

Precipitation Constellation (PC) Status Report/Discussion

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Progress Since 21st CEOS Plenary

- ✓ **7th GPM International Planning Workshop, 5-7 December 2007**
 - JAXA hosted with 146 participants from 15 countries
 - Detailed review of GPM program/project, scientific, data working group, and data utilization status

- ✓ **U.S.–Japan PC Study Team Meeting, 7 December 2007**
 - Coordination meeting for 2008 PC activities

- ✓ **X-Calibration Working Group (WG) (in coordination with WMO CGMS/GSICS)**
 - Meetings held on
 - January 15-16, 2008 - University of Central Florida, Orlando, FL, USA
 - August 3, 2008 – Colorado State University, Fort Collins, CO, USA
 - NASA, JAXA, CNES, ISRO, INPE, ESA, CAST/NRSCC, NOAA, NRL, EUMETSAT, DLR, CSA, Universities from the U.S. and Asia and WGCV/MWSS participating
 - Reports on workshop and next steps

- ✓ **CEOS SIT Chair Tag Up, 20 February 2008**
 - Provided PC status to SIT Chair

- ✓ **SIT CEOS-GEO Workshop, 20-22 February 2008**
 - Four Questionnaire Inputs submitted (18 total activities)

- ✓ **3rd GPM International Ground Validation (GV) Workshop, 4-6 March 2008**
 - 50 participants from 19 countries
 - Plans for 24 joint projects

Progress Since 21st CEOS Plenary (cont.)

- ✓ **CEOS SIT-21**
 - Presented PC status, 2008 success criteria

- ✓ **2nd CEOS Precipitation Constellation Workshop, June 5-6, Tokyo, Japan (JAXA)**
 - Hosted by JAXA
 - 30 participants, including CEOS Agencies and user community representatives

- ✓ **Moving GPM from formulation to implementation phase at NASA and JAXA**
 - GPM DPR (JAXA) PDR (1Q2008) **COMPLETED**
 - GPM DPR (JAXA) Delta PDR (2Q2008) **COMPLETED**
 - GPM Mission (NASA) PDR (4Q2008)
 - GPM Mission (NASA) KDP-C (1Q2009)

- ✓ **Future plans finalized**
 - CEOS PC Implementation Plan
 - CEOS PC 2008 Work Plan

- ✓ **Meetings/Workshops held**
 - Regional Workshop on Tropical Cyclone Research, May 26-30, La Reunion (CNES, CNRS, Meteo-France, Eumetsat, WMO)
 - 2nd GPM Asia Workshop, June 2-4, Hamamatsu (JAXA, NASA)
 - Precipitation Measuring Missions Science Team, August 4-5, Fort Collins, CO, USA (NASA)

SIT and GEO-Related Activities

All 4 CEOS Category-1 Actions COMPLETED

Action: DA-07-03_2 Coordinate international GPM ground validation (GV) activities and establish the scope of joint GV projects during the year.

Status/Deliverables: COMPLETED. Plans for 24 joint projects from 19 nations proposed. Of these one has been accepted by the PMM Program, one is in review, 11 are various stages of preparation, and 11 have been identified as potential opportunities. A report summarizing the workshop activities and describing the general framework for international collaboration on GPM GV is in preparation for release in the summer of 2008.

Action: CL-06-02_2 Make precipitation data available to a broad additional group of users who are more familiar with GIS than the satellite data formats. Allow easy integration of precipitation data into GIS analysis.

Status/Deliverables: COMPLETED. GIS format real-time precipitation data operational on 20 March 2008.

Action: DA-07-03_6 Precipitation Processing System (PPS) assumes Tropical Rainfall Measuring Mission (TRMM) data processing effective 1 June 2008.

Status/Deliverables: COMPLETED. Changeover of TRMM processing to PPS was completed on 1 June 2008.

