

HARDEN UP QUEENSLAND

CASE STUDY: Brighton Hailstorm and Archerfield Tornado, December 1980

By Mr Jeff Callaghan

Retired Senior Severe Weather Forecaster, Bureau of Meteorology, Brisbane

The storms as viewed from radar are shown in Figure 1 with a severe storm cell just south of Archerfield at 0520UTC (3.20pm 16 December local time). This storm cell spawned a dangerous tornado, which caused devastation at Archerfield Airport. Perhaps the worst storm was that seen approaching Brighton at 0550UTC (3.50pm local time).

Hail from the Brighton storm was very large and destroyed roofing in many houses with 900 homes suffering extreme hail damage. A tornado was sighted nearby at Hayes Inlet. At least 4000 tarps were needed, 860 homes unroofed, 1600 damaged and 100 structurally unsafe.

The other severe storm cell passed from Ipswich to Coopers Plains with 70 homes unroofed and 150 damaged and 25 light aircraft destroyed at Archerfield from the tornado.

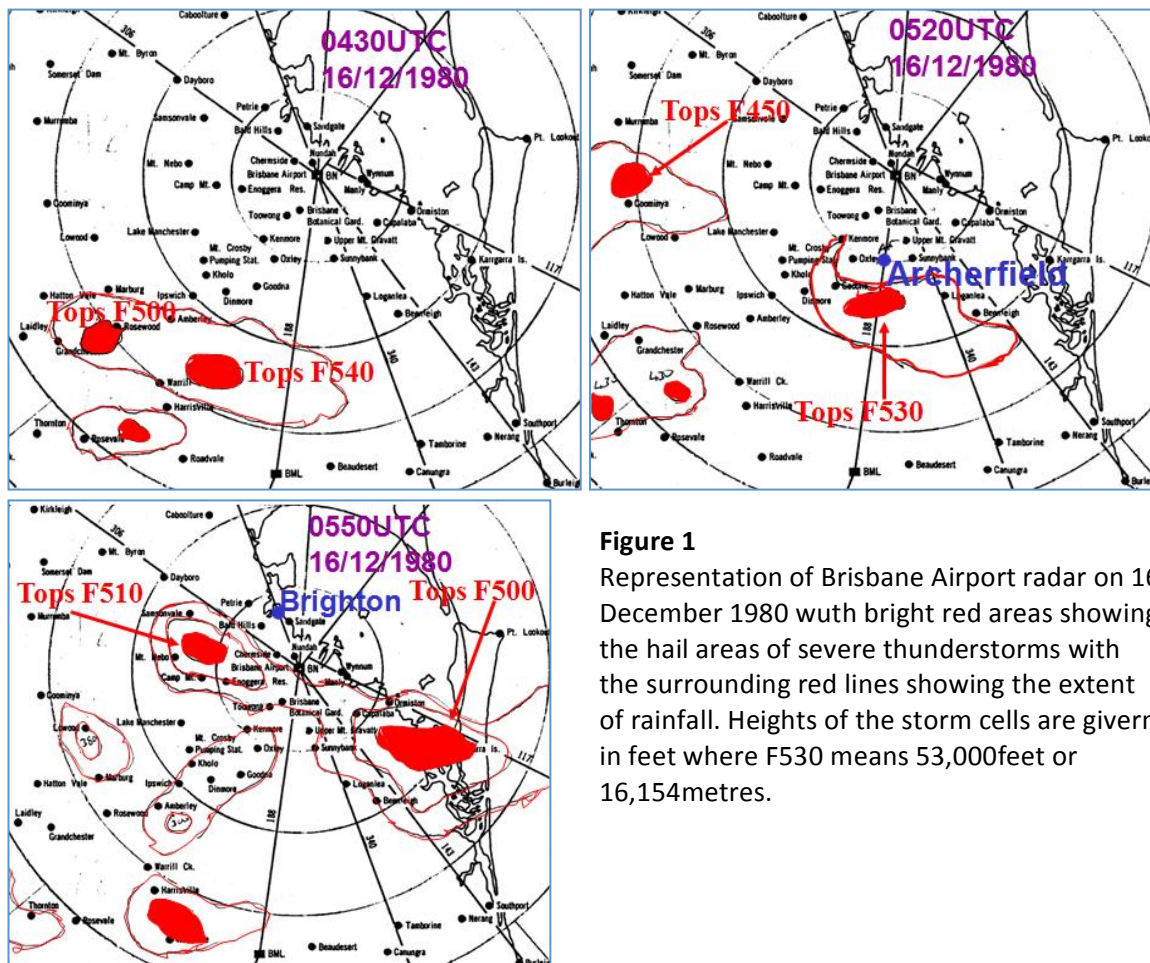


