This RGB composite AVNIR-2 image, taken from frame 2820 of orbit 15860 shows Lake Tuz, a salt lake in Turkey, located in the central Anatolian region.
### A P P R O V A L

<table>
<thead>
<tr>
<th>Title</th>
<th>ADEN ALOS AVNIR-2 Cyclic Report – Cycle 25</th>
<th>issue 1</th>
<th>revision 0</th>
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<tbody>
<tr>
<td>author</td>
<td>IDEAS Optical Team</td>
<td>date 26 March</td>
<td>date 2009</td>
</tr>
<tr>
<td>approved by</td>
<td></td>
<td>date</td>
<td>date</td>
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### C H A N G E   L O G

<table>
<thead>
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<th>reason for change</th>
<th>issue/issue</th>
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<td>1</td>
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<td>18 February 2009</td>
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</table>
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AVNIR-2 CYCLIC REPORT # 25

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

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

RD.1 ALOS/AVNIR-2 Level 1 product format description Rev J - October, 2006 JAXA (NEB 00016)

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: 25

Cycle Start: 25 January 2009

Cycle End: 12 March 2009

The main issues during the cycle have been as follows:

- Processor Version
  Current AVNIR-2 processor version: 4.05

  Version 5.04 of the processor has been delivered and is currently undergoing validation prior to installation.
  See Section 3 for install dates of ADEN processors.
3 SOFTWARE & AUX FILE VERSION CONFIGURATION

<table>
<thead>
<tr>
<th>Current Optical Processor Version</th>
<th>ESRIN</th>
<th>Matera</th>
<th>Tromso</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.05</td>
<td>09/01/08</td>
<td>14/02/08</td>
<td>18/06/08</td>
</tr>
</tbody>
</table>

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 01/02/2009 to 28/02/2009 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.

<table>
<thead>
<tr>
<th>From (UT)</th>
<th>To (UT)</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Time</td>
<td>Date</td>
</tr>
<tr>
<td>14 Feb 2009</td>
<td>-</td>
<td>14 Feb 2009</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>From (UT)</th>
<th>To (UT)</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Time</td>
<td>Date</td>
</tr>
<tr>
<td>None</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>From (UT)</th>
<th>To (UT)</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Time</td>
<td>Date</td>
</tr>
<tr>
<td>Mar. 13, 2009</td>
<td>17:55:00.000000</td>
<td>Mar. 13, 2009</td>
</tr>
<tr>
<td>Feb. 14, 2009</td>
<td>10:04:00.000000</td>
<td>Feb. 14, 2009</td>
</tr>
<tr>
<td>Jan. 30, 2009</td>
<td>16:32:00.000000</td>
<td>Jan. 30, 2009</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>From (UT)</th>
<th>To (UT)</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Time</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>From (UT)</th>
<th>To (UT)</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Time</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.

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.

119 products have been examined during the course of this cycle, and no new issues have been highlighted by the browse inspections.

5.3.1 MISSING DATA FROM BANDS (ING-NCR-09-03159 AND SP-NCR-09-3160)

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 now believed to be addressed by two NCRs which have been opened on the ADEN ground segment. 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**

The fortnightly visual inspections for AVNIR-2 have currently been put on hold by the transition to the production of a new 'detailed inspection report' which is currently being formulated. The new reports will include much more in depth analysis of the products and should be of greater use to the experts.

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:


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**

Information on this section will be included in future cyclic reports.
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_setsumei/alos_renraku_e.html
8 EVENTS

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

- ALOS simulation
  - Submission of request files for the first stage simulation#13 (Cycle28-31) is due on March 12th
  - The results of first stage simulation will be available by Feb. 30th
  - Detailed information regarding long-term simulation will be announced in March.

8.1 Past Events:

- ALOS Core Processing Software PRISM/AVNIR-2 Version 5.05 (PRISM Pointing Alignment Parameter) was released on Feb. 6th

- ADN-15 meeting was held on Feb. 24th and 25th in Tokyo

- The result files and statistics for the second stage simulation#12 were released on Feb. 13th.

- Analysis Report and Adoption/Rejection Information for simulation#12 was released on Feb. 20th.

- The submission of request files for the second stage simulation#12 is due on Jan. 19th.


- The result files of first stage simulation#12 will be available on Jan. 3rd

- ALOS Core Processing Software (Version 5.03 for PALSAR and Version 5.04 for PRISM/AVNIR-2) was provided Dec. 19th.

