EOL Sounding Data File Format

Naming convention

The standard naming convention for both dropsonde and radiosonde files is "D", followed by "yyyymmdd_hhmmss_v.QC.eol" where yyyy = year, mm = month, hh = hour of the day GMT, mm = minute of the hour, ss = second of the hour (which refer to the launch time of the sonde), “v” refers to the version number of data files, should subsequent correction be necessary, and “QC.eol” refers to the EOL file format type.

Metadata header

The header (table 1) contains information including data type, project name, site location, actual release time, and other specialized information. The first seven header lines contain information identifying the sounding. The release location is given as: lon (deg min), lon (dec. deg), lat (deg min), lat (dec. deg), altitude (meters). Longitude in deg min is in the format: ddd mm.mm'W where ddd is the number of degrees from True North (with leading zeros if necessary), mm.mm is the decimal number of minutes, and W represents W or E for west or east longitude, respectively. Latitude has the same format as longitude, except there are only two digits for degrees and N or S for north/south latitude. Lines eight, nine and ten contain information about the data system, comments about the sounding and information about the version of ASPEN used, its configuration set and the creation date of the files. For dropsondes, it also contains a flag, ‘TDDryBiasCorrApplied’, indicating the files have been corrected for a temperature dependent dry bias in the relative humidity measurements for more information on the dry bias correction please see: http://opensky.ucar.edu/islandora/object/technotes:542. The last 3 header lines contain information on the data columns. Line 12 holds the field names, line 13 the field units, and line 14 contains dashes (--- characters) signifying the end of the header.

Table 1. EOL Sounding File Header –

Data Type/Direction: AVAPS SOUNDING DATA, Channel 3/Descending File Format/Version:
EOL Sounding Format/1.1
Project Name/Platform: NASA HS3 2011, Science Flight 1/Global Hawk, NASA 872 (AV-6)
Launch Site:
Launch Location (lon,lat,alt): 154 26.51'W -154.441874, 27 00.48'N 27.007975, 18420.10
UTC Launch Time (y,m,d,h,m,s): 2011, 09, 09, 14:10:07
Sonde Id/Sonde Type: 094355195/
Reference Launch Data Source/Time: IWGADTS Format (IWG1)/14:10:07
System Operator/Comments: Remote Operator/none, none
Post Processing Comments: Aspen Version 3.1; Created on 14 Oct 2011 20:12 UTC; Configuration GHdropsonde; TDDryBiasCorrApplied

Time	-- UTC --			Press	Temp	Dewpt	RH	Uwind	Vwind	Wspd	Dir	dZ	GeoPoAlt	Lon	Lat	GPSAlt
sec	hh	mm	ss	mb	C	C	%	m/s	m/s	m/s	deg	m/s	m	deg	deg	m
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Data Parameters

Time:

The first column contains elapsed time from launch, measured in seconds. The -1.0 second time stamp indicates reference flight-level aircraft or surface met measurements collected from independent sensors. All subsequent time stamps represent data directly from the radio/dropsonde. Columns two, three and four contain UTC hour, minute and seconds from time of launch.

Pressure:

Measured in millibars, pressure is collected at a one-half second rate for dropsondes and a one-second rate for radiosondes.

Dry Bulb Temperature:

Measured in degrees Celsius, temperature is collected at a one-half second rate for dropsondes and a one-second rate for radiosondes.

Dewpoint Temperature:

Calculated from the relative humidity and temperature, using the vapor pressure equation (Bolton 1980), it's unit of measure is degrees Celsius.

Relative Humidity:

Measured by percent, relative humidity is collected at a one-half second rate for dropsondes and a one-second rate for radiosondes.

U and V Wind Components:

Calculated from wind speed and direction, the units of measure are in meters per second.

Wind Speed:

Measured in meters per second, wind speed is collected at a quarter-second rate for dropsondes and a one-second rate for radiosondes.

Wind Direction:

Measured in degrees, wind direction is collected at a quarter-second rate for dropsondes and a one-second rate for radiosondes.

Descent/Ascent Rate:

Computed using the time-differentiated hydrostatic equation, ascent and descent rates are measured in meters per second

Geopotential Altitude:

Computed height above mean sea level (MSL) is calculated from the hydrostatic equation, typically from the surface upward. For dropsondes that failed to transmit useful data to the surface, we integrate geopotential altitude from flight level down.

Latitude/Longitude:

Position comes directly from the GPS sensor and is measured in degrees

GPS Altitude:

The sondes transmits GPS altitude over the WGS84 geoid. For dropsondes the AVAPS software applies the geoid correction. The uncertainty of the GPS altitude is estimated to be less than 20 m. Investigators should follow meteorological convention and use geopotential altitude.

Additional parameters contained in the NOAA Hurricane Archive:

Radius and Azimuth Angle:

The NHC Best Track, linearly interpolated to 1-minute time resolution, was used to determine the radius and azimuth of the dropsonde. The azimuth represents the position of the dropsonde relative to the center of the tropical cyclone following the meteorological wind direction convention. Dropsondes located in the northwest quadrant have azimuths ranging from 270-360 degrees, southwest quadrant 180-270 degrees, southeast quadrant 90-180 degrees, and northeast quadrant 0-90 degrees.

Unfiltered and Filtered Vertical Wind:

Computed from the pressure-calculated and theoretical dropsonde fall rates. The filtered vertical winds are the smoothed values. The vertical wind is first interpolated and then filtered, so the filtered data at levels where the vertical wind is not available should be ignored. The algorithm for calculating the vertical wind is described in details in Wang et al. (2009, Wang, J., J. Bian, W. O. Brown, H. Cole, V. Grubišić, K. Young, 2009: Vertical Air Motion from T-REX Radiosonde and Dropsonde Data. J. Atmos. Oceanic Technol., 26, 928–942.).