Action: DA-07-03_1 Complete the initial phase of the first intercomparison study undertaken by the Precipitation Measurement Missions (PMM) Science Team intercalibration working group in coordination with the CGMS/GSICS. Consists of (a) Investigating algorithms for intercalibrating the brightness temperatures measured by similar, but not identical, spaceborne microwave radiometers, and (b) Comparing these algorithms using a common test data set.

Status/Deliverables: COMPLETED. Working group met on 15-16 January 2008 at the University of Central Florida in Orlando, FL to discuss the preliminary study results. The working group met on 3 August 2008 in Ft. Collins, CO to discuss initial phase study results and decide on the next steps. CNRS representative of the CNES/ISRO Megha-Tropiques mission (planned for launch in 2009) requested and is receiving support from the working group in determining cross-calibration techniques for the mission. A summary report was completed and will be placed on the working group server (ktb.engin.umich.edu).

SIT and GEO-Related Activities (cont.)

2 of 6 CEOS Category-2 Actions COMPLETED

Action: WA-08-P1_3 Conversion of HDF formatted 3hr global rainrate products to GIS formatted rain accumulation products to become fully operationally and available to all users (same as Category 1 Action CL-06-02_2).

Status/Deliverables: COMPLETED. The GIS format real-time precipitation data was put into regular operational status on 20 March 2008. Data are available on an anonymous ftp server for regular pickup: <ftp://trmmopen.gsfc.nasa.gov/pub/gis/>. Historical merged data products are also available but not yet on an anonymous server (see CL-06-02_2).

Action: WA-08-P1_4 The Precipitation Processing System (PPS) will enable users to create dynamic geographic subsets of TRMM rain products. This feature will allow users to retrieve precipitation data only over the area for which they wish to integrate or study in situ data.

Status/Deliverables: COMPLETED. The operational capability for users to create dynamic geographic subsets of TRMM rain products was achieved on 1 June 2008 with the assumption of TRMM data processing by the Precipitation Processing System (PPS) (see DA-07-03_6).

Action: WE-06-02_8 Prototype flood monitoring and landslide warning products from Tropical Rainfall Measuring Mission (TRMM) data will be improved and made available operationally.

Status/Deliverables: OPEN. Planning for operationalization initiated with the Pacific Disaster Center, Maui, Hawaii.

Action: WE-06-02_9 Implement improved algorithm (Version 6) for the production of Merged Tropical Rainfall Measuring Mission (TRMM) Multi-satellite Precipitation Products.

Status/Deliverables: OPEN. Completed initial testing. Follow-up testing scheduled for late September.

Action: DA-07-03_9 Continue Tropical Rainfall Measuring Mission (TRMM) operations through 2008. Action is necessary to support GPM Preparatory Phase of PC. Complete of 11 years of TRMM 3-hr, multi-satellite standard products (TMPA, 3B42).

Status/Deliverables: OPEN. TRMM flight operations and data processing fully funded through September 2009 (preliminarily through September 2011). Spacecraft/instruments in good health with robust consumables.

SIT and GEO-Related Activities (cont.)

2 of 6 CEOS Category-2 Actions COMPLETED (cont.)

Action: CL-06-02_17 Implement improved algorithm (Version 6) for the production of Merged Tropical Rainfall Measuring Mission (TRMM) Multi-satellite Precipitation Products (same as WE-06-02_9).

Status/Deliverables: OPEN. Completed initial testing. Follow-up testing scheduled for late September (see WE-06-02_9).

Action: DA-07-03_10 Continued progress on moving the Global Precipitation Measurement (GPM) mission from formulation to implementation phase at NASA and JAXA.

Status/Deliverables: OPEN. The following major near-term milestones have been completed: GPM DPR (JAXA) PDR (1Q2008), GPM DPR (JAXA) Delta PDR (2Q2008). The following major near-term milestones are planned: GPM Core Spacecraft/Mission (NASA) PDR (4Q2008), GPM Mission (NASA) Confirmation (Q2009).

