CERES Meeting Objectives

1) CERES Instrument, Algorithm and Validation Status:
   - Status of NASA & CERES Project
   - CERES Terra, Aqua and SNPP SW/LW/TOTAL Channel Calibration Update
   - CERES FM6 and RBI Update
   - CERES SNPP SSF Edition-1: VIIRS Cloud Algorithm Status
   - CERES GEO Cloud Algorithm Status
   - CERES Edition-4 ADM Development status
   - SOFA, SARB and TISA Working Group Reports
   - Data Management Team Update: Terra/Aqua/SNPP
   - Atmospheric Sciences Data Center (ASDC) Update
   - CERES Education Outreach

2) Invited Presentations Session

3) Contributed Science Presentations
CERES Team Leads

- Principal Investigator: Norman Loeb
- Project Scientist: Kory Priestley

CERES Working Groups:
- Instrument: Kory Priestley
- ERBElike: Takmeng Wong
- Clouds: Pat Minnis
- Inversion: Wenying Su
- SOFA: David Kratz
- SARB: Seiji Kato
- TISA: David Doelling
- FLASHFlux: Paul Stackhouse & David Kratz
- Data Management: Chris Harris (Acting)
- ASDC: John Kusterer
- Five CERES instruments on 3 satellites (Terra, Aqua, SNPP) are flying.
- FM6 will be fly on JPSS-1 in 2016 and the CERES Follow-on (RBI) will fly on JPSS-2 in 2021.
2013 Terra and Aqua Senior Review

- Proposal to continue missions for next 2 years
- Science highlights involving CERES and other Terra & Aqua instruments
- Publication, citation, processing and distribution metrics
- Health of CERES Instruments
- Summary of FY12-13 accomplishments, FY14-15 plans and budget, projection for FY16-17

Schedule

Proposal due: March 2013
Panel meeting: May 1, 2013
Publication of the panel’s report: June 2013
New budget guidelines and instructions to projects: July 2013
Projects revised implementation plans to ESD: August 2013
Specific CERES Themes:
- Accomplishments during past 2 years. Plans for next 2 years.
- Continue to monitor instrument health, safety and performance.
- Continue Edition3 processing.
- Complete Edition 4 algorithm improvements, validation studies.
- Improving efficiency of producing CERES data products (e.g., CATALYST).
- Improving efficiency of validation approach by exploiting CERES subsetting/visualization tool.
- Overhaul of CERES ERBE-Like using ANN approach.
### Senior Review Panel Scores

<table>
<thead>
<tr>
<th>Mission</th>
<th>Science Scores</th>
<th>Summary Science Score</th>
<th>Utility Score</th>
<th>Technical Risk</th>
<th>Conclusion</th>
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**Table 1: Summary of mission-specific findings. All science scores are on a 1-5 scale with 1 being the lowest ranking of “poor” and 5 being the highest ranking of “excellent”. *Additional commentary or conditions on the panel’s scores and/or conclusions are noted in the mission findings summary below.**
Phase F Close-Out Plan

- Describe and provide budget for activities that would be needed in FY2014 and FY2015 in the event that the data flow from Terra and/or Aqua were to terminate on October 1, 2013.

- The following is a list of new activities that will need to be performed during close-out:

1) Catalog and prepare all pre-launch instrument reports for archiving.

2) Prepare Instrument Operations documentation collected during mission for archiving. Much of this is available in CERES web pages.

3) Collect, archive and catalogue data documentation for all publically distributed CERES data products. Includes CERES Data Quality Summaries, sample read software, Readme files, etc., and other relevant documents (journal articles, technical reports, etc.).

4) Update software documentation and archive latest version of level 1-3 code and ancillary input data used prior to mission termination so that code can be run at a later date should the need arise (e.g., for comparison purposes during subsequent reprocessing of CERES record).

5) Update software documentation and archive latest version of level 1-3 code that is used to produce ancillary input data used in production of CERES data products. This includes key validation code used in the process of creating the ancillary inputs.
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EBAF TOA LW CRE Anomaly (Global Mean)

March - 2000 to February - 2013 ** Anomaly Field **

TOA CRE Longwave Flux

Min/Max Values: -1.5 - 1.5

Save Data as ASCII File | Save Image as PNG

2-nd Parameter: EBAF:TOA CRE Longwave Flux on <MM>/2000-2013>
CERES FM5 SNPP

- Calibrated VIIRS radiances from GSFC Land PEATE (Xiong) in April 2013.
- CERES FM5 time-varying gains included in SSF Edition1 via “inversion-only” run
- Consider also using CriS for CO2 bands in Edition 2?
<table>
<thead>
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<th>Product</th>
<th>Science Delivery to DMT</th>
<th>Target Public Release</th>
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<td>May 9, 2014</td>
<td>July 7, 2014</td>
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Future Earth Radiation Budget Missions

• The current plan is to transfer responsibility for sustained climate measurements from NOAA to NASA.

• CERES FM6 to launch on JPSS-1 in Nov 2016.
  - CERES team to produce Earth Radiation Budget Climate Data Records using CERES FM6, closely following FM5/SNPP approach.

• NASA is studying the best options and approaches for economically providing RBI in time for the November 2021 launch of JPSS-2 spacecraft.

