CRYSTAL FACE 2002 Dropsonde Soundings Quality Control Report

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I. File Naming Conventions

The "D" files are typically half-second data files with appropriate corrections and quality control measures applied. The naming convention for these files is the same - "D", followed by "yyyymmdd_hhmmssQC.cls" where yyyy = year, mm = month, hh = hour of the day GMT, mm = minute of the hour, ss = second of the hour, QC refers to Quality Controlled, and ".cls" refers to the NCAR CLASS format.

II. Header Information

The header records contain data type, project ID, site ID, site location, actual release time, and possibly other specialized information. The first five header lines contain information identifying the sounding, and have rigidly defined form. The following 6 header lines contain auxiliary information and comments about the sounding, and they can vary from data set to data set. The last 3 header records contain header information for the data columns. Line 13 holds the field names, line 14 the field units, and line 15 contains dashes (--- characters) signifying the end of the header.

The five standard header lines are as follows:

Line Label (fixed to 35 chars in length)	Contents
1. Data Type:	Description of type and resolution of data.
2. Project ID:	ID of weather project.
3. Launch Site Type/Site ID:	Description of launch site.
4. Launch Location (lon,lat,alt):	Position of launch
5. GMT Launch:	Time of release, in format: yyyy, mm, dd, hh:mm:ss

The release location is given as: lon (deg min), lat (deg min), lon (dec. deg), lat (dec. deg), alt (m).

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. The decimal equivalent of longitude and latitude and station elevation follow.

The six non-standard header lines may contain any label and contents. The label is fixed to 35 characters to match the standard header lines.

III. Data Records

The data records each contain time from release, pressure, temperature, dew point, relative humidity, U and V wind components, wind speed and direction, ascent rate, balloon position data, altitude, and quality control flags.

Field No.	Parameter	Units	Missing Value
1	Time	Seconds	9999.0
2	Pressure	Millibars	9999.0
3	Dry-bulb Temp	Degrees C	999.0
4	Dew Point Temp	Degrees C	999.0
5	Relative Humidity	Percent	999.0
6	U Wind Component	Meters/Second	999.0
7	V Wind Component	Meters/Second	999.0
8	Wind Speed	Meters/Second	999.0
9	Wind Direction	Degrees	999.0
10	Ascension Rate	Meters/Second	999.0
11	Longitude	Degrees	999.0
12	Latitude	Degrees	999.0

13	Range	Kilometers	999.0
14	Angle	Degrees	999.0
15	Altitude	Meters	99999.0
16	QC flag for Pressure		99.0
17	QC flag for Temp		99.0
18	QC flag for Humidity		99.0
19	QC flag for U Component		99.0
20	QC flag for V Component		99.0
21	QC flag for Horizontal Wind		99.0

IV. Data File Specifics

The files contain data calculated at half-second intervals. The variables pressure, temperature, and relative humidity are calibrated values from measurements made by the sonde. The dew point is calculated from the relative humidity. The altitude value is calculated from the hydrostatic equation using pressure, temperature, and dew point. For the dropsondes specifically, if the radiosonde is launched over water, the height is calculated by integrating from the surface (sea level) upward. However, if the radiosonde is launched over land, the surface altitude is unknown and the altitude can only be calculated by integrating from flight level downward. In some cases flight level PTU data is either not available, or it is determined to be unreliable. Under such circumstances we will recommend that the user not use the geopotential altitude data. The rate of ascent is obtained from the altitude difference between two successive time steps. The position (lat, lon), angle and range come from the GPS and altitude data. This data is interpolated to one second in order to match the wind data.

All wind data are computed from GPS navigation signals received from the sonde. The raw wind values are calculated at a one half second data rate by a commercial processing card. These raw values are subjected to a digital filter to remove low frequency oscillations due to the sonde pendulum motion beneath the balloon. This time record is used in the interpolation of the pressure, temperature, and humidity data.

V. Data Quality Control

The raw soundings are first run through the Atmospheric Sounding Processing ENvironment (ASPEN), which analyzes the data, performs smoothing, and removes suspect data points. The soundings are then visually evaluated for outliers, or any other obvious problems. Histograms of the data are then created to check the range, and number of occurrences, in values of pressure, temp, RH, wind speed and direction, and are derived from data at all levels for all soundings. Finally, time series plots of temperature, relative humidity, and wind speed and direction are created. They are used to both examine the consistency

of soundings launched from the same flight, and to show the variability of soundings from different missions.