1 of 1 CEOS Category-4 Actions COMPLETED

Action: WA-08-P1_7 Global Precipitation Measurement (GPM) mission ground validation (GV) working group use satellite and ground data to investigate key issues of combination over co-located sites. Develop and implement software to perform statistical studies of coincident precipitation estimates made by the TRMM radar and a network of operational ground radars within the U.S. to identify areas of agreement and discrepancies to guide satellite algorithm refinement.

Status/Deliverables: CLOSED. Development and implementation of software completed in U.S and studies initiated. This software has also been provided to meteorological agencies in Australia and Korea (BOM and KMA) to conduct similar studies.

How CEOS Agencies can meet PC's requests

- **CNES/ISRO to confirm approach to obtain capability to acquire Megha-Tropiques data in near-real time**
 - Additional ground station at Kourou
 - Existing ground stations in Kourou and South Africa
- **ROSHYDROMET identify PC POC and make available to the PC radiometric data from the MTVZA sounder/imagers**
- **NRSCC/NSMC identify PC POC and make available to the PC radiometer data from the recently launched FY-3 MWRI and MWHS imager and sounders**

Backup

Goal of the PC

To establish an international framework to guide, facilitate, and coordinate the continued advancements of multi-satellite global precipitation missions

- 1) To provide a framework for implementation and monitoring of GEO task AR-06-10

Advocate and facilitate the timely implementation of the Global Precipitation Measurement (GPM) mission and encourage more nations to contribute to the GPM constellation

- 2) To sustain and enhance an accurate and timely global precipitation data record including a Fundamental Climate Data Record essential for understanding the integrated weather/climate/ecological system, managing freshwater resources, and monitoring and predicting high-impact natural hazard events.

This data record should be fit for the purpose specified by GCOS for the monitoring of Precipitation as an essential climate variable (ECV) (as defined in the recent GCOS document 'Systematic Observation Requirements for Satellite-based Products for Climate')

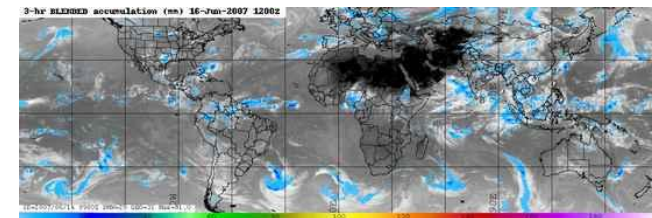
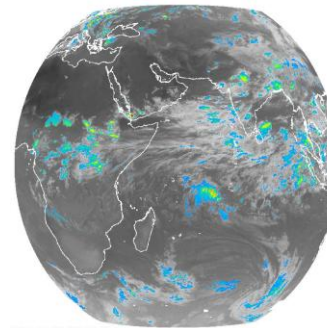
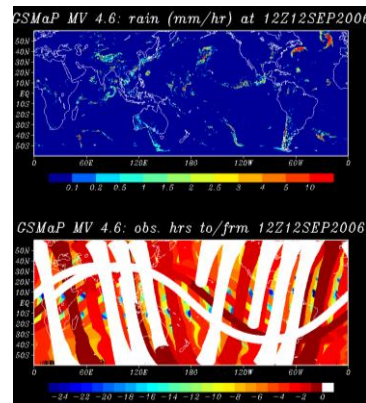
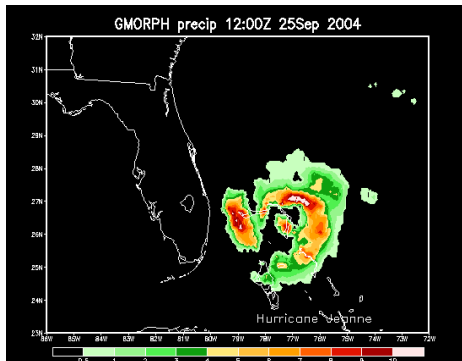
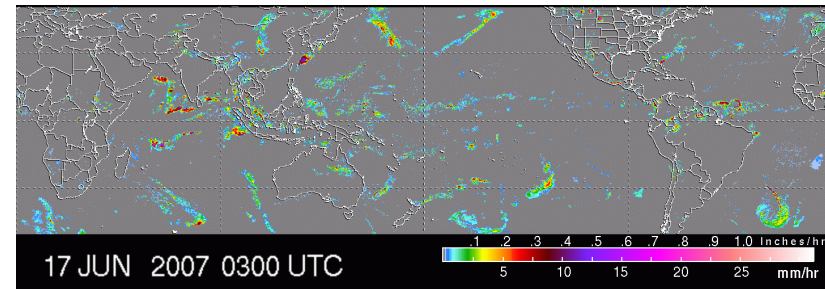
Implementation

