README Document for AMSR-MODIS Boundary Layer Water Vapor Products

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Revision History

Revision Date	Changes	Author
7/6/2016	Original Document	Thomas Hearty
10/4/2016	Added comments from Luis Millán	Thomas Hearty
6/5/2017	Added information about the data gap	Thomas Hearty

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1.0 Introduction

This document provides basic information for using AMSR-MODIS **Daily** and **Monthly** Boundary Layer Water Vapor products (**AMDBLWV** and **AMMBLWV**, respectively) that are described in more detail by Millán et al. (2016).

1.1 Dataset/Mission Instrument Description

The boundary layer water vapor is derived using microwave and near-infrared imagery. The microwave observations are from the Advanced Microwave Scanning Radiometer (AMSR) instruments (AMSR-E on the Aqua spacecraft and AMSR-2 on the Global Change Observation Mission–Water [GCOM–W1] satellites). The near-infrared observations are from the Moderate Resolution Imaging Spectroradiometer (MODIS) on the Aqua spacecraft.

1.2 Data Gap

There is a known data gap from April 2011 after the AMSR-E instrument stopped working through June 2012 afterwhich the AMSR-2 instrument began opperating.

1.3 Algorithm Background

The algorithm is described in detail in a publication by Millán et al. (2016). Briefly, the boundary layer water vapor is derived by calculating the difference between the total column water vapor derived from the AMSR-E and AMSR-2 microwave instruments and the water vapor above the clouds derived from the MODIS infrared instrument.

1.4 Data Disclaimer

The data should be used with care and with the proper citations. The AMSR-MODIS **Daily** Boundary Layer Water Vapor product may be acknowledged using the following DOI:

10.5067/MEASURES/AMDBLWV

and The AMSR-MODIS **Monthly** Boundary Layer Water Vapor product may be acknowledged using the following DOI:

10.5067/MEASURES/AMMBLWV.

2.0 Data Organization

The AMSR-MODIS daily (AMDBLWV) and monthly (AMMBLWV) Boundary Layer Water Vapor products are averaged on a 1 degree x 1 degree grid. The daily values are reported once per day for each grid cell and the monthly values are reported once per month. Fill values of -999.99 are used for grid cells with no valid data.

2.1 File Naming Convention

The file names of the AMSR-MODIS Daily Boundary Layer Water Vapor (AMDBLWV) product are defined as follows:

BLWV_D_V01.00_YYYYdDOY.nc4

Where:

- *YYYY = 4 digit year*

- *DOY = 3 digit day of they year.*

The file names of the *AMSR-MODIS* Monthly Boundary Layer Water Vapor (AMDBLWV) product are defined as follows:

BLWV_M_V01.00_YYYYmMM.nc4

Where:

- YYYY = 4 digit year

- MM = 2 number of the month.

Sample Daily and Monthly file names are listed below:

BLWV_D_V01.00_2006d001.nc4

BLWV_M_V01.00_2006d01.nc4.

2.2 File Format and Structure

The files are stored in netCDF-4 format.

3.0 Data Contents

Spatial Grid: 2D 1 degree grid (Lon and Lat are 1D)

Dimension of other variables: Lat = 180, Lon =360

The units and longname and fill values are given in variable attributes called "units", "long_name", and "_FillValue".

Data Groups:

GroupName	Description
BL_CTH	Boundary Layer Cloud Top Height
BL_CTP	Boundary Layer Cloud Top Pressure
BL_CTT	Boundary Layer Cloud Top Temperature
BL_CWV	Boundary Layer Column Water Vapor
BL_SST	Sea Surface Temperature
Total_CWV	Total Column Water Vapor

Data Fields:

Data Field Name	Description
Counts	Number of points in each bin
EndDate	End Date
Lat	Latitude
Lon	Longitude
maximum	Maximum value of variables in bin
minimum	Minimum value of variables in bin
StartDate	Start Date
std_dev	Standard deviation of variables in bin
Time	Time
Value	Average value of variables in bin

4.0 Options for Reading the Data

4.1 Command Line Utility

ncdump
The ncdump tool can be used as a simple browser for HDF data files, to display the dimension names and sizes; variable names, types, and shapes; attribute names and values; and optionally, the values of data for all variables or selected variables in a netCDF file. The most common use of ncdump is with the –h option, in which only the header information is displayed.

ncdump [-c|-h] [-v ...] [[-b|-f] [c|f]] [-l len] [-n name] [-d n[,n]] filename
Options/Arguments:
[-c] Coordinate variable data and header information
[-h] Header information only, no data
[-v var1[,...]] Data for variable(s) <var1>,... only data
[-f [c|f]] Full annotations for C or Fortran indices in data
[-l len] Line length maximum in data section (default 80)
[-n name] Name for netCDF (default derived from file name)
[-d n[,n]] Approximate floating-point values with less precision filename File name of input netCDF file

4.2 A tool for simple visualization

Panoply, developed at the Goddard Institute for Space Studies (GISS), is compliant with NetCDF Climate and Forecast (CF) Metadata Convention that is gaining popularity. A strength of the tool is that data can be previewed "remotely" over the network – i.e. user can preview file content of HDF files stored on a remote site, without downloading them. Panoply is available from GISS:

http://www.giss.nasa.gov/tools/panoply/

4.3 Programming Languages

The data can be read using major programming languages such as Fortran, C, Java, IDL, Matlab, and Python.

5.0 Data Services

Data services and access methods can be found on the dataset landing pages for the daily and monthly boundary layer water vapor products.

http://disc.sci.gsfc.nasa.gov/datacollection/AMDBLWV_01.html

http://disc.sci.gsfc.nasa.gov/datacollection/AMMBLWV_01.html

If you need assistance or wish to report a problem:
Email: gsfc-help-disc@lists.nasa.gov
Voice: 301-614-5224
Fax: 301-614-5268
Address:
Goddard Earth Sciences Data and Information Services Center NASA Goddard Space Flight Center Code 610.2 Greenbelt, MD 20771 USA

7.0 Acknowledgements

References

Millan, L., Lebsock M., Fishbein, E., Kalmus, P., & Teixeira, J. (2016), "Quantifying Marine Boundary Layer Water Vapor beneath Low Clouds with Near-Infrared and Microwave Imagery", Journal of Applied Meteorology and Climatology, 55, 213-225.