Figure 1

Representation of Brisbane Airport radar on 16 December 1980 with bright red areas showing the hail areas of severe thunderstorms with the surrounding red lines showing the extent of rainfall. Heights of the storm cells are given in feet where F530 means 53,000 feet or 16,154 metres.

In Figure 2 the Mean sea level analyses shows the large scale environment in which the severe thunderstorms developed. In the morning of the storm a low was located over northwest NSW which by the following morning had formed a very intense low east of Bass Strait.

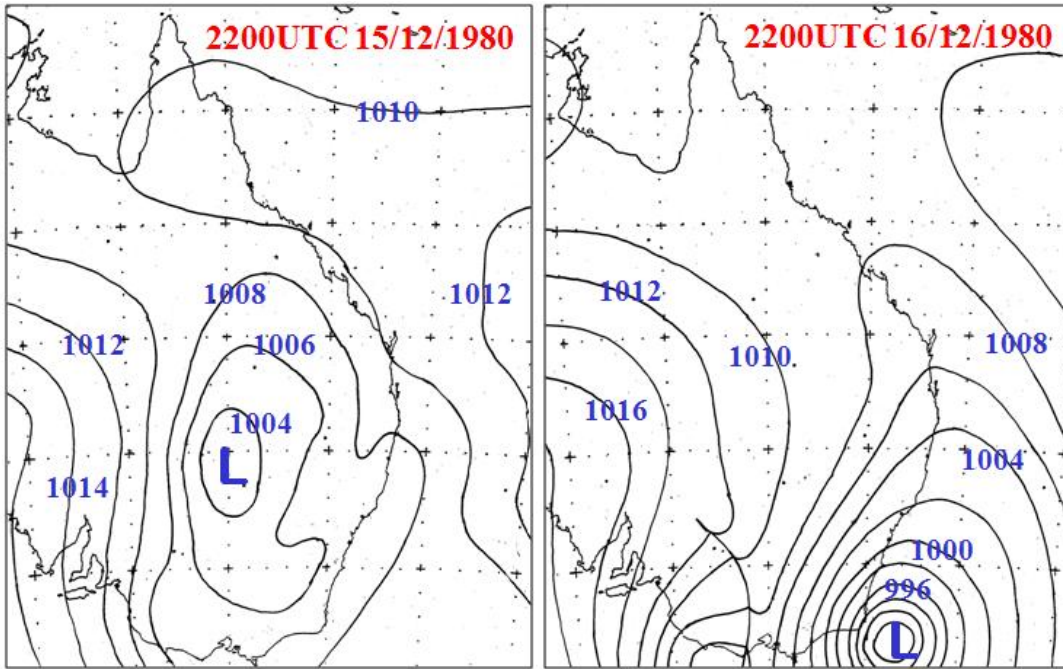


Figure 2 The Mean sea level analyses at 2200UTC 15 December 1989 (8am 16th local time) and 2200UTC 16 December 1980 (8am 17th local time).

In Figure 3 the local analyses show an inland trough during the morning of the storm (dashed line) and as the storms were developing in the early afternoon a trough had formed near the coast. This coastal trough served to intensify the storm cells as they moved eastward.