- The implementation of CEOS PC is in four phases

year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
phase	study phase	GPM preparatory phase					GPM phase					post -GPM phase	
							<div style="border: 1px dashed black; padding: 10px; width: fit-content; margin: 0 auto;">GPM</div>						

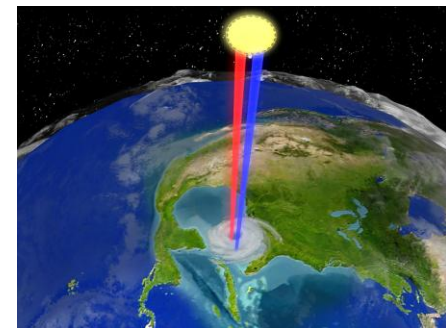
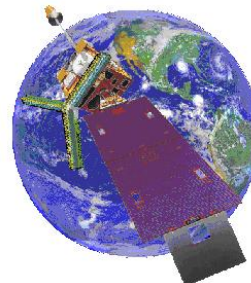
Phase Descriptions

- Objectives are articulated for four phases
 - Study Phase (2007)
 - Study key items which should be achieved to formulate the CEOS PC, and produce the initial Implementation Plan
 - Identify the key points of agreement for space agency co-operation in order to meet the needs of both the data producer and user communities
 - Study the existing multi-sensor activities undertaken by PC team members
 - NASA TRMM 3B42 standard product
 - JAXA GSMaP prototype product
 - NOAA CMORPH/QMORPH products
 - NRL products
 - EUMETSAT MPE product (TBC)



Phase Descriptions (cont.)

- GPM preparatory phase (2008-2012)
 - Comparison of different methods of inter-calibration for generating uniform precipitation estimates from diverse types of precipitation sensors
 - Evaluation of different multi-sensor precipitation products
 - The prototyping of uses of merged data products from multiple sensors as well as evaluation of tools to support such use
 - Establishing the standard merged precipitation products desired
- GPM phase (2013-2017)
 - Launch and operation of GPM, the first constellation-focused mission that will improve precipitation estimates through extensive intercalibration and the use of a reference standard
- Post-GPM phase (after 2017)
 - Beyond timeframe of GEOSS 10-Year Implementation Plan
 - Activities during this phase will not be specified clearly in an early stage
 - Lessons learned from GPM and other PC activities will serve to guide the planning and further evolution of CEOS PC



Participation

- **CEOS SIT Liaison:**
 - USA - NOAA: Mary Kicza, Mary.Kicza@noaa.gov
- **Study Lead Agencies:**
 - Japan – JAXA: Riko Oki, oki.riko@jaxa.jp & USA – NASA: Steven Neeck, steven.neeck@nasa.gov
- **Space Agency Participants:**
 - France - CNES: Didier Renaut, didier.renaut@cnes.fr
 - India - ISRO: contacted
 - Brazil - INPE: Carlos Frederico Angelis, angelis@cptec.inpe.br
 - Europe - ESA: Einar-Arland Herland, einar-arland.herland@esa.int
 - China - CAST/NRSCC: contacted
 - USA - NOAA: Ralph Ferraro, ralph.r.ferraro@noaa.gov
 - USA - Naval Research Laboratory: Joe Turk, turk@nrlmry.navy.mil
 - Europe - EUMETSAT: Johannes Schmetz, Johannes.Schmetz@eumetsat.int
 - Germany - DLR: Martin Hagen, martin.hagen@dlr.de
 - Canada - Canadian Space Agency: David Kendall, Dave.Kendall@space.gc.ca

Participation (cont.)

