Weather Report (2010/03/04)

El Niño conditions are influencing the cloud patterns in Alcântara during March 2010, and the rain has presented itself below climatological values. However, in March, 4, some convective clouds were observed around CLA. The total cloud cover had a minimum of 2/3 at the morning and started to raise reaching a maximum of 5/8 in the afternoon and evening. In the morning, cumulus and stratocumulus clouds were observed, while in the afternoon some cumulus congestus were sighted around Alcântara. Cirrus clouds were also observed during the afternoon, and they can be associated to the presence of the convective clouds south of CLA. It is important to comment that no significant weather conditions were reported by CLA Meteorological Facilities. It means that these convective clouds were not in the sky of Alcântara.

The wind direction (Figure 1) was predominantly from NE, especially in the afternoon and night. The wind speed (Figure 2) had a minimum in the morning that could be associated with local terrestrial breeze. During the afternoon the wind speed raised up to a value of 4.2 m/s.

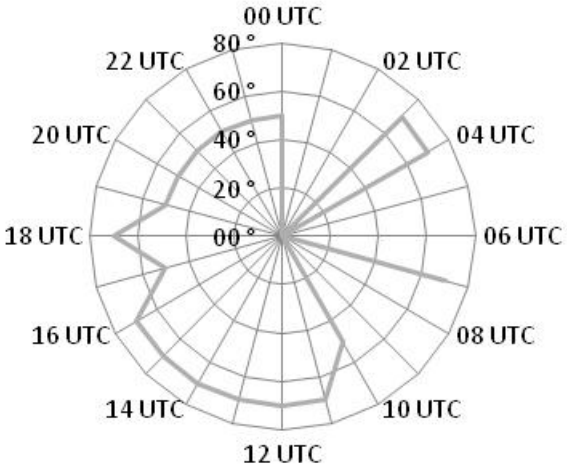


Figure 1 – Hourly wind direction for 2010/03/04.

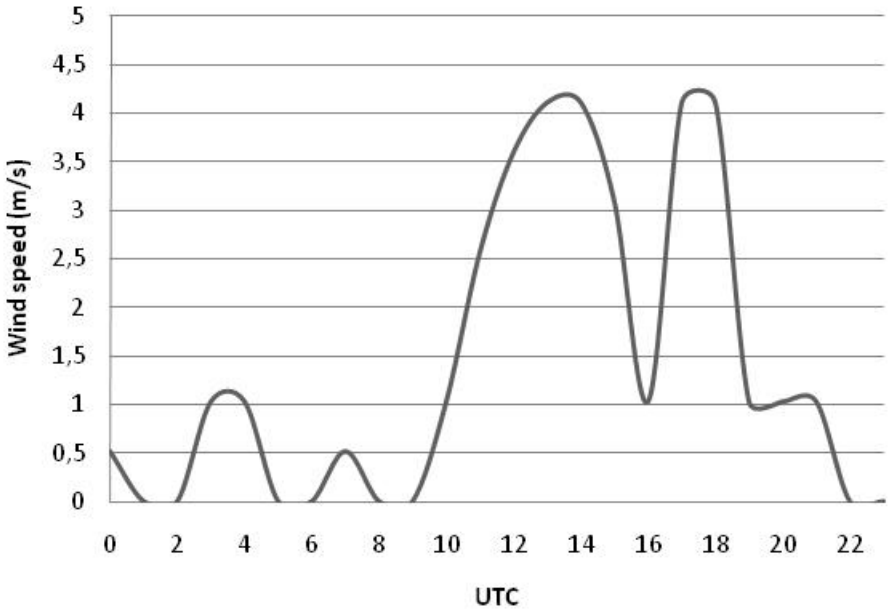


Figure 2 – Hourly wind speed for 2010/03/04.

Figure 3 shows the daily cycle of air temperature and mixing ratio. The amplitude of the air temperature was about 4.5 ºC with a minimum at 6:00 UTC and a maximum at 17:00 UTC. The mixing ratio had an opposite behavior to the air temperature, presenting a maximum in the early morning and a minimum during the afternoon. Figure 4 presents the hourly variations of the sea level pressure at CLA facilities.

