.eorc.jaxa.jp/ALOS/obs/overview.htm>

4.10 *Artefact repositories*

A number of image artefacts are not due to instrument or processing chain malfunctions. These are fully documented in the following JAXA web pages.

<http://www.eorc.jaxa.jp/en/about/distribution/info/alos/characteristics.html>

5 DATA QUALITY CONTROL

5.1 *Instrument Related Anomalies*

No reported anomalies this cycle.

5.2 *Processor Related Anomalies*

No reported anomalies this cycle.

5.3 *Daily Report Issues*

During the past cycle, daily checks have been undertaken on all AVNIR-2 products generated by ADEN which were electronically disseminated. Checks are currently conducted on a weekly basis due to data volumes.

Browse products for all optical images are visually inspected and reported on in each weekly report.

190 products have been examined during the course of this cycle, and only one issue has been highlighted by the browse product checks, this is described in the following section.

5.3.1 MISSING DATA FROM BANDS

A small number of scenes (less than 1% of those distributed) have been observed which are affected by missing data in one or more bands; the cause of this is still under investigation. The example product below shows this behaviour.



Figure 5-1 Level 1B1 AVNIR-2 image from frame 2880, orbit 11543 which shows missing data in one band towards the bottom of the image.

5.4 Visual Inspection Report Issues

Image quality analysis continued throughout this cycle in the form of Visual Anomaly Reports by the ADEN QC Optical operations team.

Other than those products exhibiting data missing in one or more bands (5.3.1); there were no image anomalies detected that have not already been documented in the JAXA document that details expected image features:

<http://www.eorc.jaxa.jp/en/about/distribution/info/alos/characteristics.html>

5.5 User Information

An AVNIR-2 FAQ containing common user requests can be found on the ESA PCS website.

An updated version of this document will be issued shortly.

The most recent version of this document can be found at:
<http://earth.esa.int/pcs/alos/avnir/userinfo/>

The information for this section will be included in a future cyclic report.

6 CALIBRATION/VALIDATION ACTIVITIES & RESULTS

6.1 Product geolocation - 1B2R products

The circular Error at 90 percentile (CE90) representation depicts that with no ground reference point used to improve the model, the accuracy is about 44 m (CE90), 28 m (RMS). When adding one ground reference point, the accuracy dropped to 24 m (CE90), 15 m (RMS).

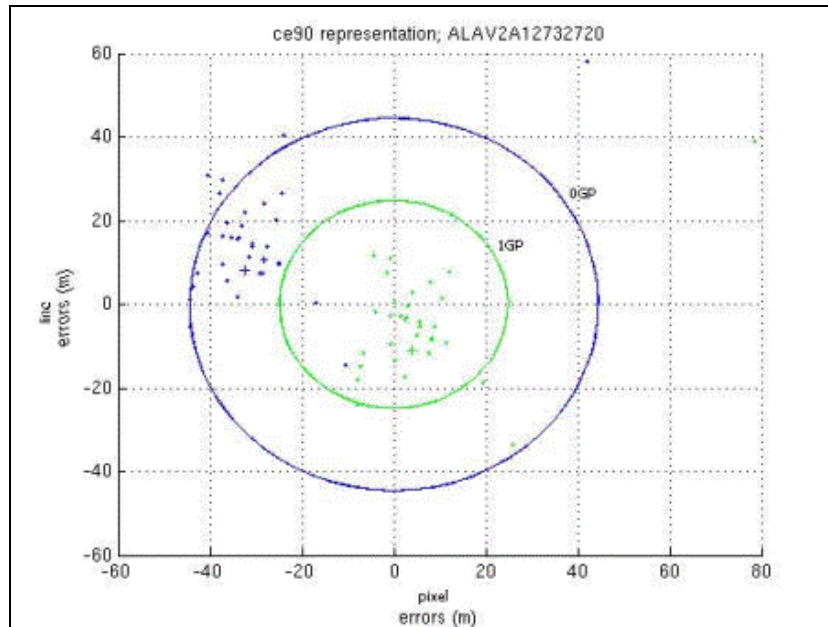


Figure 6-1 Circular error at 90 percentile, AVNIR-2 product of the cycle.