- **User Community Representatives:**

- CGMS-IPWG: Ralph Ferraro, ralph.r.ferraro@noaa.gov
- GEWEX: Chris Kummerow, kummerow@atmos.colostate.edu
- WCRP/IGWCO: Rick Lawford, lawford@umbc.edu
- GCOS: Paul Mason, p.j.mason@reading.ac.uk
- Peter Bauer, Peter.Bauer@ecmwf.int
- Phil Arkin, parkin@essic.umd.edu

U.S. Study Team

- Steven Neeck/NASA HQ
- Ramesh Kakar/NASA HQ
- Arthur Hou/NASA GSFC
- Bob Adler/ NASA GSFC
- Erich Stocker/NASA GSFC (SEO POC)
- Scott Braun/NASA GSFC (Visualization POC)
- Ralph Ferraro/NOAA
- Joe Turk/NRL
- Chris Kummerow/Colorado State University

Japan Study Team

- Riko Oki, JAXA
- Masahiro Kojima, JAXA
- Kinji Furukawa, JAXA (SEO POC)
- Keizo Nakagawa, JAXA
- Chu Ishida, JAXA
- Misako Kachi, JAXA (Visualization POC)
- Toshiaki Takeshima, JAXA
- Kengo Aizawa, JAXA
- Keiji Imaoka, JAXA
- Kazuo Umezawa, JAXA
- Kenji Nakamura, Nagoya University
- Toshio Iguchi, NICT
- Ken'ichi Okamoto, Osaka Prefecture University
- Toshio Koike, University of Tokyo
- Jun Matsumoto, Tokyo Metropolitan University
- Kazuhiko Fukami Public Works Research Institute
- Yoshiaki Takeuchi, Japan Meteorological Agency
- Yoshiyuki Chihara, Ministry of Education, Culture, Sports, Science and Technology

Requested SIT and CEOS Support

1. To urge ISRO/CNES to acquire the capability to make Megha Tropiques data available in real-time, which is important for the CEOS constellation to meet the needs of the application communities such as NWP and hydrological prediction. The SIT should assist in locating a ground station in the Southern Hemisphere to enable ISRO/CNES to collect data more than three times a day.
2. To urge Russia to make available to the PC the radiometric measurements from the ROSHYDROMET MTVZA sounder/imagers.
3. To urge China to make available to the PC the radiometer measurements from the FY-3 MWRI and MWHS imager and sounders.
4. To urge ESA and JAXA to implement a high-sensitivity light and solid precipitation measurement capability in EarthCARE.
5. To urge NASA and JAXA to commit resources for the timely implementation of the Global Precipitation Measurement (GPM) mission and encourage more space agencies to contribute to the GPM constellation.
6. To take the lead to convince all PC contributors to adopt an open data sharing philosophy through an explicit agreement that all data should be freely and openly available to all requestors.
7. To adopt policies and approaches that recognize the unique status of the individual prototype constellations in different stages of development and their needs to be engineered differently.

Status of Requested Support

1. CNES is investigating two options: additional ground station at Kourou and utilizing existing ground stations at Kourou and South Africa.
2. Stephen Ward/CEOS Secretariat discussed MTVZA with ROSHYDROMET (Alexander Uspensky). ROSHYDROMET invited to 2nd Precipitation Constellation Workshop but could not participate.
3. NRSCC and NSMC/CMA invited to upcoming 2nd Precipitation Constellation Workshop but could not participate. The PC desires a POC for sample MWRI and MWHS data from the FY-3 spacecraft launched in May.
4. JAXA and ESA confirmed that it is premature for EarthCare to participate in the Precipitation Constellation.
5. NASA FY2008 enacted budget and FY2009 proposed budget fully funds GPM. JAXA GPM/DPR Project entered Phase C on 1 April 2008.
6. No change in status.
7. No change in status.



