

March 3rd, 2009 – Ludovic Bariteau

Description of the ceilometer (CL31) data files from the 2008 African Monsoon Multidisciplinary Analysis (AMMA) aboard the NOAA Ship Ronald H. Brown. In this document, the following notation has been used:

- *jd* for Julian day.
- *mm*, *dd* and *yyyy* for month, day and year respectively.

A. Raw data

The output files for the ceilometer are located in the folder called *AMMA_2008\RHB\ceilometer\Raw*.

B. “Processed” data

A program was used to reformat the raw data into user friendly files:

- *cloudbaseyyyyymmdd_jd.txt* is the conversion of the raw hexadecimal data into ASCII format.

- 1 N, where N=number of cloud layers (0-3) or a code (4-5) for marginal clouds
- 2 Height of the first layer in meters (NaN unless N>0)
- 3 Height of the second layer in meters (NaN unless N>1)
- 4 Height of the third layer in meters (NaN unless N>2)
- 5 Hour
- 6 Min
- 7 Sec
- 8 Julian Day

- *backscatteryyyyymmdd_jd.mat* is raw variables saved into a binary MAT-file form. To retrieve the data, use the *load* function of Matlab.

- 1 UTC time in decimal hours
- 2 Range of each gate in km
- 3 Sensitivity normalized backscatter coefficient in the unit $\text{srad}^{-1} \cdot \text{km}^{-1}$

These files are saved in the folder *AMMA_2008\RHB\ceilometer\Processed*.

C. Images

From the binary MAT-files, daily graphs have been produced. These plots can be found in the folder *AMMA_2008\RHB\ceilometer\Raw_Images*.

- *backscatteryyyyymmdd_jd.jpg* is the time-height color plot of the ceilometer backscatter.
- *cloudbaseyyyyymmdd_jd.jpg* is the time-height plot of the cloud base.

D. Final data

The final files of our process are the files *AMMA 2008ceilo_time.txt* where time = 15s, 10-min or 1-hr. A program was run to read all available *cloudbaseyyyyymmdd_jd.txt* files and write a new file (*AMMA 2008ceilo_15s.txt*) that contains the basic cloud base height information:

- 1 Julian date
- 2 N, where N=number of cloud layers (0-3) or a code (4-5) for marginal clouds
- 3 Height of the first layer in meters (NaN unless N>0)
- 4 Height of the second layer in meters (NaN unless N>1)
- 5 Height of the third layer in meters (NaN unless N>2)

The same program also computes cloud statistics at 10-min and 60-min time resolution. New files are written on these statistics with the following data columns.

The data files *AMMA 2008ceilo _10min.txt* and *AMMA 2008ceilo _1hr.txt* are:

- 1 Julian date
- 2 Number of samples
- 3 Number of clear samples
- 4 Number of one cloud layer samples
- 5 Number of multiple cloud layer samples
- 6 Number of samples with N=4, obscured
- 7 Number of samples with N=5, partially obscured
- 8 Clear fraction
- 9 Cloudy fraction
- 10 Cloudy fraction including obscured
- 11 Median cloud height (m)
- 12 Height with 16% clouds lower
- 13 Height with 16% clouds higher

You can find these files in the folder *AMMA_2008\RHB\ceilometer\Processed*.