6.2 Cross calibration with ETM+

The comparison between the two sensors is based on common areas observed near-simultaneously by the two sensors. Near-simultaneous data from AVNIR-2 and ETM+ sensors acquired over the RVPN site was used for the comparison. The methodology involves comparison of TOA reflectance over areas observed by the two sensors. The challenge relies on a good selection of two co-incident image pairs with comparable atmospheric conditions and observational geometries. Figure 6-2 shows the ROI in the RVPN site that was selected for this comparison. The digital counts were converted to at-sensor spectral radiances using the rescaling coefficients given in the product. The data were then converted to TOA reflectances.

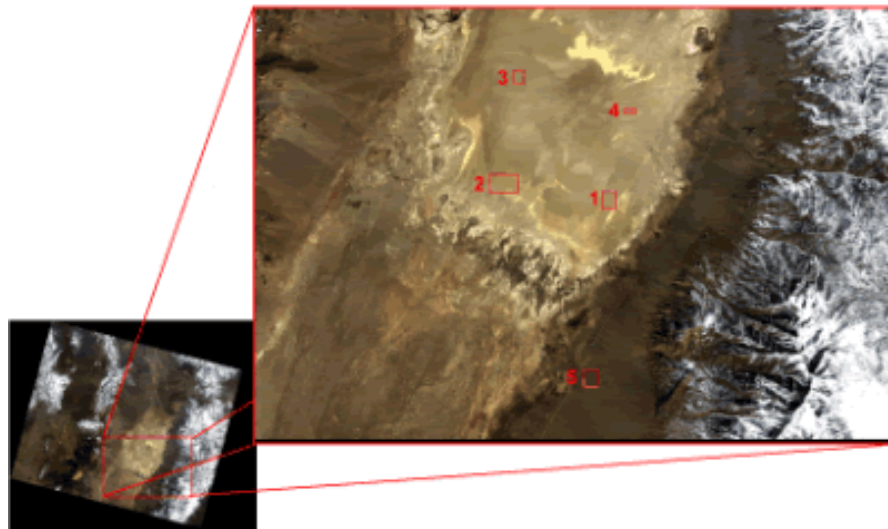


Figure 6-2 AVNIR-2 image over RVPN site. The enlarged view shows the ROI location superimposed over the blue/green/red band combination.

