

## Summary of the 43<sup>rd</sup> Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) Science Team Meeting

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The forty-third meeting of the Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) Science Team was held at Kikai Shinko Kaikan in Tokyo, Japan, June 10-12, 2013. Members of the ASTER Science Team and scientists in ASTER-related projects attended the meeting. In the opening plenary session status reports were provided on the ASTER instrument itself, data processing, and the overall mission; as a result, four issues were raised. These issues and research findings were discussed in the subsequent working group splinter sessions. The meeting concluded with a closing plenary session that included reports from the working groups.

### Opening Plenary

**H. Tsu** [Japan Space Systems (J-spacesystems)—*Japan ASTER Science Team Lead*] and **M. Abrams** [NASA/Jet Propulsion Lab (JPL)—*U.S. ASTER Science Team Lead*] made opening remarks. **H. Tsu** talked about the current tight budget situation. **M. Kato** [J-spacesystems] presented the meeting logistics.

**M. Abrams** outlined NASA's current status, the 2013 Earth Science Senior Review, budget, and data policy. He reported on the Terra spacecraft's predicted propellant usage and battery status, and went on to discuss several other missions and instruments. The Landsat Data Continuity Mission (LDCM) started operation as Landsat 8 on May 30 when NASA turned over Landsat operational responsibilities to the U.S. Geological Survey (USGS). As with previous Landsat missions, data are available at no cost to all users.

**M. Kikuchi** [J-spacesystems—*Instrument Team*] reported on the status of the ASTER instrument. He provided an update on instrument lifetime management, radiometric degradation, and a plan of action for the mission's end. Currently, there is no action being taken.

**T. Matsunaga** [National Institute for Environmental Studies (NIES)] provided an update on the Hyperspectral Imager Suite (HISUI<sup>1</sup>). He described the mission structure, project timeline, instrument development, and activities of the science working groups.

**A. Miura** [J-spacesystems—*Ground Data System (GDS)*] reported on GDS status. He gave an update on

the GDS and operations, and reported on processing and distribution metrics.

**D. Meyer** [USGS, Land Processes Distributed Active Archive Center (LPDAAC)] provided updates on distribution metrics, plans for long-term data preservation, progress on the new orthorectification product, and on the Terra/Aqua product review at the LPDAAC.

**M. Fujita** [J-spacesystems—*Science Scheduling Support Group (SSSG)*] presented the SSSG and Operation and Mission Planning (OMP) report. He discussed mission progress, scheduling, and observations.

To close the plenary, **Y. Yamaguchi** [Nagoya University] raised four issues for discussion in the working groups: mission monitoring, radiometric calibration coefficients, preparations for turning off the shortwave infrared (SWIR) instrument, and operational strategies to address budget uncertainty.

### Working Group Sessions

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

The first half of the session focused on validation results from ASTER Level-1 (L1) algorithm/software, including a report on new software that can generate L1 products without SWIR data. Overall, there are no major issues or concerns with L1 processing at this time. The second half of the session focused on the ASTER Global Digital Elevation Model (GDEM) project. **H. Fujisada** [Sensor Information Laboratory Corporation (SILC)] reported on the status of the next version of the GDEM. The main updates addressed adding newly observed scenes, removing floating ice effects, and improving river elevation. **A. Iwasaki** [Tokyo University] reported on a new stacking method to remove anomalies in tropical areas using statistical comparisons of elevations from ASTER DEMs with data from the Shuttle Radar Topographic Mission (SRTM). **B. Crippen** [JPL] showed SRTM Version 3, a new release of the SRTM data from JPL that uses GDEM Version 2 to fill SRTM Version 2 and Global Multiresolution Terrain Elevation Data (GMTED) 2010 to fill problem areas.

