

Summary of the 31st ASTER Science Team Meeting

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The 31st Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) Science Team Meeting was held at TEPIA Hall in the AOYAMA district, Tokyo, Japan on June 5-7, 2007. Seventy ASTER science team members attended the meeting as well as other relevant participants. The meeting began with an Opening Plenary during which related projects were reported and the issues to be addressed at this meeting were reviewed. Splinter sessions of each working group took place after the plenary session, after which the group reconvened as a whole for a Closing Plenary to hear reports from each working group. Additionally, on June 8 an ASTER workshop took place to present the research achievements of the science team members, including presentations from a broad range of researchers.

Opening Plenary

H. Tsu [Earth Remote Sensing Data Analysis Center (ERSDAC)—*Japan ASTER Science Team Leader*] and **M. Abrams** [Jet Propulsion Lab (JPL)—*U.S. ASTER Science Team Leader*] made opening remarks. **M. Kato** [ERSDAC] explained the meeting schedule.

W. Turner [NASA Headquarters] reported on NASA's current status, which covered NASA's organization and future projects, and included a detailed presentation of the current status of Landsat-related plans.

T. Sato [Japan Resources Observation System and Space Utilization Organization (JAROS)] reported on the instrument status. He presented details about the temperature increase in the Short Wave Infrared (SWIR) element and the associated instrument operation to correct the problem on May 17 and 18. Following this, there was some discussion on the measures to be taken in the future. Results of an ongoing analysis of the instrument operation were going to be revealed on June 17 and then reported in mid-July. The appropriate countermeasures will be determined after obtaining the analysis results.

B. Bailey [U. S. Geological Survey Land Processes Distributed Active Archive Center (USGS LPDAAC)] updated the recent distribution status at LPDAAC, mainly after on-demand processing of the Level-1B (L1B) and orthorectified products. Expedited Data Set (EDS) change was also reported, which would be confirmed with Ground Data System (GDS).

M. Hato [ERSDAC] reported on GDS status. He presented the assumed future operation scenarios for the temperature increase in the SWIR detector and also reported on the production/distribution status.

M. Fujita [ERSDAC] presented the Science Scheduling Support Group/Operations and Mission Planning (SSSG/OMP) report. He reported the analysis results of observation status in association with the Global Mapping Science Team Acquisition Request (STAR).

M. Abrams reported on the recent Earth Science Senior Review, gave an update on the Data Downlink (DDL), and discussed the Solid State Recorder (SSR) status. He reported the upcoming memory swap and resultant memory size reduction for SSR, and the resolution of all problems noted by the test of the previous year as well as a scheduled retest in July for DDL.

To close the plenary, **Y. Yamaguchi** [Nagoya University] raised three points for further discussion in the working groups. These included discussing: (1) the effects of SSR change and pointing; (2) future observation plans—e.g., the third round of Global Map (GM) acquisitions including night Thermal Infrared (TIR) GM settings, and prioritized SWIR observation in certain areas; and (3) contingency plans in the event the SWIR detector must be turned off.

Working Group Sessions

Level 1/Geometric/Digital Elevation Model (DEM) Working Group

The first half of the session was used to discuss results and improvements of the Level-1/DEM/ortho software. There have been no problems to date.

The second half of the session was devoted to a discussion of the ASTER global DEM project. **H. Fujisada** [Sensor Information Laboratory Corporation (SILC)] proposed having fully automated DEM generation using all existing data with no human interface. **T. Tachikawa** [ERSDAC] and **B. Bailey** presented the validation results of the generated DEM.

Radiometric Calibration Working Group

The instrument team reported on results of ongoing onboard calibration efforts. Regarding Visible-Near Infrared (VNIR) and SWIR, there is no need to change the radiometric database. As for TIR, the consensus of the group was that the radiometric database should be updated as soon as possible. Following the discussion about calibration, **K. Arai** [Saga University] reviewed the roles/responsibilities with regard to the SWIR issue and selected the issues that should be discussed at this working group. There followed a discussion

about any action that should be taken with the instrument settings.

This working group also heard a presentation on results of the current field campaign results as well as plans for the next field campaign. **K. Thome** [University of Arizona] and **K. Arai** reported on the status of the web page on radiometric calibration coefficients derived from vicarious calibration. The group decided that it was preferable to have the data open to the public through the ASTER Science Project web site.

Atmospheric Correction Working Group

B. Eng [JPL] reported on the status of the U.S. ASTER Level-2 software. Level-2 software is operating in *Version 3.1-3* from August 2006. The next update includes interpolation of aerosol correction to remove visible boundaries; three new ozone sources—the Total Ozone Mapping Spectrometer (TOMS); Total Ozone Analysis from Solar Backscatter Ultraviolet Instrument-2 [SBUV-2] (TOAST); and TIROS Operational Vertical Sounder (TOVS) data from the SeaWiFS Data Analysis System archive (SeaDAS)—and a new interface that corresponds to the latest Moderate Resolution Imaging Spectroradiometer (MODIS) product. Future plans are to include an update of TIR recalibration and MODIS aerosol usage.

Temperature-Emissivity Separation (TES) Working Group

The first half of the session consisted of many presentations on the TES accuracy validation results and research accomplishments using TES products. In the second half of the session, participants heard a presentation on the status of TIR nighttime STAR and discussed plans for future acquisitions. The group agreed that the areas shown on the Original Priority Map of TIR STAR should receive highest priority, starting with West Africa and the Central U.S., and that this issue would be revisited in two months via e-mails when more observation results are available.

