

Howard University Profiling Microwave Radiometer

Authors

PI: Belay Demoz

bdemoz@umbc.edu

<http://jcet.umbc.edu/jcet-faculty/person/lb75334>

Contact for questions / information about the data:

Kevin Vermeesch

kevin.c.vermeesch@nasa.gov

kvermees@umbc.edu

1. Data Set Overview

This data set contains surface and vertical profile data of temperature and humidity derived by a Radiometrics MP-3000A profiling microwave radiometer. The radiometer was located at the PECAN FP-2 site in Greensburg, KS (37.60695°N, -99.27606°E). Figure 1 shows the radiometer as it was positioned during data acquisition. Data collection began on 02 June 2015 and ended on 15 July 2015.

2. Instrument Description

All information about the radiometer can be found in the operator's manual in the link below:

<http://radiometrics.com/data/uploads/2014/08/MP-3000A-Operator-Manual-RevG.pdf>



Figure 1. Howard University microwave radiometer at its location in Greensburg, KS (FP-2) during PECAN. The camera is facing southwest.

3. Data Collection and Processing

The data are normally collected into daily files. The files contain retrievals of temperature (K), vapor density (g m^{-3}), liquid density (g m^{-3}), and relative humidity (%). They also contain integrated quantities of vapor and liquid as well as surface measurements of temperature, relative humidity, sky brightness temperature, and the presence of rain. See the operator's manual for more details on data processing. No data quality checking has been performed.

4. Data Format

The data files are in netCDF format (converted from the comma-delimited ASCII files they were originally written in). The file naming convention is: MWRprof_<siteName>_yyyymmdd, where yyyy is the year, mm is the month of the year, and dd is the day of the month. The files contain "level 2" data products, which are meteorological / physical quantities that were derived from the radiometer's brightness temperature measurements. All times are in UTC.

The file header is shown below:

```
netcdf MWRprof_FP2_20150602 {
dimensions:
    time = UNLIMITED ; // (892 currently)
    height = 58 ;
variables:
    double base_time ;
        base_time:long_name = "base time" ;
        base_time:units = "seconds since 01 Jan 1970 00:00:00 UTC to
start_time" ;
    float time_offset(time) ;
        time_offset:long_name = "profile time" ;
        time_offset:units = "number of seconds elapsed since start_time"
;
    float height(height) ;
        height:long_name = "height levels" ;
        height:units = "meters above radiometer" ;
    float Tamb(time) ;
        Tamb:_FillValue = 9.96921e+36f ;
        Tamb:long_name = "Ambient air temperature at the radiometer" ;
        Tamb:units = "Kelvin" ;
    float RH(time) ;
        RH:_FillValue = 9.96921e+36f ;
        RH:long_name = "Ambient air relative humidity at the radiometer"
;
        RH:units = "%" ;
    float P(time) ;
        P:_FillValue = 9.96921e+36f ;
        P:long_name = "Air pressure at the radiometer" ;
        P:units = "hPa" ;
    float Tir(time) ;
        Tir:_FillValue = 9.96921e+36f ;
        Tir:long_name = "Sky brightness temperature" ;
        Tir:units = "Kelvin" ;
    byte rain_flag(time) ;
        rain_flag:_FillValue = -127b ;
        rain_flag:long_name = "rain flag (0 = no rain, 1 = rain)" ;
        rain_flag:units = "unitless" ;
    float integrated_vapor(time) ;
```

```

integrated_vapor:_FillValue = 9.96921e+36f ;
integrated_vapor:long_name = "column-integrated water vapor" ;
integrated_vapor:units = "cm" ;
float integrated_liquid(time) ;
integrated_liquid:_FillValue = 9.96921e+36f ;
integrated_liquid:long_name = "column-integrated liquid water" ;
integrated_liquid:units = "mm" ;
float cloud_base(time) ;
cloud_base:_FillValue = 9.96921e+36f ;
cloud_base:long_name = "cloud base" ;
cloud_base:units = "meters above radiometer" ;
cloud_base:comment = "-1 indicates that no cloud base was found."
;

float T_profile(time, height) ;
T_profile:_FillValue = 9.96921e+36f ;
T_profile:long_name = "Atmospheric temperature profile" ;
T_profile:units = "Kelvin" ;
float vapor_density_profile(time, height) ;
vapor_density_profile:_FillValue = 9.96921e+36f ;
vapor_density_profile:long_name = "Atmospheric water vapor
density profile" ;
vapor_density_profile:units = "g/m^3" ;
float liquid_density_profile(time, height) ;
liquid_density_profile:_FillValue = 9.96921e+36f ;
liquid_density_profile:long_name = "Atmospheric liquid water
density profile" ;
liquid_density_profile:units = "g/m^3" ;
float RH_profile(time, height) ;
RH_profile:_FillValue = 9.96921e+36f ;
RH_profile:long_name = "Atmospheric relative humidity profile" ;
RH_profile:units = "%" ;

// global attributes:
:project_name = "PECAN" ;
:site_name = "FP2" ;
:reference = "http://radiometrics.com/data/uploads/2014/08/MP-
3000A-Operator-Manual-RevG.pdf" ;
:creating_program = "RadiometricsL2lib.py" ;
:start_time = "02 Jun 2015 00:00:00 UTC" ;
:creation_time = "09 Mar 2016 19:17:08 UTC" ;
:site_lon_E = -99.27606 ;
:owner = "Howard University" ;
:site_elev_mASL = 681. ;
:site_lat_N = 37.60695 ;
:equipment = "Radiometrics MP-3000A profiling microwave
radiometer" ;
}

```