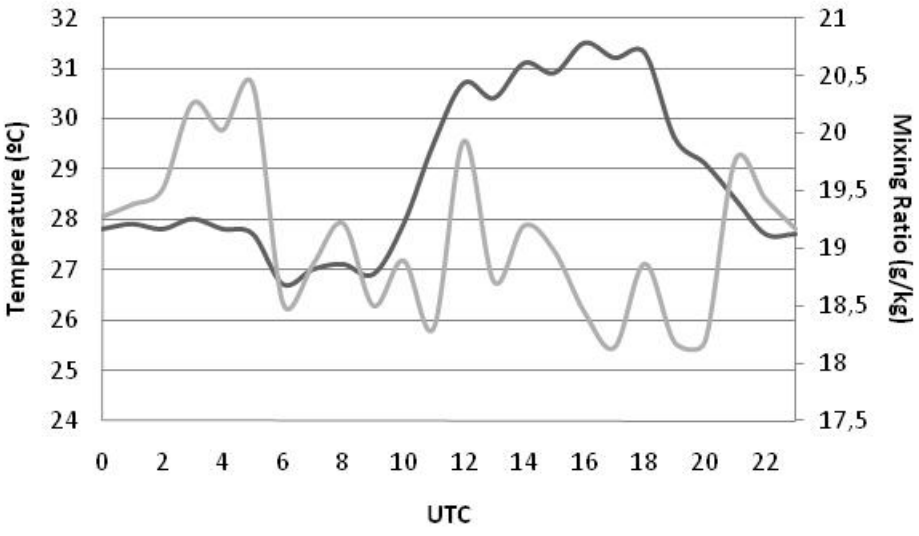


Figure 3 – Hourly temperature (black) and mixing ratio (grey) for 2010/03/04.

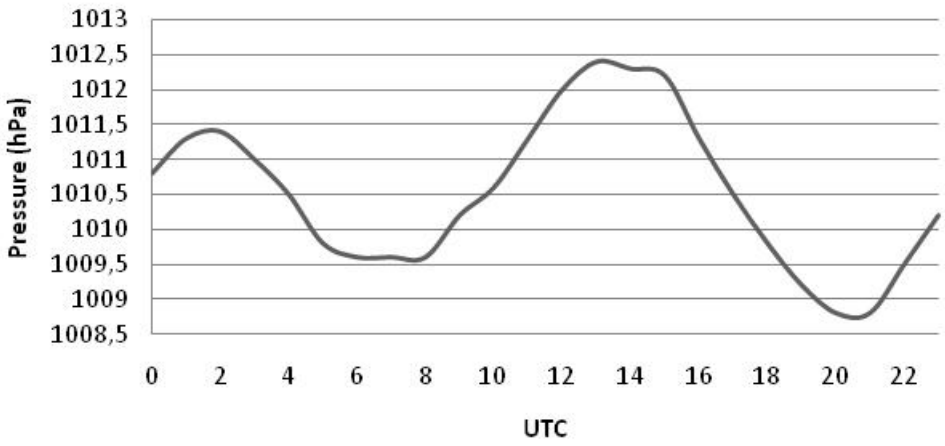


Figure 4 – Hourly sea level pressure for 2010/03/04.

The instability conditions for the region can be seen at Figure 5, were we note by the instability indices that the atmosphere presented a unstable behavior. However, taking a look at the dew point curve, many subsidence layers are also observed.