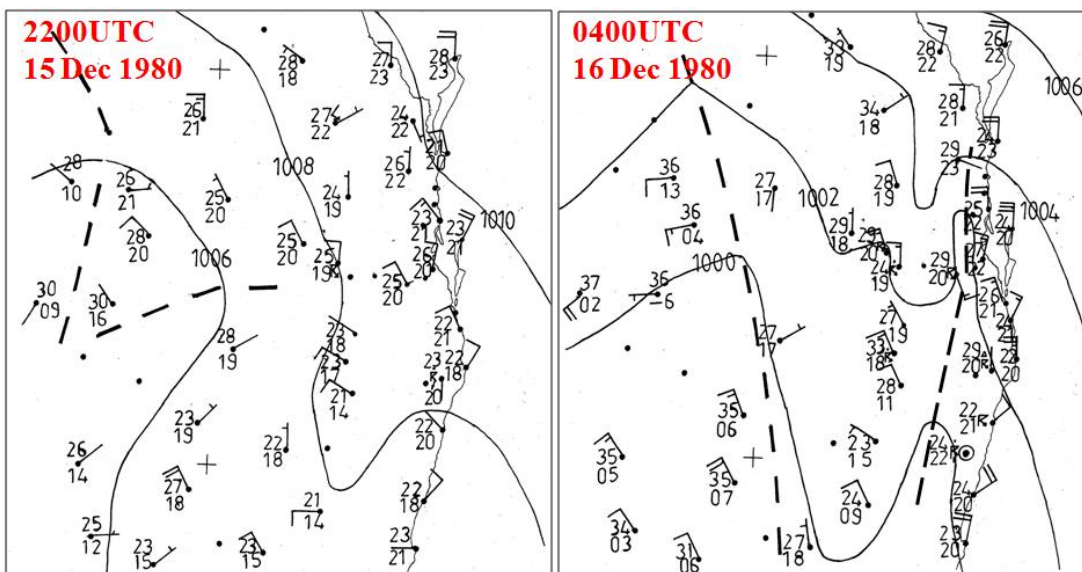


Figure 3 The Mean sea level analyses at 2200UTC 15 December 1989 (8am 16th local time) and 0400UTC 16 December 1980 (2pm 16th local time).

The coastal trough interacted with the seabreeze and Figure 4 shows a seabreeze front pass through Amberley at 0350UTC and subsequently the storm complex developed the kidney bean shape of a supercell.

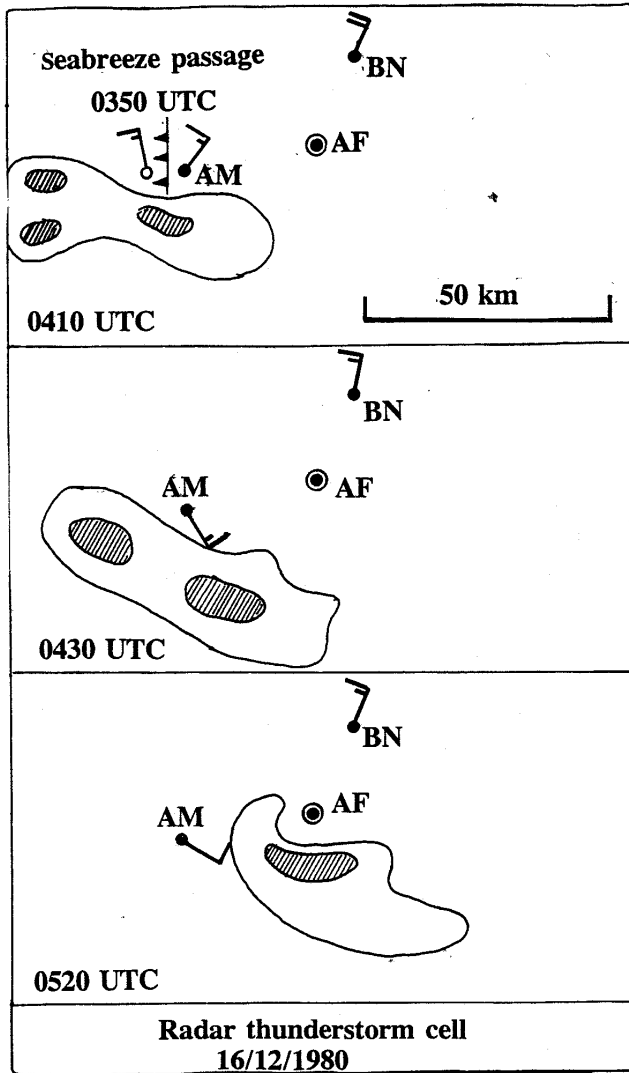


Figure 4 The development of a supercell (hatched area indicates hail) near Archerfield from 0410UTC to 0520UTC 16 December 1980, AM is Amberley RAAF base, AF is Archerfield aerodrome and BN is Brisbane Airport.