Climate Modeling Best Estimate (CMBE) Dataset – New Additions

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Introduction

The **Climate Modeling Best Estimate (CMBE)** data was created to serve the needs of climate model developers.

The dataset was assembled from the **highest quality ARM observational and Value-Added Product (VAP) data** relevant to climate model evaluation and diagnostics.

The temporal resolution was chosen to be comparable with the climate model **resolution of one hour**. It is a multi-year dataset over the 5 primary ARM sites at **SGP, NSA and TWP**.

Detailed description of the data and the algorithms:
http://science.arm.gov/wg/cpm/scm/best_estimate.html

SGP – ARM Southern Great Plains Site,   **NSA** – North Slope of Alaska,   **TWP** – Tropical Western Pacific

CMBE Purpose

• **Encourage** greater use of ARM data by the **modeling community.**

• Create **highly polished, multi-year datasets** suitable for modelers.

• Facilitate the use of ARM observational data by model developers in the **model diagnosis, evaluation and improvement where possible.**

New Additions

Previous version of the CMBE dataset (CMBE v2) consists of **hourly averaged**:

- **cloud fraction**   (**ARSCL,TSI**),
- **liquid water path & precipitable water** (**MWRRET**),
- **surface radiation fluxes** (**QCRAD**).

New additions:

The CMBE v3 dataset is being extended by

- **soundings**   (**sondewnpn, lssonde**),
- **surface precipitation**   (**SMOS**),
- **surface heat fluxes**   (**BAEBBR**),
- **surface meteorology fields**   (**SMOS**),
- **top of the atmosphere radiative fluxes** (**satellite**),
- **Numerical Weather Prediction (NWP) model analysis data.**

The CMBE data is a condensed and integrated subset from ACRF data collection with measurements that have undergone stringent quality controls and are usually "best estimates" derived from several instruments and /or VAPs.
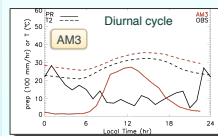
CMBE use at NCAR and GFDL

CMBE dataset is used in evaluation of the **NCAR** and the **GFDL** climate models.

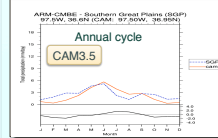The following runs were used in the examples below:
- **GFDL AM3** - 12-y JJA mean from 1996-2007,
- **NCAR CAM3.5** - an annual climatology from a sample 10-year run.

Precipitation and 2-meter Temperature at SGP

GFDL AM3 vs. CMBE

• AM3 fails to simulate nocturnal precip. and overestimates the mid-day.
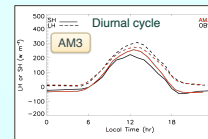
• AM3 shows warm bias in surface temperature.

NCAR CAM3.5 vs. CMBE

• CAM3.5 overestimates the observed precip. during summer months and underestimates during cold seasons at SGP.
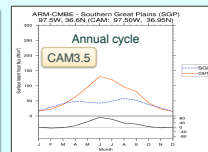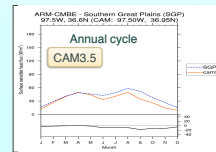
Sensible and Latent Heat at SGP

GFDL AM3 vs. CMBE

• AM3 overestimates SH and underestimates LH, consistent with its warm and dry bias in temperature over the central US.
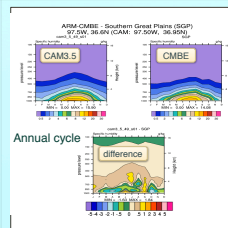

NCAR CAM3.5 vs. CMBE

• CAM3.5 overestimates LH in warm months (Mar.-Oct.) and slightly underestimates SH over Jun-Dec period.

Specific Humidity at SGP

NCAR CAM3.5 vs. CMBE

• CAM3.5 generally underestimates the moisture in lower troposphere and slightly overestimates it in middle and upper levels.

• CAM3.5 shows significant moist bias during summer months near the surface.

Web Access

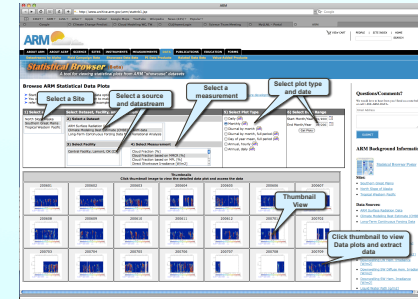The CMBE data is located in the new ARM Data Category: "Showcase Data Sets"

Data download

http://iop.archive.arm.gov/arm-iop/0showcase-data/cmbe/

Browse Plots, Download Statistics and Extract Data

Statistical Browser user interface

(**http://www.archive.arm.gov** and **click Statistical Browser**)


The **daily, monthly and yearly plots** provide a detailed view of the **original data** as well as the **hourly averaged CMBE** data together with the **QC Flag** and the **standard deviation**.

Users will be able to:

• **view** daily, monthly and yearly **CMBE plots**

• **extract the statistical data** behind the statistical graph

• **obtain the CMBE data** that were used in calculating the statistics,

• **order the original ARM data files** that were used in creation of CMBE data.
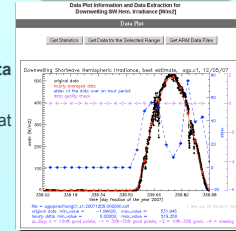
Future Work

- The **CMBE v3** release in **May 2009**.
- The **high temporal resolution** version of CMBE .
- The CMBE data for **ARM Mobile Facilities (AMFs)**.
- **Updating** to the most current available original data.
- The **statistical summaries** for the CMBE.