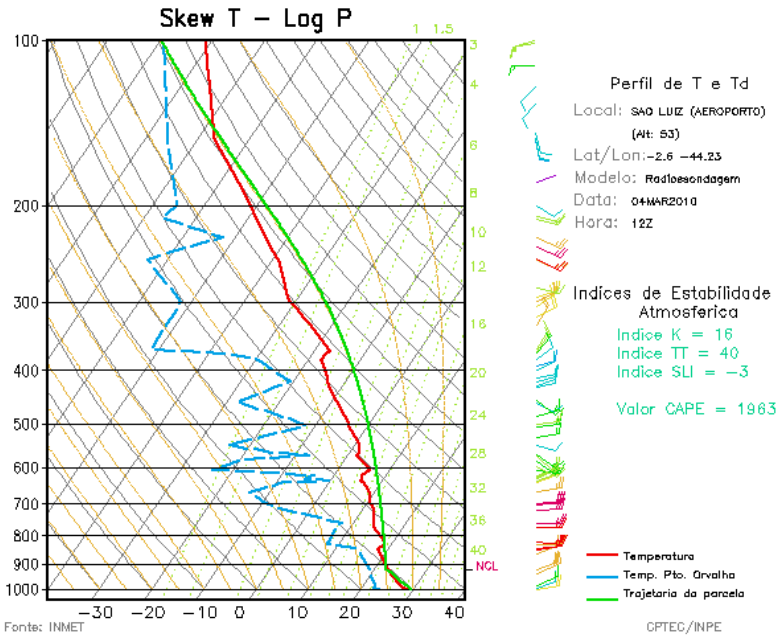
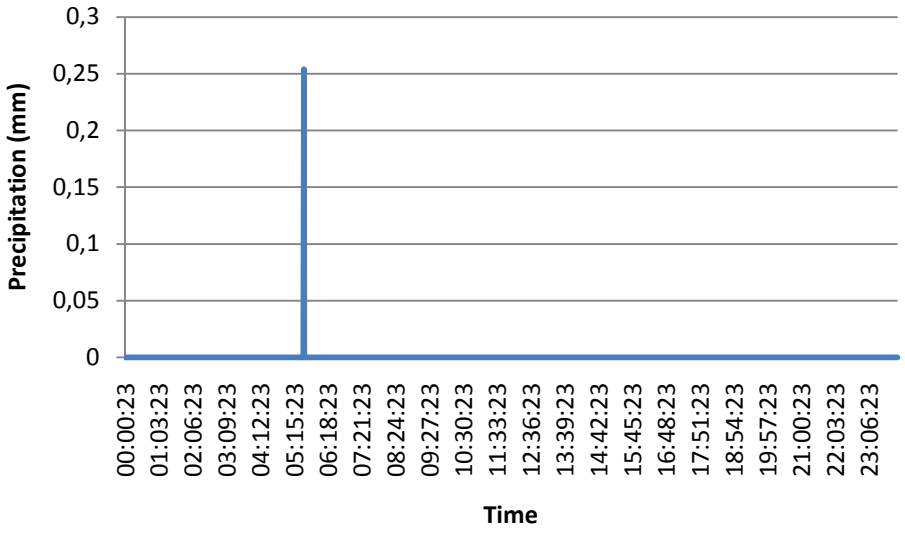


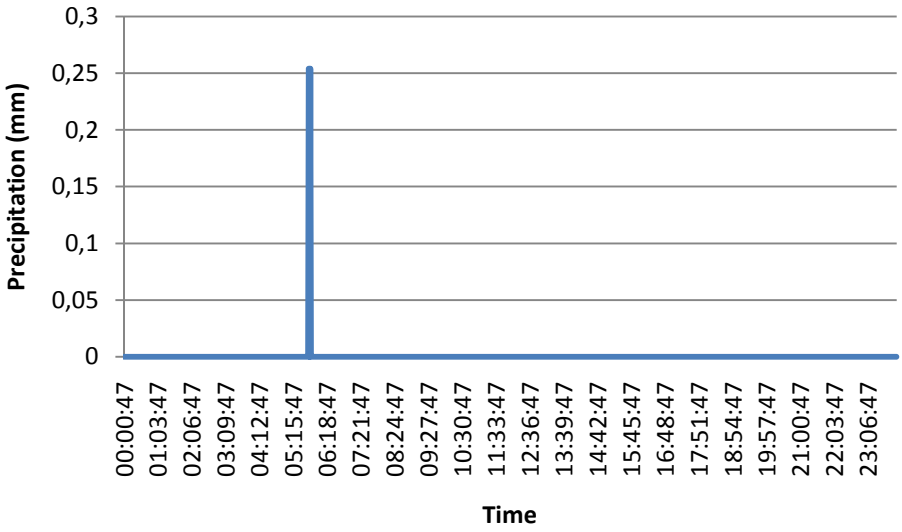
Figure 5 – Thermodynamic profile at São Luis Airport Station.

Precipitation was measured by three rain gauges located at the field campaign, one at the airport, on at the Radar and the other one at INPE Facilities (Figure 6). At about 05:00 UTC, the rain gauge located at the airport and the one located at INPE Facilities measured a small amount of 0.25 mm. The RADAR rain gauge did not measure the same precipitation of the Airport and INPE rain gauges. The precipitation measured by RADAR rain gauge was between 11:00 and 11:30 UTC with an amount of 0.25 mm. It could be said with a high amount of confidence that between 11:00 and 11:30 UTC the rain gauges located at the airport and at INPE Facilities did not measure the precipitation because of evaporative processes. The same thing could have happened at the RADAR rain gauge that did not measure the rain occurred at about 05:15 UTC.

