LIST OF FIGURES

Figure 5.9: Ten 36-h backward kinematic air parcel trajectories ending within the PRE region at 0600 UTC 25 September 2005 overlaid on the NCEP 1° GFS total PW analysis at 1800 UTC 23 September 2005 (shaded in mm according to the color bar on the left). The red (black) numbers denote the ending (beginning) point of each trajectory. Trajectories 1–5 begin at 850 hPa and trajectories 6–10 begin at 700 hPa. The white circles mark the 0000 UTC 25 September and 0000 UTC 24 September air parcel positions. The air parcel pressure values (hPa) are shaded according to the color bar at the bottom. For reference, the track of TC Rita subsequent to 1800 UTC 23 September 2005 is indicated by the blue arrow, and the positions of TC Rita at 1800 UTC 23 September, 0000 UTC 25 September, and 0600 UTC September 2005 are marked by the tropical storm symbols. The dashed blue line indicates the location of the 925-hPa baroclinic zone at 0600 UTC 25 September.

Figure 5.10: 200-hPa irrotational wind vectors (> 5 m s^{-1}; reference vector is at the bottom of each panel), 200-hPa wind speed (shaded in m s^{-1} according to the color bar), 700-hPa ascent (contoured in red every 5×10^{-3} hPa s^{-1} starting at -5×10^{-3} hPa s^{-1}), and 250–200-hPa PV (0.5, 1, 2, 4, and 6 PVU contours shown in black) generated from the NCEP 1° GFS analyses at (a) 0000 UTC, (b) 0600 UTC, and (c) 1200 UTC 25 September 2005. The TC and PRE locations are denoted by the tropical storm symbol and the star, respectively. Cross-section E–F is indicated in panels (a) and (c).

Figure 5.11: Vertical cross sections generated from the NCEP 1° GFS analyses showing potential temperature (contoured in gray every 3 K), ascent (contoured in red every 5×10^{-3} hPa s^{-1} starting at -5×10^{-3} hPa s^{-1}), PV (shaded in PVU according to the color bar), and horizontal wind speed (contoured in black every 10 m s^{-1} starting at 30 m s^{-1}) at (a) 0000 UTC and (b) 1200 UTC 25 September 2005. Panel (b) also shows positive 12-h potential temperature changes (contoured in green every 0.5 K starting at 1 K and every 1 K starting at 3 K) between 0000 UTC and 1200 UTC 25 September. The cross-section location is indicated in Figs. 5.10a,c.

Fig. 5.12: The NHC Best Track positions for TC Ernesto during 29 August–3 September 2006 overlaid on the NPVU QPE analysis (shaded in mm according to the color bar) for 1200 UTC 30 August–1200 UTC 1 September 2006. The filled (unfilled) circles denote the 0000 UTC (1200 UTC) TC positions. The inset in the upper-left corner shows NPVU QPE analysis (shaded in mm according to the color bar) for 1200 UTC 30–1200 UTC 31 August 2006.

Figure 5.13: As in Fig. 5.3, except for 1800 UTC 30 August 2006.

Figure 5.14: NCEP 20-km RUC analyses of 2-m potential temperature (contoured in red every 2 K) and 10-m winds (barbs in m s^{-1} according to the convention in Fig. 5.2) overlaid on WSI NOWrad radar reflectivity mosaics (shaded in dB*Z* according to the color bar) at (a) 1800 UTC 30 August, (b) 2100 UTC 30 August, (c) 0000 UTC 31 August, and (d) 0600 UTC 31 August 2006. Cross sections A–B and C–D are indicated in panels (b) and (c), respectively. The TC location is denoted by the tropical storm symbol.

Figure 5.22: The NHC Best Track positions for TC Wilma during 16–26 October 2005 overlaid on the NPVU QPE analysis (shaded in mm according to the color bar) for 1200 UTC 23–1200 UTC 25 October 2005. The filled (unfilled) circles denote the 0000 UTC (1200 UTC) TC positions. The red numbers indicate the 1200 UTC central sea level pressure values (hPa) for TC Wilma. The red dashed line indicates the time and location at which TC Wilma was classified as extratropical.

Figure 5.23: *GOES-12* IR (~11 μm) satellite imagery at (a) 1800 UTC 23 October, (b) 0000 UTC 24 October, (c) 0600 UTC 24 October, and (d) 1200 UTC 24 October 2005. The "W" and the "α" symbols indicate the positions of TC Wilma and TS Alpha, respectively. [Images courtesy of the National Climatic Data Center (NCDC) GIBBS web site at http:// www.ncdc.noaa.gov/gibbs/].

Figure 5.24: WSI NOWrad radar reflectivity mosaics (shaded in dB*Z* according to the color bar) at (a) 1800 UTC 23 October, (b) 0000 UTC 24 October, (c) 0300 UTC 24 October, (d) 0600 UTC 24 October, (e) 1200 UTC 24 October, and (f) 1800 UTC 24 October 2005.

Figure 5.25: As in Fig. 5.3, except for 1800 UTC 23 October 2005, and the position of TS Alpha is indicated by the "α" symbol.

Figure 5.26: 850-hPa geopotential height (contoured in black every 2 dam), potential temperature (contoured in blue every 2 K), Petterssen frontogenesis [contoured in green every 1 K (100 km)$^{-1}$ (3 h)$^{-1}$ starting at 1 K (100 km)$^{-1}$ (3 h)$^{-1}$], and positive potential temperature advection (shaded in 10^{-5} K s^{-1} according to the color bar) generated from the NCEP 1° GFS analyses at (a) 1800 UTC 23 October, (b) 0000 UTC 24 October, (c) 0600 UTC 24 October, and (d) 1200 UTC 24 October 2005. Cross section A–B is indicated in panel (c).

Figure 5.27: As in Fig. 5.16, except generated from the NCEP 1° GFS analysis at 0600 UTC 24 October 2005. The star denotes the position of the PRE. The cross section location is indicated in Fig. 5.26c.

Figure 5.28: As in Fig. 5.17, except generated from the NCEP 1° GFS analyses at (a) 1800 UTC 23 October, (b) 0000 UTC 24 October, (c) 0600 UTC 24 October, and (d) 1200 UTC 24 October 2005.

Figure 5.29: As in Fig. 5.18, except all trajectories end at 600 hPa at 0600 UTC 24 October 2005, and the PW analysis at 1800 UTC 22 October is shaded. The dashed blue line denotes the axis of maximum radar reflectivity values associated with the PRE at 0600 UTC 24 October. The red "α" symbol denotes the position of TS Alpha at 1800 UTC 22 October.

Figure 5.30: As in Fig. 5.10, except for (a) 1800 UTC 23 October, (b) 0600 UTC 24 October, (c) 1200 UTC 24 October, and (d) 1800 UTC 24 October 2005.