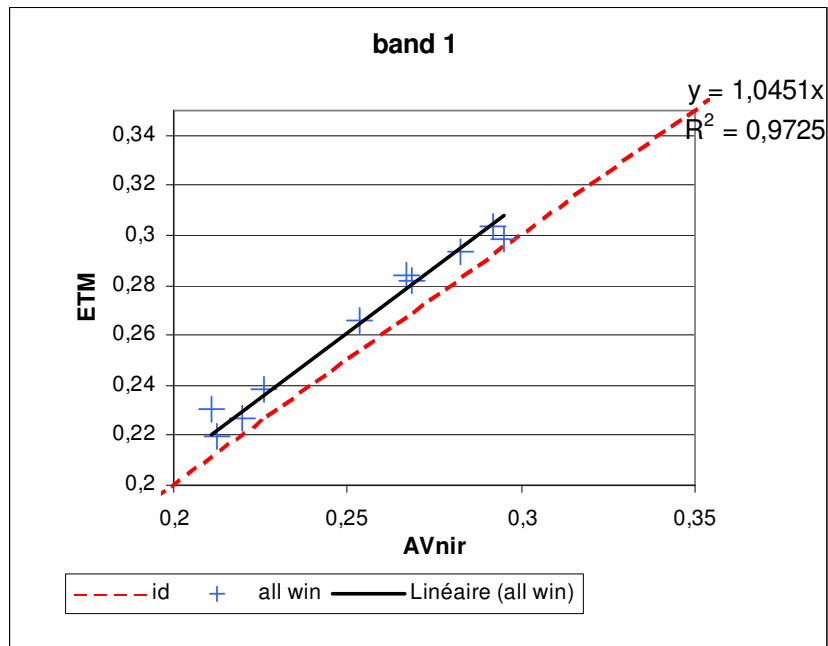


Figure 6-3 TOA Refletance from ETM+ and AVNIR-2 sensors – band 1

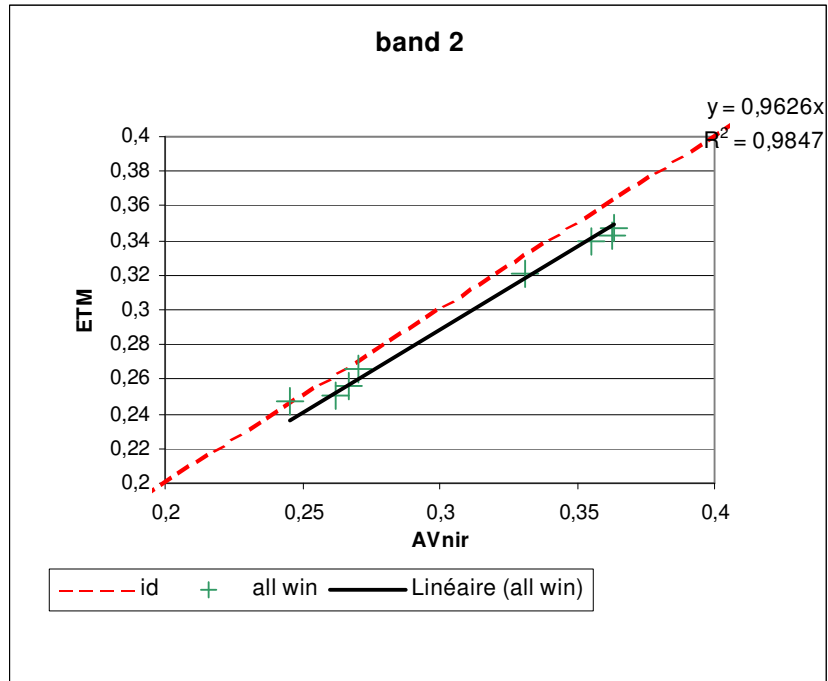


Figure 6-4 TOA Refletance from ETM+ and AVNIR-2 sensors – band 2

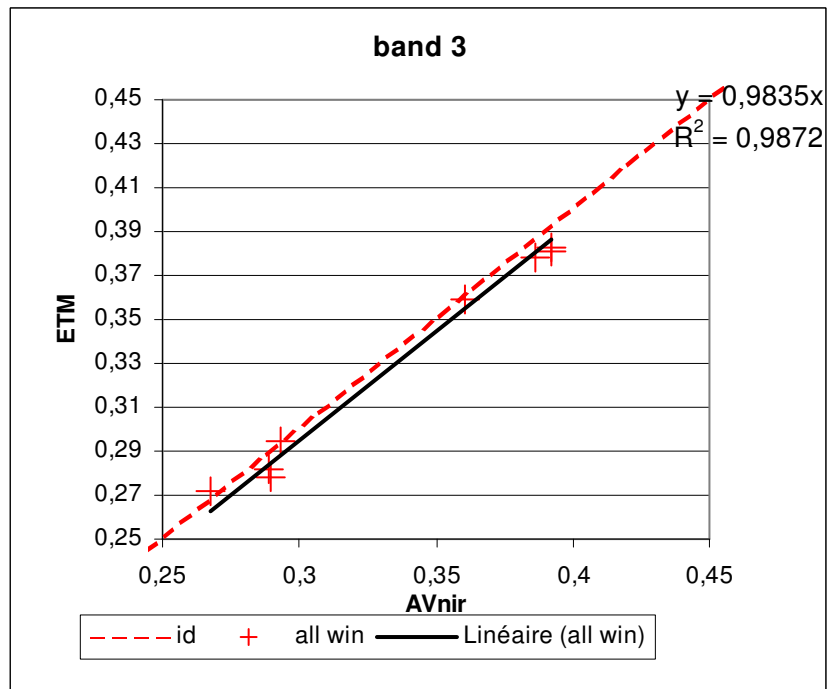


Figure 6-5 TOA Refletance from ETM+ and AVNIR-2 sensors – band 3