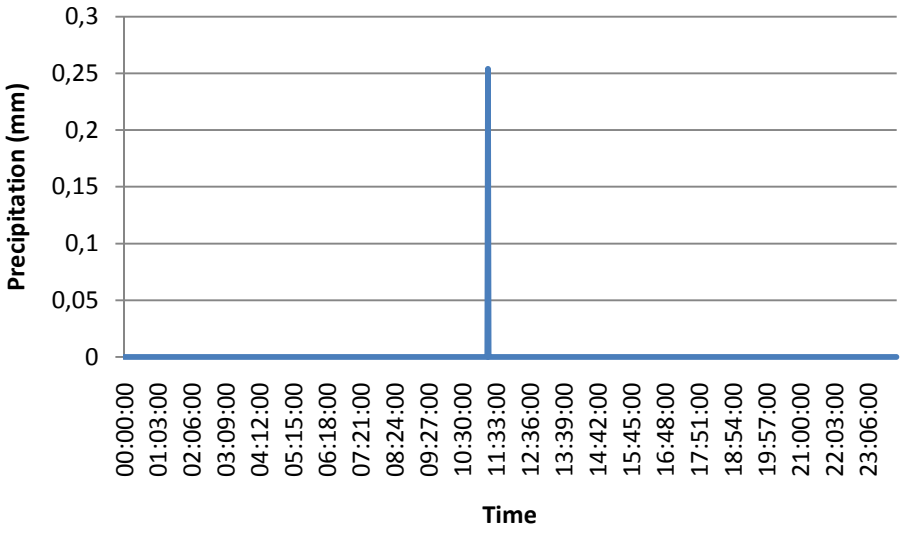


(a)

Figure 6 – Hourly precipitation at INPE rain gauges located at: a) Airport b) INPE Facilities c) Radar. Continue



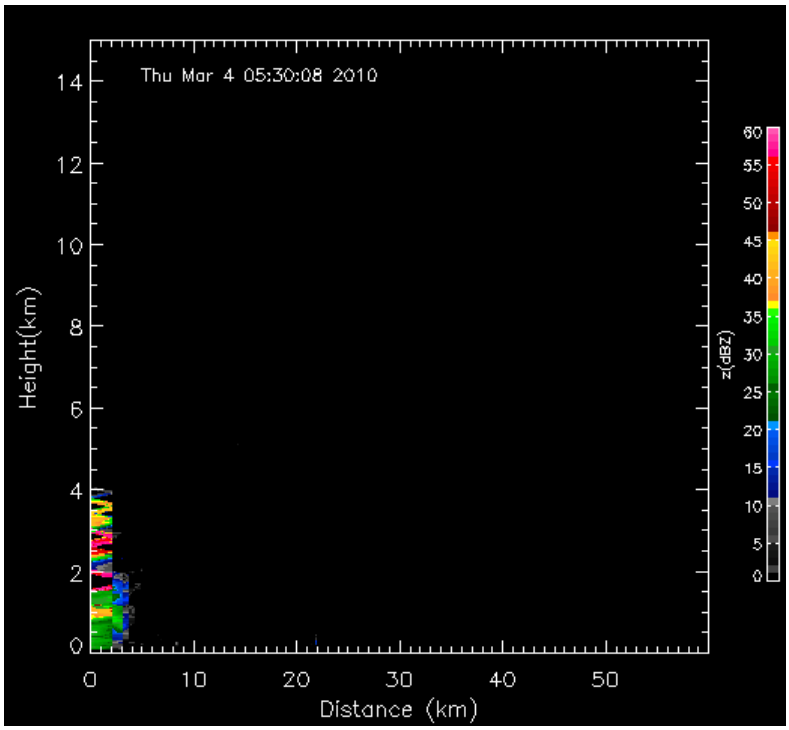
(b)



