# *Storm Monitor and Analysis Program*

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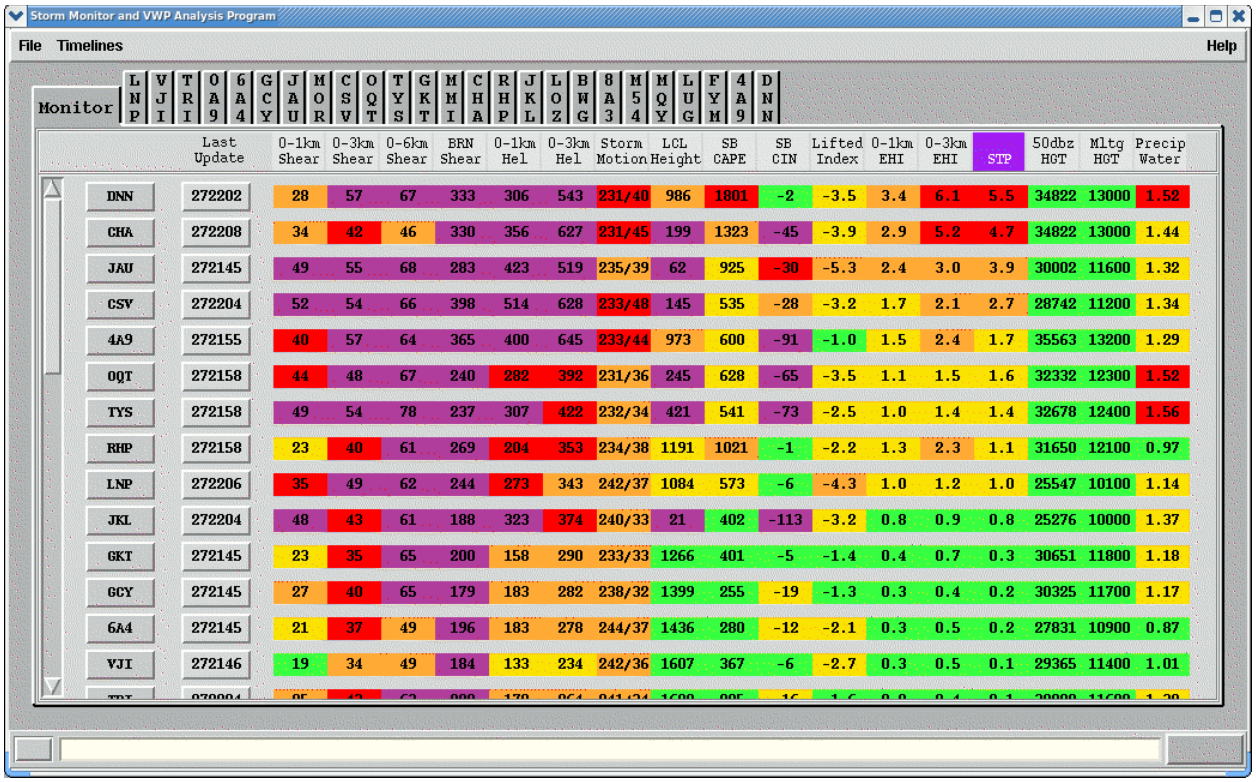
A best practice frequently noted in service assessments of severe weather events is situational awareness of the near storm environment. This article (and associated presentation at the 36th NWA Annual Meeting) will introduce the Storm Monitor and Analysis Program, developed as a tool for local weather forecast offices to monitor severe weather potential. This UNIX-based software is designed to accept both observed and forecast data, such as surface weather observations, WSR-88D Velocity/Azimuth Display Wind Profiles, and data from the RAPid Refresh (RAP) and Local Analysis and Prediction System (LAPS) models, to provide a continuous weather watch of severe weather potential. The Analysis Program provides updated monitoring of wind shear, helicity, buoyancy, thermodynamic and composite parameters. There are 28 parameters available to monitor, and additional parameters are being added with each new version. The Storm Monitor uses color codes to highlight parameters that meet or exceed specified thresholds.

