Summary of EPIC-2001 Rain Map Files

EPIC Rainmap files were generated using all surveillance scans (3 tilt, full PPI) collected by the Ronald H. Brown (RHB) C-band radar while the ship was on-station in the ITCZ (12 September 2001 13Z – 1 October 2001 07 UTC) at its nominal location of 10 N, 95 W. For each date and time, 3 files are included:

1. epic_rr_yymmdd_hhmm.gif
2. epic_rr_yymmdd_hhmm.ps.gz
3. epic_rr_yymmdd_hhmm.txt.gz

where yymmdd is the file date (e.g., 010912 is 12 Spetember 2001) and hhmm is the start of the surveillance radar scan in UTC. The gif file (1) shows a 1-km height map (CAPPI) of rainfall intensity (mm hr^{-1}). The subtitle in these plots indicates the rain area and average rain rate for all grid points containing a rain rate equal to or exceeding 0.5 mm hr^{-1}. The .ps file (2) is a gzipped postscript version of the gif plot with better image quality. The ascii txt file (3) is a gzipped file which contains header information about the rain map cartesian grid and data values of radar reflectivity (dBZ) and rain rate (mm hr^{-1}) for each point in the grid domain at a height of 1 km. The files listed above are located in the gif, ps, and ascii subdirectories which are further subdivided by date.

Radar Data QC

All of the radar reflectivity data used to generate rain maps have first been filtered to remove 2nd trip echo, sea clutter, and other spurious echos using software developed by the NASA TRMM Office. No calibration correction has been applied to the RHB radar reflectivity data. Also, no attempt has been made to correct for attenuation.

Gridding Procedure

The radar data were first interpolated from polar to cartesian coordinates using the NCAR REORDER software. The grid size for each file extends 120 km in each direction from the nominal RHB location (10 N,95 W), which is at the center of the cartesian grid (x = 0, y = 0).
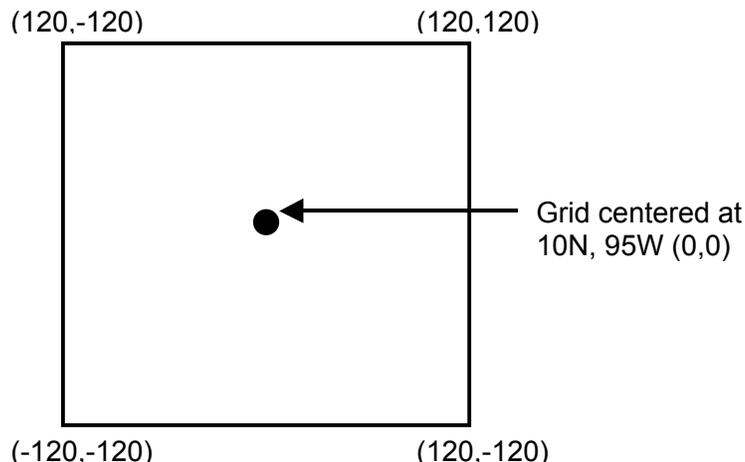
Note that the RHB radar was not stationary during the EPIC field program. The plot below shows the location of the ship while on-station during the ITCZportion of EPIC-2001. Because of the increasing radar beam height at far range and the non-stationary location of the ship around the interpolated grid origin (10 N, 95 W), there are occasional data losses in the 1 km height maps at far range (> 100 km). It is therefore recommended that quantitative data analyses be restricted to ±100 km of the grid origin.

EPIC RHB Location: 010912 (1300 UTC) - 011001 (0700 UTC)
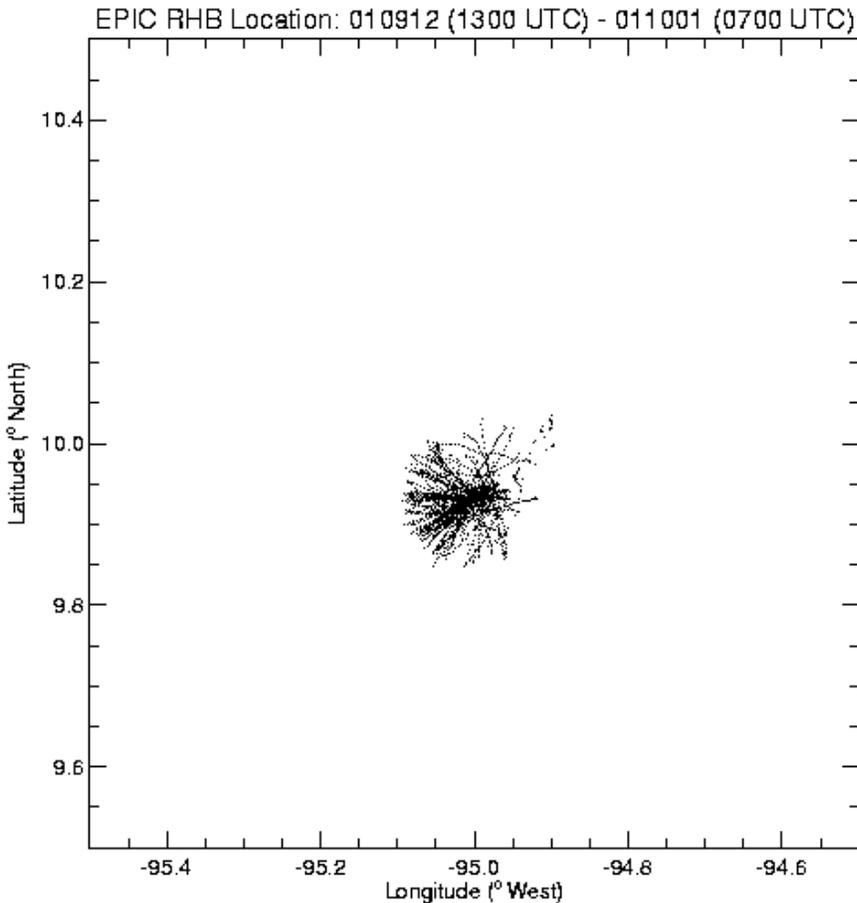
Estimation of Rainfall Rates

Instantaneous rainfall maps were generated using the Reflectivty-Rainfall (Z-R) relationship: $Z=218*R^{(1.6)}$. This relationship was derived from analysis of 2D-P data collected on-board the NCAR C-130 aircraft during the ITCZ portion of EPIC-2001.

Reading the Ascii Data File

The data values are written from the lower left hand portion of the grid (-120,-120) with all values in the X-direction (east-west) written for a given y value (north-south). Thus, the first line of the reflectivity and rain data consists of 241 data points: (-120,-120), (-119,-120), (-118,-120)…(120,-120). The 2nd line consists of the next 241 data points:

(-120,-119), (-119,-119), (-118,-119)…(120,-119). The last line consists of the the last 241 points: (-120,120), (-119,120), (-118,120)…(120,120).

Questions concerning the EPIC rain map products can be directed to:

Rob Cifelli (rob@atmos.colostate.edu) or
Walt Petersen (walt.petersen@msfc.nasa.gov)