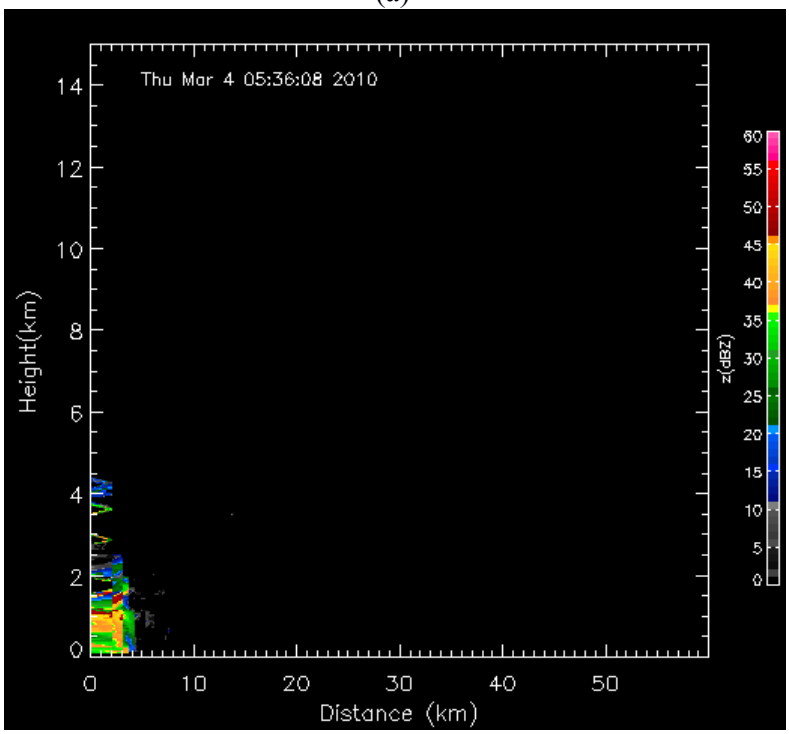
(c)

Figure 6 – Conclusion.

The CLA RADAR registered both precipitating systems occurred at the main line of the measurements (Figure 7 and 8).

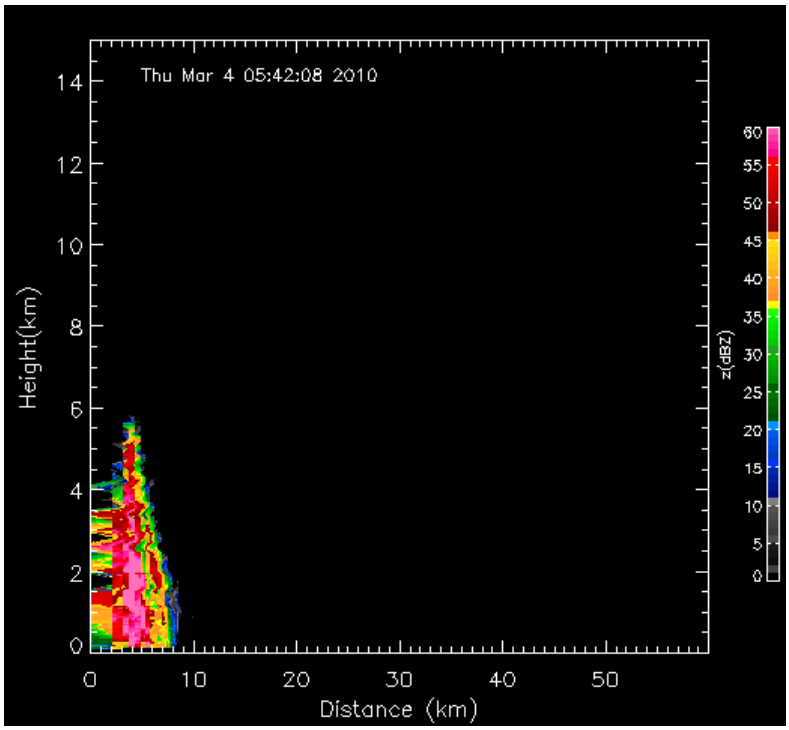


(a)



(b)

Figure 7 – RHI sequence at 141.2° azimuth for CLA RADAR. Continue



(c)

