CERES NEWS CCCM
RelA
Data Quality Summary

Data product:	**CALIPSO CloudSat CERES and MODIS (CCCM)**
Data set:	**Aqua (Instruments: CALIPSO, CALIOP; CloudSat, CPR; CERES, FM-3; MODIS)**
Data set version:	**RelA2 and RelA3**

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Nature of CCCM Product

The CALIPSO-CloudSat-CERES-MODIS (CCCM) data set integrates measurements from the Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observations (CALIPSO) Cloud-Aerosol Lidar with Orthogonal Polarization (CALIOP), CloudSat Cloud Profiling Radar (CPR), Clouds and the Earth's Radiant Energy System (CERES), and the Moderate Resolution Imaging Spectroradiometer (MODIS) data. The cloud and aerosol properties from CALIOP and cloud properties from the CPR are matched to a MODIS pixel and then an Aqua CERES footprint. The product contains only the CERES footprint in each scan that has the highest CALIPSO and CloudSat ground track coverage. The product consists of all cloud and aerosol properties derived from MODIS radiances included in the Single Scanner Footprint (SSF) product and computed irradiances included in the Cloud Radiative Swath (CRS) product. Two sets of SSF variables are including the CCCM data. One set covers the entire CERES footprint and the other set is only over CALIOP and CPR ground track. CERES derived top-of-atmosphere (TOA) shortwave, longwave and window irradiances by angular distribution models are also included. In addition, irradiance profiles computed by a radiative transfer model using MODIS, CALIOP, and CPR derived aerosol, clouds, and surface properties are included in the product. Furthermore, MODIS-derived cloud properties from the algorithm that incorporates CALIOP and CPR cloud information are also included. MODIS-derived cloud properties and TOA irradiances derived from CERES radiances are produced by the same algorithm that produces CERES SSF and CRS products. However, the CCCM product should not be considered as a climate data record since various input data product versions and algorithm modifications will occur along the course of the measurement period. The scan and packet numbers unique to the CERES footprint provide the means to match the data to other CERES products, although the CCCM product contains more near nadir CERES footprints compared with SSF and CRS products. The resulting HDF granule contains 24 hours of data.

Data Used for Producing CCCM Data

Data used for producing currently available CCCM data are:

- CALIPSO
    1. CALIPSO_VFM:CAL_LID_L2_VFM-Prov-V2-01.YYYY-MM-DDTHH-*hdf
    2. CALIPSO_05kmALay:CAL_LID_L2_05kmALay-Prov-V2-01.YYYY-MM-DDTHH-*hdf
    3. CALIPSO_05kmCLay:CAL_LID_L2_05kmCLay-Prov-V2-01.YYYY-MM-DDTHH-*hdf
    4. CALIPSO_05kmCPro:CAL_LID_L2_05kmCPro-Beta-V2-01.YYYY-MM-DDTHH-*hdf

- CloudSat
    1. CLOUDSAT_CLDCLASS:YYYYJDY*_CS_2B-CLDCLASS_GRANULE_P_R04_E00.hdf
    2. CLOUDSAT_2B-TAU:YYYYJDY*_CS_2B-TAU_GRANULE_P_R04_E02.hdf
    3. CLOUDSAT_CWC-RO:YYYJDY*_CS_2B-CWC-RO_GRANULE_P_R04_E01.hdf

- MODIS (retrievals are done by the CERES cloud algorithm)
    1. MAC: MAC021S1.AYYYYJDY.HHMM.*.hdf
    2. MAC_GEO: MAC03S1.AYYYYJDY.HHMM.*.hdf
    3. MAC_AEROSOL: MAC04S1.AYYYYJDY.HHMM.*.hdf

- CERES
    1. Edition1-CV (Cal/Val)

Cautions, Helpful Hints, and Known Problems

- Because CALIPSO 5 km cloud profile product used in CCCM are beta version, the CCCM-53 through CCCM-60 variables are beta version (see Data Product Catalog (PDF) for the variable names).

- Users also need to read CALIPSO, CloudSat, CERES, and MODIS quality summary or similar documents before they analyze variables from those instruments.
    - **CALIPSO:** CALIPSO Data Quality Statements
    - **CloudSat:** CloudSat Standard Data Products
    - **CERES and MODIS:** CERES SSF Aqua Edition2C Data Quality Summary
- CALIPSO, CloudSat and MODIS data are separated and stored by CERES footprints. For each CERES scan line, a CERES footprint that contains largest CALIPSO and CloudSat ground track was kept in CCCM.
- Besides cautions related to variables mentioned in CALIPSO and CloudSat documents, other cautions in using variables in this product.
    - **CERES flux:**
      TOA shortwave flux-downwards (SSF-38a) contains a default value. The TOA SW downward can be obtained from CCCM-87.
    - **MODIS derived cloud properties:**
      Some of optical thicknesses derived over snow/sea ice surface are unrealistically large.
    - **Radiative flux:**
      Radiative computations over snow/sea ice for all-sky conditions are affected by unrealistically large cloud optical thicknesses mentioned above.

Feedback and Questions

For questions or comments on the CERES-NEWS Quality Summary, contact the User and Data Services staff at the Atmospheric Science Data Center.

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