Forecasters can display a hodograph for each station identifier. The hodograph is interactive and allows the user to modify the wind speed, wind direction and storm motion. The ability to easily display and modify the wind profile gives the forecaster a useful tool to monitor the near-storm environment, thereby increasing situational awareness.

The following images illustrate the use of the software during the tornado outbreak of April 27-28, 2011. At 2200 UTC April 27, 2011, the Storm Monitor highlighted large values of shear and helicity (Fig. 1) across the area. The Significant Tornado Parameter (STP) column heading is highlighted and values in the column are sorted from highest to lowest. Notice CHA, the Chattanooga Metropolitan Airport location, is well above the threshold for tornado occurrence (threshold is $\geq 1$ for tornadoes and $\geq 2$ for strong tornadoes). An EF-1 occurred at 2215 UTC April 27, 2011 and an EF-4 occurred at 0027 UTC April 28, 2011 near CHA.

The software allows the user to view time-line graphs of each parameter, such as the plot of the STP during the tornado outbreak (Fig. 2). The tornadoes across the Chattanooga, Tenn., area have been annotated on the graph. There is a spike in the STP during or just before each tornado touchdown.

Forecasters will have the ability to view the hodograph for each observation site. The hodographs are interactive and can be manipulated to change storm motion and wind input. Figure 3 shows the hodograph at CHA using the RAP analysis and surface observations at 0000 UTC April 28, 2011.




| | Last Update | 0-1km Shear | 0-3km Shear | 0-6km Shear | BRN Shear | 0-1km Hel | 0-3km Hel | Storm Motion | LCL Height | SB CAPE | SB CIN | Lifted Index | 0-1km EHI | 0-3km EHI | STP | 50dbz HGT | Mltg HGT | Precip Water |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DNN | 272202 | 28 | 57 | 67 | 333 | 306 | 543 | 231/40 | 986 | 1801 | -2 | -3.5 | 3.4 | 6.1 | 5.5 | 34822 | 13000 | 1.52 |
| CHA | 272208 | 34 | 42 | 46 | 330 | 356 | 627 | 231/45 | 199 | 1323 | -45 | -3.9 | 2.9 | 5.2 | 4.7 | 34822 | 13000 | 1.44 |
| JAU | 272145 | 49 | 55 | 68 | 283 | 423 | 519 | 235/39 | 62 | 925 | -30 | -5.3 | 2.4 | 3.0 | 3.9 | 30002 | 11600 | 1.32 |
| CSV | 272204 | 52 | 54 | 66 | 398 | 514 | 628 | 233/48 | 145 | 535 | -28 | -3.2 | 1.7 | 2.1 | 2.7 | 28742 | 11200 | 1.34 |
| 4A9 | 272155 | 40 | 57 | 64 | 365 | 400 | 645 | 233/44 | 973 | 600 | -91 | -1.0 | 1.5 | 2.4 | 1.7 | 35563 | 13200 | 1.29 |
| OQT | 272158 | 44 | 48 | 67 | 240 | 282 | 392 | 231/36 | 245 | 628 | -65 | -3.5 | 1.1 | 1.5 | 1.6 | 32332 | 12300 | 1.52 |
| TYS | 272158 | 49 | 54 | 78 | 237 | 307 | 422 | 232/34 | 421 | 541 | -73 | -2.5 | 1.0 | 1.4 | 1.4 | 32678 | 12400 | 1.56 |
| RHP | 272158 | 23 | 40 | 61 | 269 | 204 | 353 | 234/38 | 1191 | 1021 | -1 | -2.2 | 1.3 | 2.3 | 1.1 | 31650 | 12100 | 0.97 |
| LNP | 272206 | 35 | 49 | 62 | 244 | 273 | 343 | 242/37 | 1084 | 573 | -6 | -4.3 | 1.0 | 1.2 | 1.0 | 25547 | 10100 | 1.14 |
| JKL | 272204 | 48 | 43 | 61 | 188 | 323 | 374 | 240/33 | 21 | 402 | -113 | -3.2 | 0.8 | 0.9 | 0.8 | 25276 | 10000 | 1.37 |
| GKT | 272145 | 23 | 35 | 65 | 200 | 158 | 290 | 233/33 | 1266 | 401 | -5 | -1.4 | 0.4 | 0.7 | 0.3 | 30651 | 11800 | 1.18 |
| GCY | 272145 | 27 | 40 | 65 | 179 | 183 | 282 | 238/32 | 1399 | 255 | -19 | -1.3 | 0.3 | 0.4 | 0.2 | 30325 | 11700 | 1.17 |
| 6A4 | 272145 | 21 | 37 | 49 | 196 | 183 | 278 | 244/37 | 1436 | 280 | -12 | -2.1 | 0.3 | 0.5 | 0.2 | 27831 | 10900 | 0.87 |
| VJI | 272146 | 19 | 34 | 49 | 184 | 133 | 234 | 242/36 | 1607 | 367 | -6 | -2.7 | 0.3 | 0.5 | 0.1 | 29365 | 11400 | 1.01 |