#### *Radiometric Calibration/Atmospheric Correction (RC/AC) Working Group*

**B. Eng** [JPL] reported on the status of an atmospheric correction (i.e., Level-2 software) update; the

<sup>1</sup> HISUI is composed of both a hyperspectral and multispectral imager, planned as part of the payload of the Japanese Advanced Land Observation Satellite-3 (ALOS-3), slated for launch in 2016.

instrument team reported the results of *onboard calibration*—monitoring the lamp onboard the spacecraft. **F. Sakuma** [J-spacesystems] reported a large gain error, probably caused by an electrical output anomaly from the power supply, **A. Iwasaki** showed differences of up to 2% in odd-even rows in the Band 1 high-gain product, and **H. Yamamoto** [National Institute of Advanced Industrial Science and Technology (AIST)] pointed out a 9% error in Band 2, found by *cross calibration* with the Moderate Resolution Imaging Spectroradiometer (MODIS) on the same satellite. **S. Tsuchida** [AIST] and **H. Tonooka** [Ibaraki University] reported on the results of field *vicarious calibration* exercises. **T. Tachikawa** [J-spacesystems] and **K. Arai** [Saga University] summarized the status of the errors described in this working group session, namely that present radiometric calibration based on *onboard calibration* shows significant errors in degradation coefficient and gain. The working group concluded by recommending additional processing for replacing the degradation coefficient and gain coefficients in the radiometric correction table used for Level-1A processing. **T. Kouyama** [AIST] proposed conducting a second lunar calibration, and reported that a SELENE<sup>2</sup>-derived lunar reflectance model is now available. **M. Kikuchi** announced the termination of onboard calibration due to budget cuts.

#### *Temperature-Emissivity Separation (TES) Working Group*

**A. Gillespie** [University of Washington (UW)] and **S. Kato** [NIES] reported on validation for the emissivity product, explaining that atmospheric correction was necessary to get good emissivity data. **G. Hulley** [JPL] and **H. Tonooka** described ongoing efforts to develop large-scale emissivity datasets. JPL's ASTER Global Emissivity Dataset (GED), will include Africa, the Arabian Peninsula, Australia, China, and Europe, and will be released by the Earth Resources Observation and Science (EROS) Land Processes Digital Active

<sup>2</sup> SELENE and ENgineering Explorer (SELENE) is a Japanese lunar orbiter, operated by the Japan Aerospace Exploration Agency (JAXA) from 2007 to 2009, that carried instruments for scientific investigation of the Moon.

Archive Center (LPDAAC) by the end of June 2013. Tonooka's global mapping of ASTER's thermal infrared (TIR) ortho time-series products is complete—except for Canada and Alaska. **M. Fujita** and **H. Tonooka** discussed the status of nighttime TIR global mapping (TGM). This working group agreed to recommend continuing TGM for the new target areas.

#### *Operations and Mission Planning (OMP) Working Group*

The team reviewed all previous action items and addressed two open items regarding the GDEM Science Team Acquisition Request (STAR) and the possibility of implementing a long-term inhibit zone for the Alaskan problem area. **T. Tachikawa** reported that the scheduling simulation generated by removing SWIR data showed a 26% increase in daytime observations without a significant impact on nighttime observations. **H. Inada** [NEC-Toshiba Space—*Instrument Team*] proposed a procedure to stop the onboard SWIR data flow; the Science Team would like to implement this as soon as possible. **M. Fujita** then reviewed the status of Global Mapping 5<sup>th</sup> Round (GM5) and TGM 5<sup>th</sup> Round (TGM5). GM5 will continue as-is but, per the recommendation of the TES Working Group, TGM5 will be replaced with TGM6. Fujita also reported on the Underserved Area (UA) STAR and Tachikawa proposed updating the target area for the UA STAR based on GDEM processing. Fujita reported on Global Land Ice Measurements from Space (GLIMS) and the Volcano STAR, both of which are proceeding smoothly. Tachikawa showed that the performance of cloud avoidance by improving a scheduling parameter worked well. **L. Maldonado** [JPL] analyzed the worldwide distribution of the data acquisition requests (DAR). **A. Miura** warned that attention must be paid to the timing of DAR submissions, which could affect scheduling. Maldonado requested that the occurrence of scheduling failures due to GDS operational reduction be monitored.