Figure 7 – Conclusion

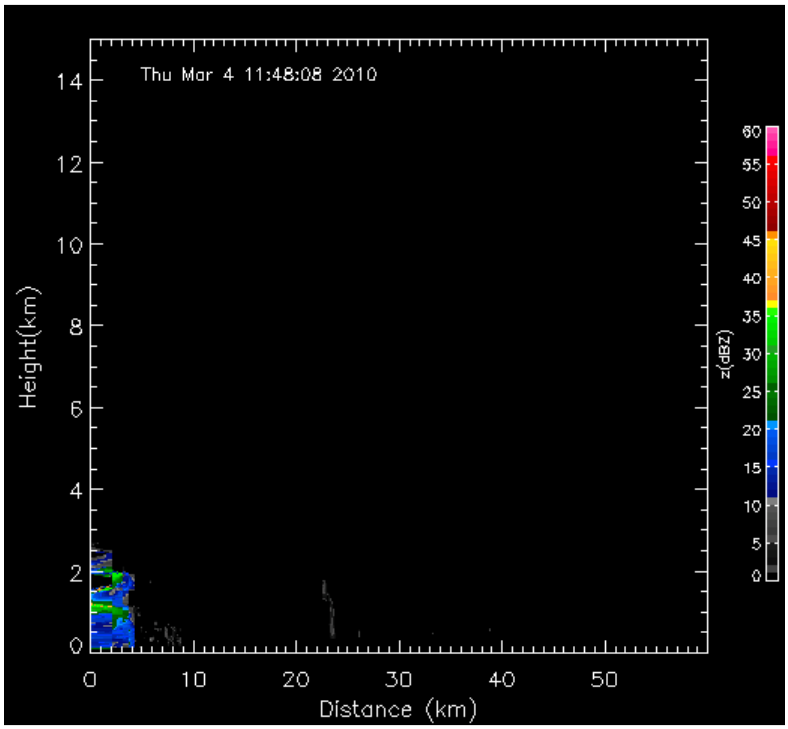
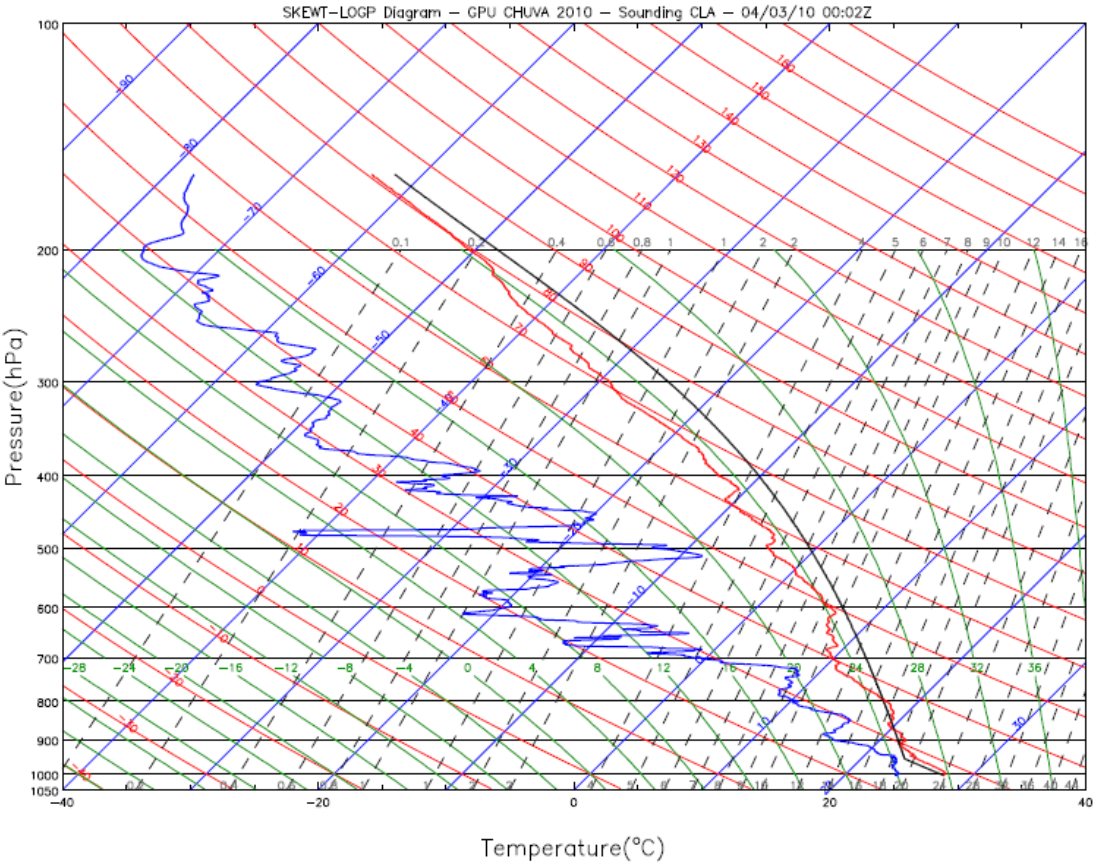