Figure 1: Storm monitor at 2200 UTC April 27, 2011. The STP column heading is highlighted in purple and values in that column are sorted from highest to lowest. Green indicates values not normally associated with tornado occurrence, warm colors show increasing association with tornado occurrence from yellow to purple.

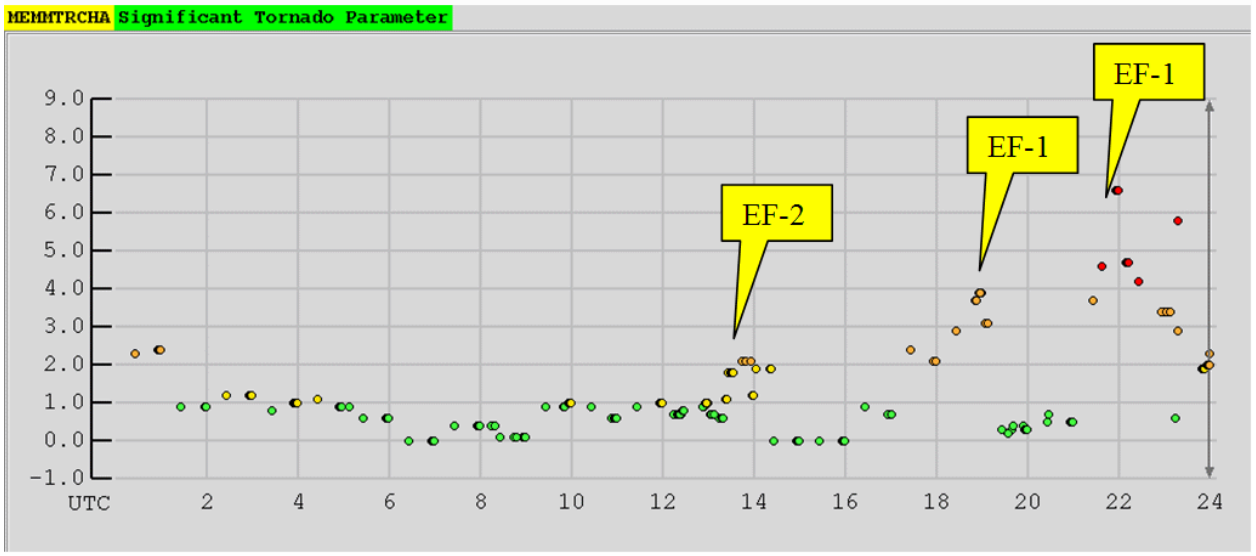



Figure 2: Time line graph of the STP at CHA. The graph is from 0000 to 2359 UTC April 27, 2011. The tornadoes occurred near CHA.