Status: **CLOSED**

Action: DA-07-03_2

Category #: 1

Primary SBA Area: Transverse

NASA Point of Contact: Steven Neeck

Due Date: 3/31/2008

Participating Organizations: NASA, JAXA, NOAA, AEB, INPE, ISRO, EC, FMI, KNMI, JMA, KMA, CNR, BMRC, LMD, ISAC, OPERA, SIMEPAR, CEDEX, UCLM, ETP-CNRS-UVSQ, German Weather Service, Cyprus Weather Service, Universities from U.S., Asia, and Europe

Participating CEOS groups: PC

Action Description

- Coordinate international GPM ground validation (GV) activities and establish the scope of joint GV projects during the year.
 - The objective of this action is to establish collaborative GV measurement and research activities between the GPM Mission and international partners to support pre-launch satellite algorithm development and post-launch product evaluation.
 - Action is important for coordinating GV assets and facilities around the world within a consistent framework to contribute to the refinement of satellite simulators and retrieval algorithms for GPM.
 - Action is also part of the effort for determining error characteristics of satellite precipitation products for the development and production of the next-generation multi-satellite global precipitation data products and for improved applications in weather forecasting and hydrological prediction.



- The 3rd International GPM GV Planning Workshop hosted by AEB/INPE was held in Buzios, Brazil, 4-6 March 2008, to develop joint research projects for investigators from the international community to collaborate with the U.S. Precipitation Measurement Mission (PMM) Science Team on GPM GV. The workshop concluded with plans for 24 joint projects from 19 nations. Of these 24 proposed activities, one has already been accepted by the PMM Program, one is in review, 11 are various stages of preparation, and 11 have been identified as potential opportunities.
- The workshop presentations are available online at <http://pindara.cptec.inpe.br/gpm/workshop/index.html>.
- A report summarizing the workshop activities and describing the general framework for international collaboration on GPM GV is in preparation for release in the summer of 2008.



Status: **CLOSED**

Action: CL-06-02_2

Category #: 1

Primary SBA Area: Climate

NASA Point of Contact: Steven Neeck

Due Date: 4/30/2008

Participating Organizations: NASA

Participating CEOS groups: PC

Action Description

- Make precipitation data available to a broad additional group of users who are more familiar with GIS than the satellite data formats. Allow easy integration of precipitation data into GIS analysis.
 - The task is to make the prototype GIS format using TIFF with world files available to the general community in full operational mode. This action allows access to precipitation data to operational and research users who use GIS extensively and for whom HDF formats are not easily accessible.



- The GIS format real-time precipitation data was put into regular operational status on 20 March 2008.
- Data are available on an anonymous ftp server for regular pickup
 - 3hr, daily and 7 day rain accumulation products
 - trmmopen.gsfc.nasa.gov
 - pub/gis directory
 - Accessed by disaster monitoring organization (Pacific Disaster Center at Maui, Hawaii)
- Historical merged data product also available but not yet on anonymous server
 - Used by researchers at University of Georgia
 - Used by U.N. World Food Programme researcher
 - Will be soon moved to anonymous server



Status: CLOSED

Action: DA-07-03_6

Category #: 1

Primary SBA Area: Transverse

NASA Point of Contact: Steven Neeck

Due Date: 6/1/2008

Participating Organizations: NASA

Participating CEOS groups: PC

Action Description

- The Precipitation Processing System (PPS) will assume Tropical Rainfall Measuring Mission (TRMM) data processing effective 1 June 2008. This action allows an early build of and risk reduction for the data processing system to be used for the successor Global Precipitation Measurement (GPM) mission. This system will allow testing the architectural characteristics of multi-satellite data merging: flexibility, extensibility, and maintainability. In addition, the action improves the access to the user community of all TRMM-based data including the production merged satellite products.