- 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 was due Dec. 16th.

- 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
  o The results of the second stage simulation were made available by JAXA on Feb.4th.
  o 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

<table>
<thead>
<tr>
<th>AVNIR-2</th>
<th>Radiometric accuracy</th>
<th>Geometric accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1B2</td>
<td>Band 1  +5.05% (1σ)</td>
<td>RMS</td>
</tr>
<tr>
<td></td>
<td>Band 2  -0.1% (1σ)</td>
<td>Pixel (CT)</td>
</tr>
<tr>
<td></td>
<td>Band 3  -1.3% (1σ)</td>
<td>Line (AT)</td>
</tr>
<tr>
<td></td>
<td>Band 4  +5.16% (1σ)</td>
<td>Norm</td>
</tr>
<tr>
<td></td>
<td>Sensor Intercomparison with various EO Sensor (Meris, Landsat ...) as reference (ESA/ESTEC, USGS, LISE)</td>
<td>Polynomial coefficients embedded within product are used to predict geo location (GAEL).</td>
</tr>
<tr>
<td></td>
<td>Nadir* 35.732 m</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>17.401 m</td>
</tr>
<tr>
<td></td>
<td></td>
<td>39.744 m</td>
</tr>
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</table>

AVNIR-2 Product specifications, radiometric and geometric accuracy

<table>
<thead>
<tr>
<th>AVNIR-2</th>
<th>Image Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1B1</td>
<td>MTF@Nyquist</td>
</tr>
<tr>
<td>Band 1</td>
<td>0.51</td>
</tr>
<tr>
<td>Band 2</td>
<td>0.50</td>
</tr>
<tr>
<td>Band 3</td>
<td>0.48</td>
</tr>
<tr>
<td>Band 4*</td>
<td>N/A</td>
</tr>
<tr>
<td>HR/LR Method (ONERA)</td>
<td></td>
</tr>
<tr>
<td>*Not evaluated due to image saturation</td>
<td></td>
</tr>
</tbody>
</table>

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 14\textsuperscript{th} February 2009
- Orbit manoeuvres conducted on 3\textsuperscript{rd}, 10\textsuperscript{th}, 16\textsuperscript{th} and 30\textsuperscript{th} of January 2009
- Orbit manoeuvres conducted on 15\textsuperscript{th}, 29\textsuperscript{th} November 2008
- Orbit manoeuvres conducted on 11\textsuperscript{th}, 18\textsuperscript{th}, 24\textsuperscript{th} October 2008
- Orbit manoeuvres conducted on 12\textsuperscript{th}, 26\textsuperscript{th} September 2008
- Orbit manoeuvres conducted on 5\textsuperscript{th}, 8\textsuperscript{th} August 2008
- Orbit manoeuvres conducted from 2\textsuperscript{nd} August 2008 14:27 – 3\textsuperscript{rd} August 2008 06:05
- Inclination and related in plane orbit manoeuvres conducted from 29\textsuperscript{th} July 22:26 – 31\textsuperscript{st} July 05:42
- Orbit manoeuvres conducted on 19\textsuperscript{th} July 2008,
- LSSR acquisition failure 11\textsuperscript{th} June 2008,
- Orbit manoeuvres conducted on 19\textsuperscript{th} July 2008,
- Orbit manoeuvres conducted on 11\textsuperscript{th}, 14\textsuperscript{th}, 17\textsuperscript{th}, 20\textsuperscript{th}, 23\textsuperscript{rd} June 2008,
- Calibration operations for Star Tracker conducted on 11\textsuperscript{th} and 13\textsuperscript{th} of May 2008,
- Orbit manoeuvres conducted on 16\textsuperscript{th} May 2008,
- Orbit manoeuvres conducted on 26\textsuperscript{th} April 2008,
- Orbit manoeuvres conducted on 4\textsuperscript{th} April 2008.
- Orbit manoeuvres conducted on 26\textsuperscript{th} January and 2\textsuperscript{nd}, 15\textsuperscript{th}, 29\textsuperscript{th} February 2008.
- YAW steering was suspended on 28\textsuperscript{th} January 2008
- Orbit manoeuvres conducted on 15\textsuperscript{th} December 2007, 4\textsuperscript{th}, 11\textsuperscript{th} & 18\textsuperscript{th} 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 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 – 21:57 UT (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