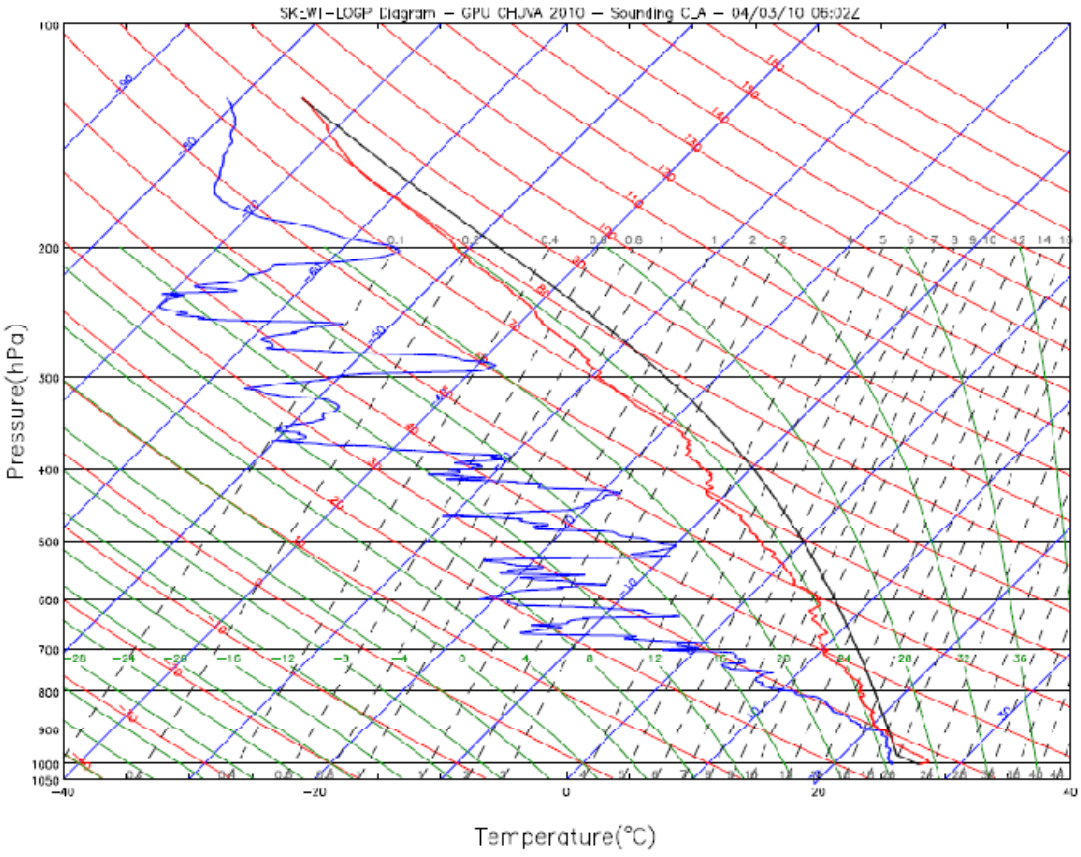
Figure 8– RHI at 141.2° azimuth for CLA RADAR.

The instability conditions obtained by the laughing of radiosondes at the Meteorological Facilities of CLA can be seen at Figure 9.