- System testing ended on 31 March 2008
- Operational Acceptance Testing (OAT) began on 1 April 2008 and was completed on 31 May 2008
- Changeover of TRMM processing to PPS was completed on 1 June 2008



Status: **CLOSED**

Action: DA-07-03_1

Category #: 1

Primary SBA Area: Transverse

NASA Point of Contact: Steven Neeck

Due Date: 8/31/2008

Participating Organizations: NASA, JAXA, CNES, ISRO, INPE, ESA, CAST/NRSCC, NOAA, NRL, EUMETSAT, DLR, CSA, Universities from the U.S. and Asia (Korea)

Participating CEOS groups: PC, WGCV (invited)

Action Description

- Complete the initial phase of the first intercomparison study undertaken by the Precipitation Measurement Missions (PMM) Science Team intercalibration working group in coordination with the CGMS/GSICS.
 - Consists of
 - Investigating algorithms for intercalibrating the brightness temperatures measured by similar, but not identical, spaceborne microwave radiometers, and
 - Comparing these algorithms using a common test data set.
 - This action is an important step in establishing how PC data should be intercalibrated at antenna and brightness temperature stage. It also examines the issues involved in using a reference satellite as part of the intercalibration.



- The working group met on 15-16 January 2008 at the University of Central Florida in Orlando, FL to discuss the preliminary study results.
 - Two categories of cross-calibration algorithms - “[brightness temperature mapping algorithms](#)” and “[limiting value algorithms](#)” - were identified. The two methods can be used to check against each other.
 - Comparison of radiative transfer codes is necessary precursor to algorithm comparison.
 - A number of sun angle effects must be addressed.
 - Wind azimuth effects were not significant.
- The working group met on 3 August 2008 in Ft. Collins, CO to discuss initial phase study results and decide on the next steps.
 - Review radiative transfer code comparisons.
 - Review BESS/CSU and UCF/JAXA inter-calibration algorithm pair-wise comparisons.
 - Review improved sun angle correction techniques.
 - CNRS representative of the CNES/ISRO Megha-Tropiques mission (planned for launch in 2009) participated and requested and is receiving support from the working group in determining cross-calibration techniques for the mission.
 - A summary report was completed and will be placed on the working group server (ktb.engin.umich.edu).



Status: **CLOSED**

Action: WA-08-P1_3

Category #: 2

Primary SBA Area: Water

NASA Point of Contact: Steven Neeck

Due Date: 6/1/2008

Participating Organizations: NASA

Participating CEOS groups: PC

Action Description

- Conversion of HDF formatted 3hr global rainrate products to GIS formatted rain accumulation products to become fully operationally and available to all users (same as Category 1 Action CL-06-02_2).



- The GIS format real-time precipitation data was put into regular operational status on 20 March 2008. Data are available on an anonymous ftp server for regular pickup: <ftp://trmmopen.gsfc.nasa.gov/pub/gis/>. Historical merged data products are also available but not yet on an anonymous server (see CL-06-02_2).



Status: **CLOSED**

Action: WA-08-P1_4

Category #: 2

Primary SBA Area: Water

NASA Point of Contact: Steven Neeck

Due Date: 6/1/2008

Participating Organizations: NASA

Participating CEOS groups: PC

Action Description

- The Precipitation Processing System (PPS) will enable users to create dynamic geographic subsets of TRMM rain products.
- This feature will allow users to retrieve precipitation data only over the area for which they wish to integrate or study *in situ* data.



- The operational capability for users to create dynamic geographic subsets of TRMM rain products was achieved with the assumption of TRMM data processing by the Precipitation Processing System (PPS) (see DA-07-03_6).
- Completed on 1 June 2008.