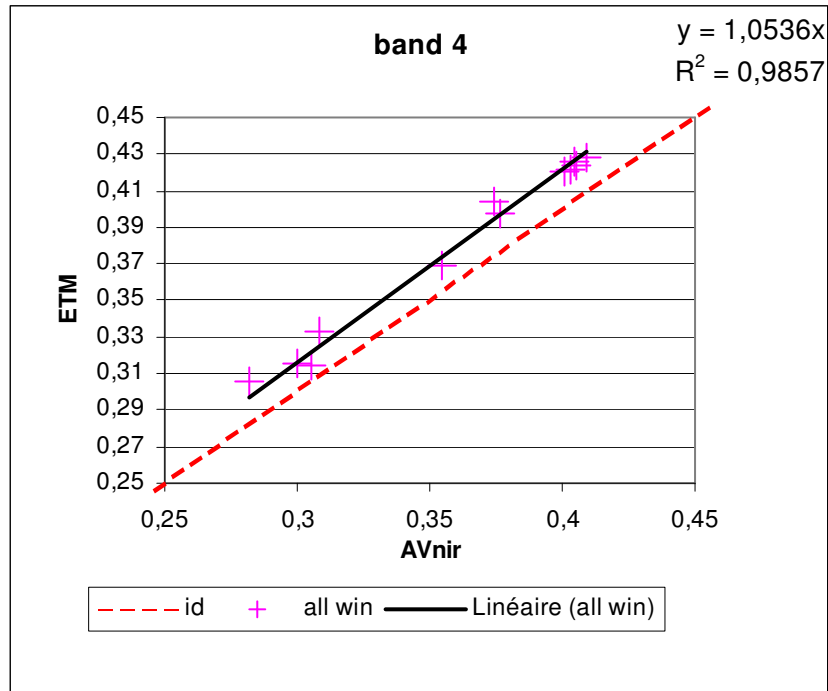


Figure 6-6 TOA Reflectance from ETM+ and AVNIR-2 sensors – band 4

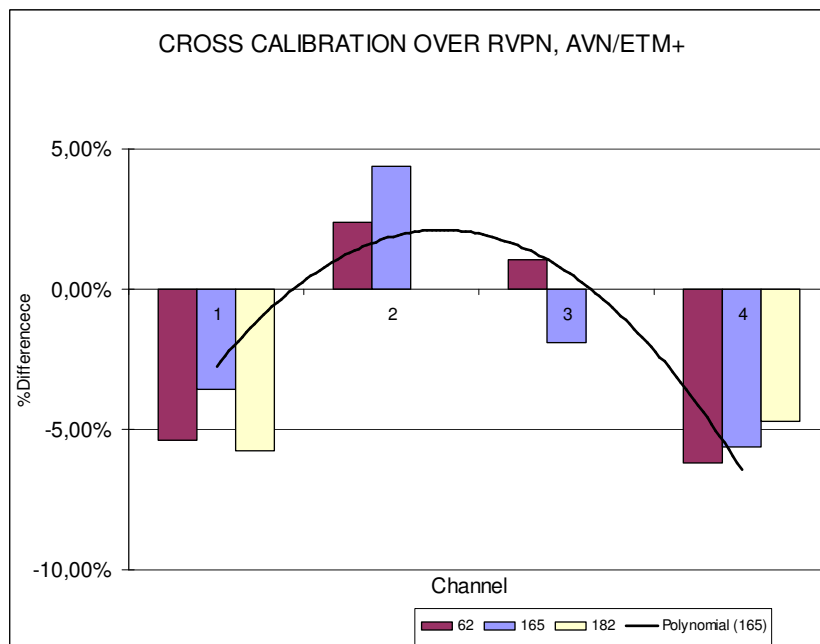


Figure 6-7 Percentage difference in TOA Reflectance from ETM+ and AVNIR-2 sensors

Three image-pairs from the ETM+ and AVNIR-2 obtained during spring 2008 were used for this study.

