TITLE: (Updated) ETL Doppler Lidar Wind Velocity and Direction Profiles from EPIC 2001

1. AUTHORS and CONTACT INFORMATION:

Instrument: NOAA/ETL's Mini-MOPA Doppler Lidar
Instrument and Technical Contacts:
Alan.Brewer@noaa.gov
Scott.P.Sandberg@noaa.gov
Raul.Alvarez@noaa.gov

Data Products: High-resolution vertical profiles of Doppler Wind Velocity and Direction.
Data Processing and Product Contacts:
Janet.Intrieri@noaa.gov
Brandi.McCarty@noaa.gov

Website:
http://www.etl.noaa.gov/et2/

Mailing Address:
NOAA/Environmental Technology Laboratory
Optical Remote Sensing Division, R/E/ET2
325 Broadway
Boulder, CO 80305

2. DATA SET OVERVIEW:

http://www.etl.noaa.gov/programs/2001/epic/

Vertical profiles of wind velocity and direction are produced from Doppler lidar measurements taken aboard the Ron Brown from September 12th through October 22nd, 2001. The VAD technique (Browning and Wexler, 1968) was employed to process wind information taken in scanning mode to produce the high-resolution vertical profiles. All velocities are in m/s and heights in meter.

3. INSTRUMENT DESCRIPTION:

http://www.etl.noaa.gov/et2/instruments/mini-mopa/

The mini-MOPA Doppler lidar was originally developed at ETL to provide wind velocity and direction in clear-air (non-cloud) regions. It was modified for the EPIC project with an additional laser line to provide water vapor profiles using a Differential Absorption (DIAL) technique.

4. DATA COLLECTION AND PROCESSING:

http://www.etl.noaa.gov/et2/data/data_pages/epic_winds.html

The lidar operated every day with some exceptions due to rain. The data were obtained by scanning in VAD mode (i.e. sweeping in a full circle around the compass (0 to 360 degrees) and then stepping up in discrete steps between 0 and 65 degrees in elevation angle). A velocity profile is then built from these successive set of scans to produce the vertically resolved "profiler" like data displayed in the images. Scans used to build the velocity profiles were taken no longer than 30 minutes apart.

5. DATA FORMAT:

Data file structure and file naming conventions: Two gif images are available, one representing the region from 0 to 1200 meters, and the other a closer view of the region from 0 to 200 meters. Also available are ASCII data files which include height, wind speed, direction and standard deviation. The naming convention for the data files is the following: dd-mm-yyyy [X]. Where d represents the day of the month, m represents the month of the year, and y is the year. If the file has a letter in square brackets, this corresponds in the following manner: [A] is the early part of the day, [B] is the later part of the day.

Data format and layout : The ASCII file header looks like the following:

```
      36      0      29      4      9      7     2001  55.75  1.00      2
d:\EPIC\Data\010906\^numrows hr min sec mon dy yr el std_thr filenum/ v hght spd ang std
```

The second line describes the first line of the file as well as the data from the 3rd row and after.

FIRST ROW DESCRIPTION:

1. Data location, in the above example: d:\EPIC\Data\010906\ [string]
2. numrows, the number of rows of data to follow the header, in the above example: 36 [integer]
3. hr, the hour of the day corresponding to the profile, in the above example: 0 [integer]
4. min, the minute of the hour corresponding to the profile, in the above example: 29 [integer]
5. sec, the second of the minute corresponding to the profile, in the above example: 4 [integer]
6. mon, the month of the year corresponding to the profile, in the above example: 9 [integer]
7. dy, the day of the month corresponding to the profile, in the above example: 7 [integer]
8. yr, the year corresponding to the profile, in the above example: 2001 [integer]
9. el, the elevation angle corresponding to the elevation level of the scan of which the profiles were taken, in the above example: 55.75 This number is fairly arbitrary as multiple scans were used to calculate this high resolution profile. [float]
10. std_thresh, the threshold in which the data standard deviation must not exceed to be included in the profile, in the above example: 1.0 [float]
11. filenum, the original file number that the profile was calculated from, in the above example: 2 This number is arbitrary as multiple files were concatonated in order to calculate the velocity profile [integer] .

THIRD AND SUBSEQUENT ROWS DESCRIPTION:
1. v hght corresponds to the first column of data. These values are the vertical height in meters corresponding to the location of the measured velocity. [float]
2. spd is the second column of data. These values are the wind velocity in meters/second.
3. ang corresponds to the third column of data. These values range from 0 to 359 degrees. Where a value of 90 represents easterly flow, and 0 (or 360) represents northerly winds.

List of parameters with units, sampling intervals, frequency, range: The parameters represented in this file are height [meters], velocity [meters/sec], wind direction [degrees], and standard deviation. The values were calculated by averaging scans (in the elevation plane) in which the time between them is no longer than 30 minutes.

Data version number and date: Data version number 1, December 5, 2002

Description of flags, codes used in the data, and definitions (i.e., good, questionable, missing, estimated, etc.): The missing or bad data flag in this data set is -999.0

6. DATA REMARKS:

The Doppler lidar profiles provided herein have been updated (as of August 2003) from our preliminary version. Note however that only minimal QC has been applied to the data and therefore occasional outliers may still exist in the data.

7. REFERENCES:

VAD reference:

Browning, K.A., and R. Wexler, 1968: The determination of kinematic properties of a wind field using a Doppler radar. *J. Appl. Meteor*., **7**, 105-113.