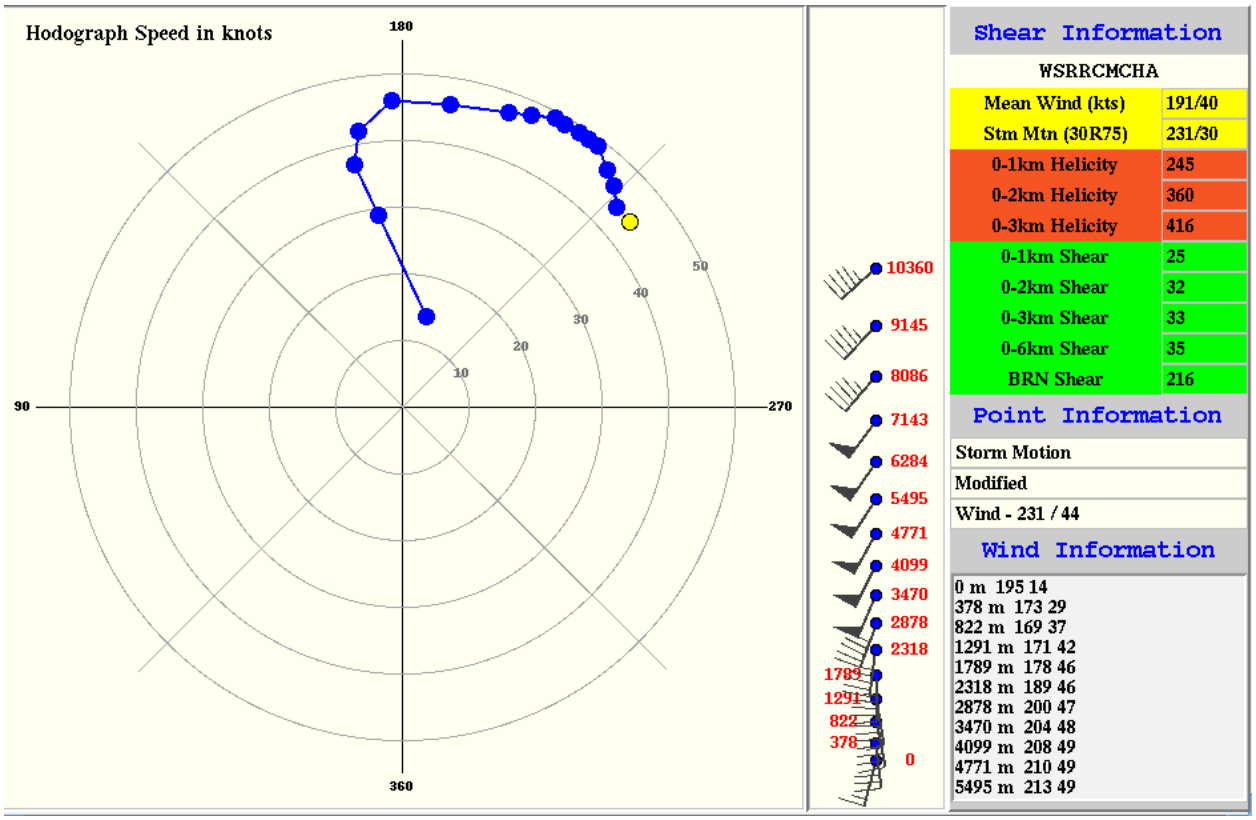



Figure 3: Hodograph at CHA using RAP wind speed analysis in knots (blue dots) and computed storm motion (yellow dot) at 0000 UTC April 28, 2011. The heights display in red are in meters. The shear information column is divided into wind and storm motion information (yellow), helicity (red), and shear (green). The shear information will automatically change if the wind speed and/or storm motion are modified.