Operations and Mission Planning (OMP)/Science Scheduling Support Group (SSSG)

K. Okada [ERSDAC] and **H. Tonooka** [Ibaraki University] reported on the statistical results of observation. **Y. Yamaguchi** stated that the third round of Global Mapping STAR should be continued. The methods for data acquisition for Global DEM STAR were discussed based on this result.

After hearing some reports on some operational adjustments, the group sought to develop an operation plan without the SWIR subsystem. As a result of discussion, the group decided that: (1) Having only visible or only thermal mode is unacceptable. (2) Pseudo visible/ther-

mal mode is needed. (The instrument and GDS teams must determine how to best achieve this). (3) A SWIR gain change is desirable, but the final decision will have to be made by SSSG/ERSDAC.

STAR Committee

A *two-week automatic approval* rule was confirmed. Global Land Ice Measurement from Space (GLIMS) STAR will be resubmitted. **J. Kargel** [University of Arizona] makes some revisions and SSSG checks the parameters.

Ecosystem/Oceanography Working Group

After a review of STAR status, the group heard nine research reports. After the research reports, the group discussed the eventual turn-off of SWIR and the implications on studies of Ecosystems and Oceanography using ASTER, and concluded that they had no specific/new observation request plans in light of the potential SWIR turn-off.

Geology/Spectral Working Group

This group heard reports on research results using ASTER data in the fields of resources, hazards, geomorphology, volcanology and mapping. Following the presentations, the group discussed the potential impact of a SWIR turn-off on Geology/Spectral research using ASTER. The group concluded that Low Gain Mode should be used for all future data acquisition requests.

ASTER Workshop

An ASTER Workshop was held on June 8 in conjunction with the ASTER Science Team Meeting, greeting 144 participants from the Japan and U.S. ASTER Science Teams, private corporations, universities and research institutes, among others. ASTER and surroundings were introduced by project team members. **Y. Yamaguchi** opened the workshop and gave an overview of ASTER. **M. Abrams** reported on the NASA Earth Observing System (EOS) status. **M. Hato** presented the ASTER GDS status. After those introductory reports, the remainder of the workshop was dedicated to reports on **research activities related to ASTER**. Workshop participants heard 14 reports on various research projects that showcased some of the practical applications that can be studied using ASTER data.

These included:

- studying various natural disasters (e.g., volcanoes, glaciers and floods);
- monitoring of urban and natural environments; and
- detecting metal and energy resources.

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contributions of sulfur from natural and anthropogenic sources to atmospheric SO₂, sulfuric acid (H₂SO₄) gas, and new particle formation. Lucas also briefly discussed future applications of this modeling system to constraining sulfuric acid from observations of SO₂ and aerosols.

Jae Kim [Pusan University, Korea/University of Alabama, Huntsville (UAH)] presented work done in collaboration with Mike Newchurch [UAH] on deriving tropospheric ozone by making use of observations from different satellite viewing angles. This was accomplished in the tropics with TOMS and more recently with OMI. He showed differences between his method and the OMI-MLS residual method. He then applied singular value decomposition to examine correlations between the derived tropospheric ozone and carbon monoxide retrievals from the Terra Measurements Of Pollution In The Troposphere (MOPITT) instrument.

June 8

In the final core group meeting, **Maarten Sneep** [KNMI] and **Joanna Joiner** [NASA] led a discussion on clouds.

- **P. K. Bhartia** gave a historical perspective showing how clouds alter the spectral dependence of Rayleigh and Raman scattering. He stressed that more than one approach to handling clouds may be necessary to meet different algorithmic needs. For example, while the Mixed Lambertian Equivalent Reflectivity (MLER) model works well for the OMI DOAS total ozone algorithm, the plane-parallel cloud model may work better for OMI TOMS O₃.
- **Sneep** expanded upon his presentation of the previous day in which he discussed the meaning of the MLER cloud properties (effective cloud fraction and pressure) reported in the current OMI cloud data products. He mentioned possible uses of the OMI cloud products outside of the OMI science team. He also showed that distributions of cloud pressure from the OMI O₂-O₂ algorithm are similar to those derived from GOME using the O₂-A band and significantly different from thermal infrared (IR) MODIS retrievals of cloud top pressure.
- **Johan de Haan** showed that the MLER approach gives relatively small errors for O₃ and NO₂ DOAS-type retrievals. He also showed that path lengths are similar for O₂-O₂, O₂-A band and Raman scattering. Joiner discussed how CloudSat data are being used to explain that OMI retrieves pressures deep inside convective clouds and sometimes near the lower of two cloud decks. She closed by mentioning that in the future the synergistic use of the different A-train cloud observations, including those from OMI, will be further explored.

P. K. Bhartia led a discussion of OMI calibration.

- **Changwoo Ahn** [SSAI] presented results of a comparison of OMI and MODIS Level 1B data at the overlapping wavelength of 470 nm. There is a significant swath angle dependence of the differences that is yet to be completely explained.

Pieter Levelt wrapped up the meeting by noting that *Collection 3* will be operational starting August 1 and by the end of the year all of the Level 2 products from launch until this date will be regenerated using this improved data set. This will lead to a full set of OMI Level 1B and Level 2 *Collection 3* data. ■

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Also included among the 14 presentations were results of a study on the effectiveness of the ASTER user interface. General discussion took place after the presentations were finished, and it was commented that the continuous observation was expected. ■