Climate Modeling Best Estimate (CMBE) Dataset

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Introduction

A new ARM product, the **Climate Modeling Best Estimate (CMBE)** dataset, 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 data files from the 5 primary ARM Climate Research Facility sites at SGP, NSA and TWP.

The CMBE dataset consists of **hourly averaged**

- **cloud fraction** (narrow field-of-view and total sky) (**ARSCL,TSI**),
- **liquid water path** and **precipitable water** (**MWRRET**),
- **surface radiation fluxes** (**QCRAD**).

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

The Purpose

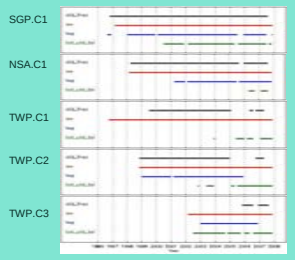
- **Encourage** greater use of ARM data by the **modeling community**
- Create **highly polished, multi-year datasets** suitable for modelers
- Move toward the future availability of **statistical summaries for high quality ARM products** (plots and statistical tables)

The Availability

The CMBE data is available for the 5 main ARM sites and for the duration of the observational data

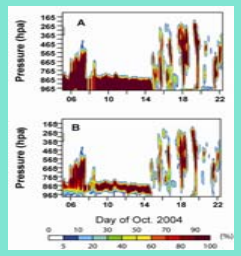
SGP.C1	Lamont, OK	1996 -- 2007
NSA.C1	Barrow, AK	1998 -- 2007
TWP.C1	Manus Island, PNG	1996 -- 2007
TWP.C2	Nauru	1998 -- 2007
TWP.C3	Darwin,AU	2002 -- 2007

Statistical Summary of data availability



The Algorithm and QC

Improved Algorithm for Cloud Fraction from ARSCL

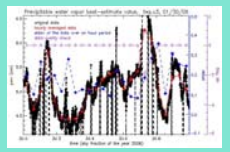


(A) Original method
use MMCR and Lidar only
→ clouds contaminated with precipitating ice beneath cloud base

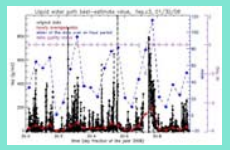
(B) New method
use Ceilometer and Lidar determined best estimate of cloud base to remove precipitating ice beneath cloud base

Improved Algorithm for LWP and PWV

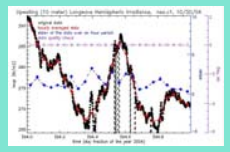
The original MWRRET data contain some suspicious data points.



Additional quality controls were applied:
- max and min check
- outliers removed
- time variability check



Improved Algorithm for QCRAD



The QCRAD data were improved to exclude bad data points.

Additional quality controls:
- max and min check
- outliers removed

Direct SW (SWDIR) added
SWDIR = SWDN – SWDIF

QC Flag and Standard Deviation provided

Each variable has a corresponding QC Flag added to indicate how many data points were valid during the one hour averaging interval

- **qc flag = 0** - more than 50% of data are valid over the hour time period,
- **qc flag = -1** - more than 30% but less than 50% of the data are valid,
- **qc flag = -2** - more than 10% but less than 30% of the data are valid,
- **qc flag = -3** - less then 10% valid data points,
- **qc flag = -4** - means missing data point

The Standard Deviation over an hour period is also calculated.

Web Access

Located in the Showcase Section of the ARM Archive

The CMBE dataset is located in the **new ARM Data Category "Showcase Data Sets"** with:
- condensed and integrated subset of results from the ARM CRF data collection
- targeted for a particular research community
- contain only a few measurements
- measurements are usually "best estimates" derived from several instruments and/or VAPS.

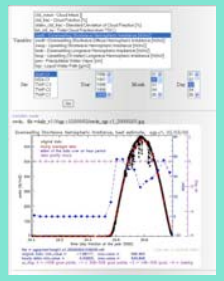
To download the data go to:
http://iop.archive.arm.gov/arm-iop/0showcase-data/cmbe/

Quick Look Daily, Monthly, Yearly Plots

The plots as well as detailed description of the algorithms are available from the CMWG page:
http://science.arm.gov/wg/cpm/scm/data/best_estimate/

The daily 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**.

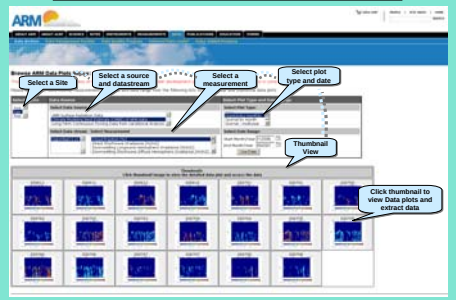
The monthly and yearly plots provide a view of the **hourly averaged CMBE** data, the **QC Flag** and the **Standard Deviation** in the .



ARM Archive Statistical Views Interface

The ARM Archive is developing a new interface to display graphs for Statistical Views from CMBE and other showcase datasets. Related statistical tabulations at various time scales will also be available.

http://www.archive.arm.gov/arm/stattnb1.jsp



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