• Radiation Budget Instrument (RBI) Status:
  - Draft RFP released in April, 2013
  - Industry-Day April 30
  - Official RFP release: June 14
  - Award: Spring 2014
  - RBI delivery date: Spring 2019.
• DOE purchased Ches Light to create RFORE -- Reference Facility for Offshore Renewable Energy.

• If RFORE continues to stay on track, offshore construction will begin Summer 2015.

• The 100 m tower will be instrumented with precision anemometers, barometers, and thermometers.

• One or more wind profiling lidars or radars are also planned.

• COVE BSRN instruments and Cimel will be located on top of the new tower.

• COVE in situ instruments and MFRSR will be located near helopad level, and possibly a 2nd BSRN tracker and Cimel.

• COVE MPLNET will either be located at helopad level or removed and located on CAPABLE site at LaRC.

• Meanwhile, the COVE project is still collecting data.

• After a DOE-mandated safety hiatus (Nov 2012 to July 2013), COVE systems are fully operational again.
Upcoming Conferences & Meetings of Interest

**Fall American Geophysical Union**
- December 9–12, 2013, San Francisco, CA

**94th AMS Annual Meeting**
- February 2–6, 2014, Atlanta, GA

**Spring CERES Science Team Meeting**
- April 29–May 1, 2014, NASA LaRC

**European Geophysical Union General Assembly**
- April 27–May 2, 2014, Vienna, Austria

**14th AMS Conference on Atmospheric Radiation & Cloud Physics**
- July 7–11, 2014, Boston, MA

**IGARSS 2014**
- July 13–18, 2014, Quebec City, Canada

**7th International Science Conference on the Global Energy and Water Cycle**
Other News

• SORCE spacecraft (launched Jan 2003) is currently operating in an ‘emergency’ mode due to the loss of another battery cell.
• There is currently no data beyond July 30, 2013.
• SORCE team is preparing the spacecraft software & operations to support a campaign to ensure overlapping measurements between SORCE and Total Solar Irradiance Calibration Transfer Experiment (TCTE) in December 2013.
  • TCTE: Total Solar Irradiance Calibration Transfer Experiment.
    - Will fly onboard a U.S. Air Force Space Test Program spacecraft.
    - Launch date: November 4, 2013
    - Launch location: Wallops Island, Virginia
    - Launch vehicle: Minotaur I
    - Mission duration: 18 months
• Following the intercalibration campaign, effort will focus on returning SORCE back to continuous (daily) science data acquisition.
• CERES team is evaluating RMIB TSI composite (mainly DIARAD/VIRGO instrument on SOHO) as alternate source of solar irradiance data.
• CALIPSO – Functioning nominally
• CloudSat – Returned to the A-Train. Nominal Daylight Only Operations (DO-Op) continue.
Other News

- Deep Space Climate Observatory (DSCOVR) is to be launched in early 2015.
- Positioned at the Sun-Earth L1 Lagrangian point (1.5 million kilometers from Earth) to provide early warning of approaching solar storms. It will also have a continuous view of the sun and the sunlit side of the Earth.
- Earth-Viewing Instruments: EPIC (spectral imager; 8-14 km spatial resolution); NISTAR (broadband; full view of sunlit side of Earth).
- The DSCOVR mission is a partnership between NOAA, NASA and the U.S. Air Force:
  - NOAA will operate the DSCOVR mission.
  - NASA refurbished DSCOVR satellite and instruments. Is developing the ground system.
  - The U.S. Air Force is providing the SpaceX Falcon 9 launch vehicle for DSCOVR mission.
Global spectral images of the sunlit side of the Earth. Wavelength spans ultraviolet and near infrared. 4 megapixel CCD sensitive over entire wavelength with 8-14 km resolution.
Earth radiation data from 4-channel Radiometer
- visible to far infrared (0.2-100 μm) channel to measure total radiant power in UV, visible, and infrared wavelengths
- solar (0.2-4 μm) channel to measure reflected solar radiance in UV, visible and near infrared wavelengths
- near infrared (0.7-4 μm) channel to measure reflected IR solar radiance
- photodiode (0.3-1 μm) channel for calibration reference
End
Global TOA **All-Sky** Radiation Anomalies
(CERES_EBAF_Ed2.7; 03/2000 – 06/2013)

**Absorbed Solar**

**– Emitted LW**

**NET Radiation**

Year
Upper Ocean Heating Rate and Net TOA Radiation (Annual Mean)

Ocean Heating Rate and Net Radiation (W m⁻²)

Year:
- 1995
- 2000
- 2005
- 2010

Legend:
- Willis et al. (2004)
- PMEL/JPL/JIMAR (0-700 m) Updated June 2013
- PMEL/JPL/JIMAR (0-1,800 m) Updated June 2013
- ERBS Net TOA (Wong et al. 2006)
- CERES EBAF Ed2.7 Net TOA
- NODC
- Hadley
- PMEL/JPL/JIMAR (0-700 m; OLD)

Net TOA:
- 1995
- 2000
- 2005
- 2010

Legend:
- Willis et al. (2004)
- PMEL/JPL/JIMAR (0-700 m; OLD)
- PMEL/JPL/JIMAR (0-700 m) Updated
- PMEL/JPL/JIMAR (0-1,800 m) Updated
- ERBS Net TOA (Wong et al. 2006)
- CERES EBAF Ed2.7 Net TOA