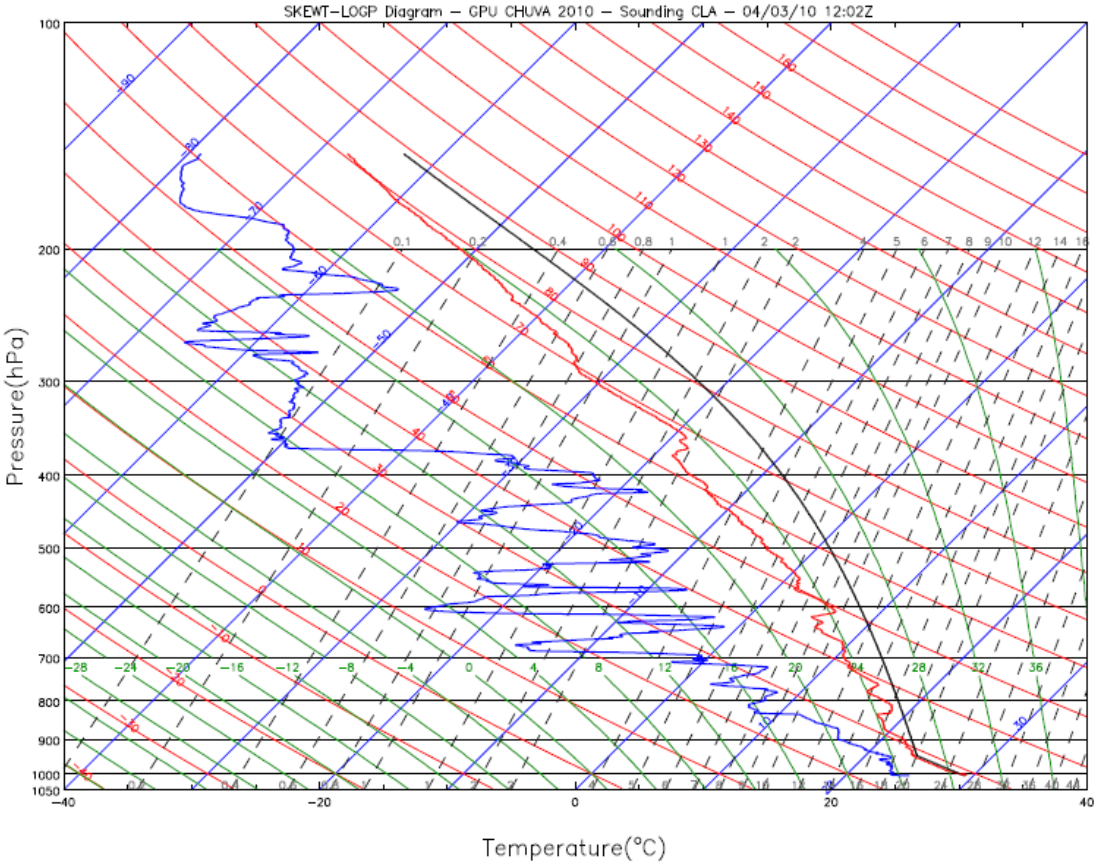


(a)

Figure 9 – Sequence of SkewT LogP diagrams for March, 4. Continue.

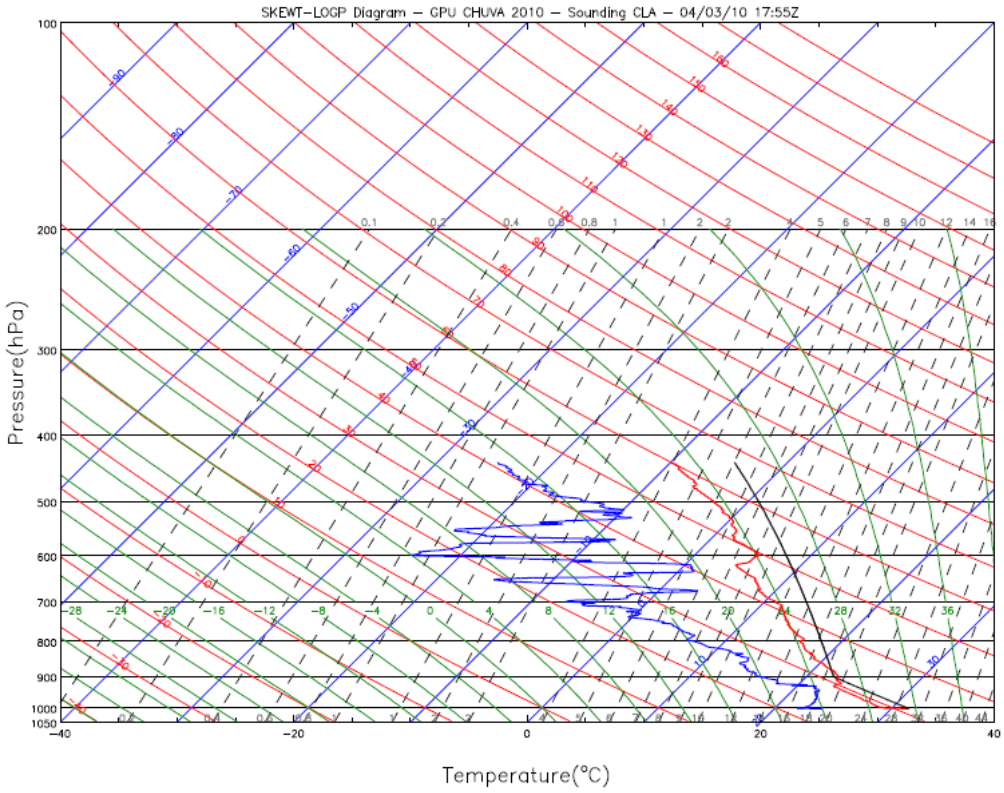


(b)



(c)

Figure 9 - Continue



(d)

Figure 9 – Conclusion.