The results shown in Figures 6.3 - 6.6 demonstrate that AVNIR-2 is in agreement with ETM+ to within 5%. The average relative differences in TOA reflectance obtained from the comparison are shown in Figure 6-7. It can be observed that the influence of the atmosphere, especially the Raleigh scattering is predominant when comparing the image-pair from Band 1. When the observations are near-simultaneous the matching between the two sensors is usually below 3.5%. The difference for Band 4 remains stable for the three image-pairs. A fixed atmospheric component related to aerosol loading can be retrieved.

7 DISCLAIMERS

No new disclaimers have been issued during this cycle.

A list of known product errors caused by image processing algorithm errors is listed on the JAXA site at:

http://www.eorc.jaxa.jp/hatoyama/satellite/data_tekyo_setsumeai/alos_renraku_e.html

8 EVENTS

The following section details events that may be of interest to ALOS data users.

- ALOS Simulations:
 - Result files and statistics for simulation#11 were released on Nov. 21st
 - Analysis Report and Adoption/Rejection Information for simulation#11 were released on Nov. 29th.
 - The submission of request files for the first stage of simulation#12 is due Dec. 16th.

8.1 *Past Events:*

- The second ALOS PI Symposium took place from the 3rd to the 7th of November in Rhodes, Greece.
- Results of first stage simulation#11 made available on Oct. 15th.
- The submission of request files for the second stage simulation#11 was due on Oct. 28th.
- Analysis report and Adoption/Rejection information of simulation#10 were released by JAXA on 21/08/2008.
- The due date of Observation/Acquisition request files for ALOS simulation 11 was 25/09/2008. This simulation covers the period 10/12/2008 to 11/06/2008.
- ADN-14 meeting was held at ASF from Sep. 9th to 11th
- Analysis report and Adoption/Rejection information of simulation#10 were released by JAXA on 21/08/2008.
- The submission of request files for ALOS simulation number 10 was due by 20th of June.
- The submission of request files for ALOS simulation number 9 was due by March 21, 2008
- The ALOS PCS Site is now available at: <http://earth.esa.int/pcs/alos/>
- ALOS simulation #8 for Cycle 18-21
 - The results of the second stage simulation were made available by JAXA on Feb.4th.
 - The Analysis Report on ALOS simulation #8 was delivered by JAXA on Feb.12th.

- 29 January 2008: Users are now able to submit orders for ALOS future acquisitions via EOLI-SA (email eohelp@esa.int for more information)

APPENDIX A DATASET FOR L1B2 PERFORMANCE MONITORING

There was no L1B2 performance monitoring in this report.

APPENDIX B PRODUCT SPECIFICATION

AVNIR-2	Radiometric accuracy	Geometric accuracy			
Level1B2	Band 1 +5.05% (1 σ) Band 2 -0.1% (1 σ) Band 3 -1.3% (1 σ) Band 4 +5.16% (1 σ)	RMS	Pixel (CT)	Line (AT)	Norm
		Nadir*	35.732 m	17.401 m	39.744 m
	Sensor Intercomparison with various EO Sensor (Meris, Landsat ...) as reference (ESA/ESTEC, USGS, LISE)	Polynomial coefficients embedded within product are used to predict geo location (GAEL). *Acquisition with a 0 pointing degree.			

AVNIR-2 Product specifications, radiometric and geometric accuracy

AVNIR-2	Image Quality		
Level 1B1	MTF@Nyquist		
		Pixel (CT)	Line (AT)
	Band 1	0.51	0.24
	Band 2	0.50	0.30
	Band 3	0.48	0.32
	Band 4*	N/A	N/A
	HR/LR Method (ONERA)		
	*Not evaluated due to image saturation		

AVNIR-2 Product specifications, image quality

APPENDIX C INSTRUMENT ANOMALIES

Below is a list of ALOS anomalies that may have an impact on image quality, radiometric calibration or localisation accuracy (from 24th October 2006).