#### *Ecosystem/Oceanography Working Group*

**K. Iwao** [AIST] and **G. Geller** [JPL] began the session by reviewing action items and STAR status. Two new or updated STARS were submitted, but the total number of submissions has decreased. A series of eight presenta-

**Table 1.** Science presentations from the Ecosystems/Oceanography Working Group.

Topic	Presenter
Observation of Open Burning by Thermal Infrared (TIR) Remote Sensing	<b>S. Kato</b> [NIES]
Environmental Implications of a Shrinking Sea: Initial Science Results of the NASA Mineral And Gas Identifier (MAGI) Airborne Instrument at the Salton Sea, CA	<b>M. Ramsey</b> [University of Pittsburgh]
Some Recent ASTER Work Relevant to Ecosystems	<b>K. Hirose</b> [J-spacesystems]
JEarth 100 Cities Project	<b>L. Prashad</b> [Arizona State University]

Environmental Monitoring of Bolgoda Lake, Sri Lanka, Using ASTER Data	<b>D.D.G.L. Dahanayaka</b> [Ibaraki University]
TerraLook/Google Earth Engine Update	<b>G. Geller</b> [JPL]
Introduction to Essential Biodiversity Variables and Global Earth Observations Biodiversity Observation Network (GEOBON)	<b>G. Geller</b> [JPL]
GEO Work Plan Symposium Review (Earth Datasets)	<b>K. Iwao</b> [AIST]

tions describing project and research activities followed the opening remarks—see **Table 1**.

#### *Geology/Spectral Working Group*

**M. Urai** [AIST] and **D. Pieri** [JPL] began the session with a review of outstanding action items. Nine research activity presentations then followed that covered such diverse topics as geology, floods, glaciers, and volcanic activity—see **Table 2**. After the presentations, continuing action items were discussed. Monitoring of GLIMS acquisitions and assessment of the volcano STAR will continue.

#### *STAR Committee*

The committee reviewed and approved two new STARs, to monitor eastern Japan's recovery after the

2011 earthquake and urban heat islands. The plan for the GLIMS STAR was confirmed. The maximum number of urgent STARs was set to be around 60 requests per month.

#### **Closing Plenary**

The meeting concluded with a closing plenary that summarized the discussions of each working group; specifically, the OMP WG proposed a procedure to stop the SWIR data flow as soon as possible; and the Radiometric Calibration WG recommended adding processing for replacing the radiometric correction table in Level-1A generation.

**H. Tsu** closed the meeting after announcing that the next (44<sup>th</sup>) ASTER Science Team meeting would be held in Tokyo the week of March 10, 2014. ■

**Table 2.** Research presentations from the Geology/Spectral Working Group.

<b>Topic</b>	<b>Presenter</b>
Geological Mapping of the Francistown Area in Northeastern Botswana by Surface Temperature and Spectral Emissivity Information Derived from ASTER TIR Data	<b>T. Yajima</b> [Japan Oil, Gas and Metals National Corporation]
Rotational Pixel Swapping Method to Detect Circular Features: Extraction of Impact Craters from ASTER Images	<b>S. Yamamoto</b> [NIES]
Small-scale Landform Classification and Flood Susceptibility Assessment of the Alluvial Plains in Vietnam Using Remotely Sensed Data	<b>Y. Yamaguchi</b> [Nagoya University]
Glaciation in the Gobi Desert	<b>A. Gillespie</b> [UW]
Thermophysical Properties of Mantled and Blocky Lava Flows Derived from ASTER TIR Data	<b>M. Ramsey</b> [JPL]
New Eruptions in the North Pacific Monitored with the ASTER Urgent Request Protocol Project	<b>M. Ramsey</b> [JPL]
Nighttime TIR Geolocation Evaluation Using Volcanic Hotspots	<b>M. Urai</b> [AIST]
ASTER Volcano Archive (AVA) Review	<b>D. Pieri</b> [JPL]
In Situ Gas Sampling at Turrialba Volcano	<b>D. Pieri</b> [JPL]