Status: OPEN

Action: WE-06-02_8

Category #: 2

Primary SBA Area: Weather

NASA Point of Contact: Steven Neeck

Due Date: 12/31/2008

Participating Organizations: NASA

Participating CEOS groups: PC

Action Description

- Prototype flood monitoring and landslide warning products from Tropical Rainfall Measuring Mission (TRMM) data will be improved and made available operationally.



- Planning for operationalization initiated with the Pacific Disaster Center, Maui, Hawaii.



Status: OPEN

Action: WE-06-02_9

Category #: 2

Primary SBA Area: Weather

NASA Point of Contact: Steven Neeck

Due Date: 12/31/2008

Participating Organizations: NASA

Participating CEOS groups: PC

Action Description

- Implement improved algorithm (Version 6) for the production of Merged Tropical Rainfall Measuring Mission (TRMM) Multi-satellite Precipitation Products.



- Completed development and initial testing. Follow-up testing scheduled for late September.



Status: OPEN

Action: DA-07-03_9

Category #: 2

Primary SBA Area: Transverse

NASA Point of Contact: Steven Neeck, Riko Oki

Due Date: 12/31/2008

Participating Organizations: NASA, JAXA

Participating CEOS groups: PC

Action Description

- Continue Tropical Rainfall Measuring Mission (TRMM) operations through 2008. Action is necessary to support GPM Preparatory Phase of PC.
- Complete of 11 years of TRMM 3-hr, multi-satellite standard products (TMPA, 3B42).



- TRMM flight operations and data processing fully funded through September 2009 (preliminarily through September 2011).
- Spacecraft and instruments remain in good health with robust consumables.



Status: OPEN

Action: CL-06-02_17

Category #: 2

Primary SBA Area: Climate

NASA Point of Contact: Steven Neeck

Due Date: 12/31/2008

Participating Organizations: NASA

Participating CEOS groups: PC

Action Description

- Implement improved algorithm (Version 6) for the production of Merged Tropical Rainfall Measuring Mission (TRMM) Multi-satellite Precipitation Products (same as WE-06-02_9).



- Completed development and initial testing. Follow-up testing scheduled for late September (see WE-06-02_9).



Status: **OPEN**

Action: DA-07-03_10

Category #: 2

Primary SBA Area: Transverse

NASA Point of Contact: Steven Neeck, Riko Oki

Due Date: 3/1/2009

Participating Organizations: NASA, JAXA

Participating CEOS groups: PC

Action Description

- Continued progress on moving the Global Precipitation Measurement (GPM) mission from formulation to implementation phase at NASA and JAXA.
- Major near-term milestones are:
 - GPM DPR (JAXA) PDR (1Q2008)
 - GPM DPR (JAXA) Delta PDR (2Q2008)
 - GPM Core Spacecraft/Mission (NASA) PDR (4Q2008)
 - GPM Mission (NASA) Confirmation (1Q2009)



- The following major near-term milestones have been completed:
 - GPM DPR (JAXA) PDR (1Q2008)
 - GPM DPR (JAXA) Delta PDR (2Q2008)



Status: CLOSED

Action: WA-08-P1_7

Category #: 4

Primary SBA Area: Water

NASA Point of Contact: Steven Neeck

Due Date: 11/30/2008

Participating Organizations: NASA

Participating CEOS groups: PC

Action Description

- Global Precipitation Measurement (GPM) mission ground validation (GV) working group use satellite and ground data to investigate key issues of combination over co-located sites.
 - Develop and implement software to perform statistical studies of coincident precipitation estimates made by the TRMM radar and a network of operational ground radars within the U.S. to identify areas of agreement and discrepancies to guide satellite algorithm refinement.



- Development and implementation of software completed in U.S and studies initiated. This software has also been provided to meteorological agencies in Australia and Korea (BOM and KMA) to conduct similar studies.