- Orbit manoeuvres conducted on 15th, 29th November 2008
- Orbit manoeuvres conducted on 11th, 18th, 24th October 2008
- Orbit manoeuvres conducted on 12th, 26th September 2008
- Orbit manoeuvres conducted on 5th, 8th August 2008
- Orbit manoeuvres conducted from 2nd August 2008 14:27 – 3rd August 2008 06:05
- Inclination and related in plane orbit manoeuvres conducted from 29th July 22:26 – 31st July 05:42
- Orbit manoeuvres conducted on 19th July 2008,
- LSSR acquisition failure 11th June 2008,
- Orbit manoeuvres conducted on 19th July 2008,
- Orbit manoeuvres conducted on 11th, 14th, 17th, 20th, 23rd June 2008,
- Calibration operations for Star Tracker conducted on 11th and 13th of May 2008,
- Orbit manoeuvres conducted on 16th May 2008,
- Orbit manoeuvres conducted on 26th April 2008,
- Orbit manoeuvres conducted on 4th April 2008.
- Orbit manoeuvres conducted on 26th January and 2nd, 15th, 29th February 2008.
- YAW steering was suspended on 28th January 2008
- Orbit manoeuvres conducted on 15th December 2007, 4th, 11th & 18th January 2008.
- Observation, yaw steering, and precision attitude system suspended on 31st October 2006 between 03:50 and 15:50 UT due to change AOCS on-board orbit model to that of 15th order.

- Yaw steering suspended during 23rd February 00:12 UT to 24th February 2007 23:01 UT (yaw steering suspended due to calibrating operations for Star Tracker (STT) and Precision Attitude Determination).
- Yaw steering suspended during 22nd March 00:24 UT to 23rd March 2007 23:17 UT (yaw steering suspended due to calibrating operations for Star Tracker (STT) and Precision Attitude Determination).
- Yaw steering on/off switching on 10th April 2007:
 - Yaw steering on to off: 12:57 – 13:22 UT (data unavailable)
 - No yaw steering operation: 13:22 – 14:42 UT (data available)
 - Yaw steering off to on: 14:42 – 15:45 UT (data unavailable)
- Orbit manoeuvres on 25th, 27th and 29th April 2007.
- Orbit manoeuvres on 8th and 22nd June 2007.
- Orbit manoeuvres conducted on 7th and 20th July 2007.
- Yaw steering on/off switching on 31st July 2007:
 - Switching in progress: 00:00 – 00:30, 21:57 – 22:46 UT (Observation suspended)
 - No yaw steering observation: 00:30 – 21:57UT (Data available)
- Orbit manoeuvres conducted on 3rd and 25th August 2007.
- Orbit manoeuvres conducted on 6th, 12th and 26th October 2007.
- Orbit manoeuvres conducted on 10th and 23rd November 2007.
- Orbit manoeuvres conducted on 7th and 15th December 2007.
- Orbit manoeuvres conducted on 4th, 11th, 18th and 26th January 2008.
- Orbit manoeuvres conducted on 2nd, 15th and 29th February 2008.
- Orbit manoeuvres conducted on 8th March 2008.

APPENDIX D PROCESSOR UPDATE SUMMARY

Upgrade Version: 4.05

Previous Version: 4.04

Modifications:

(1) Update of Processing Software

- Update radiometric correction algorithm of PRISM Level 1 processing:
Reduction of stripe noises (Vertical stripe)
- The correspondence of the phenomenon that filter processing is terminated abnormally [Ver_PSM_SW_Radco="5.03"]]

(2) Update of Correction Parameter

- Update radiometric correction algorithm of PRISM Level 1 processing:
Reduction of stripe noises (Vertical stripe)
[Ver_PSM_PR_CalConstant=5.01]
- PRISM Pointing Alignment parameter file (Update version of October 25, 2007)
(for PRISM) [Ver_PSM_PR_AlignmentParameter="5.05"]]

(3) Update of DEM data directory

None

Comments:

None