Australian Synoptic Conditions Analysis for Australian Farming Community

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- **Autumn & Winter Patterns**
- **Spring & Summer Patterns**

Autumn & Winter Patterns

Autumn Pattern

The most significant feature of the first half of Autumn is the rapidly increasing anti-cyclonicity over southern inland areas of Australia, particularly over southeastern Australia, caused by the migration of the anticyclones toward the Equator. With the stronger anticyclonic circulation, the cells tend to be more extensive and show less tendency to split into two centers, as frequently happens in summer. Sometimes an anticyclone develops to such an extent as a single cell moving slowly eastward that it covers almost the whole Australian area.

Depressions in April, May and June increase greatly in frequency over the Tasman Sea, including over the east and southeast coastal areas of the continent. Most in these areas develop in an easterly surface stream.

- Map 1
- Map 2

Winter Pattern

In this season, anticyclones pass across the continent along their most northern paths and often remain almost stationary over the interior for several days while depressions pass rapidly along the southern fringes of their circulation. There cells may extend to

4000 kilometers along their west-east axis. Northern Australia is then influenced by mild dry south-east trade winds, while southern Australia experiences cool and moist (often gusty) westerly winds. These westerlies and associated frontal systems have a controlling influence on the climate of southern Australia, causing rainy periods. Cold outbreaks over this region occur when cold air of Southern Ocean origin is directed northwards either by intense depressions south of Tasmania or by anticyclones situated in the Great Australian Bight with their major axis orientated north-south extending into far south latitudes.

During September, the circulation starts to depart from its winter pattern as the anticyclones start their migration poleward again.

- Map 3
- Map 4

Spring & Summer Patterns

Spring Pattern

Spring gives rise to very changeable weather over south eastern Australia. Fine mild conditions prevail in the vicinity of the anticyclone axis but the troughs between these cells can become markedly active, often with depressions forming in them.

1. **Windy Westerlies:**

   Lows passing south of the NSW state with cold fronts moving rapidly east across NSW. This regime might last for several days or a week in late winter/early spring. Low-level turbulence over the ranges and near the escarpment is a hazard for light aircraft. Mountain waves are often observed. Damage to structures occurs sometimes in towns such as Katoomba in the Blue mountains or Jindabyne in Snowy mountains.

2. **Strong SW Flow:**

   Lows often develop in central Tasman in response to upper cold pools and baroclinic instability. Strong winds or gales along coastal waters and ocean waters may last a few days. Late spring snowfalls can occur along the ranges, followed by frosts.

3. **Hot day in Late Spring:**

   With inland temperatures rising the occasional northerly flow ahead of a cold front can bring high temperatures to the coast. Thunderstorms are an increasing possibility, although humidity is still generally low. Large hail in severe storms is most common in NSW in November.

4. **NW cloud bands:**

   This is a long, narrow band extending from tropics to the north and west of Australia to mid-latitudes. It is oriented in an approximately northwest to southeast sense. It may be thousands kilometers long and only a few hundred kilometers wide. It is an important weather system bringing, on occasion extensive rains to inland eastern Australia.

Summer Pattern

The typical summer pattern shown in map 1 is one of the approximately three day cycles. East to northeast sea breezes along the NSW coast are followed by the passage of a cold front astern of which winds turn south to southeast with a period of bad weather possible. As the anticyclone progresses eastwards, the wind slowly backs east to northeast and the weather clears.

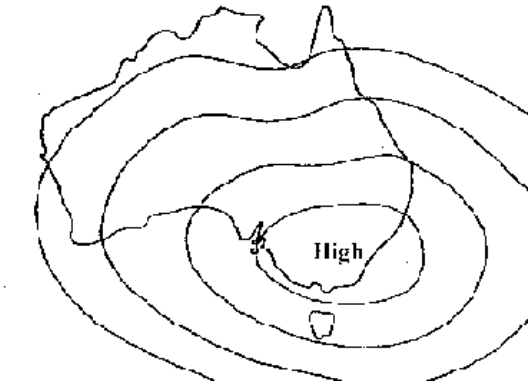
Heat waves occur over south-east Australia when there is an interruption to the eastward progression of anticyclones over the Tasman Sea and winds back northerly and later northwesterly ahead of the next front.

The Inter-Tropical Convergence Zone (ITCZ) usually lies across the northern latitudes of the continent in summer and occasionally moves further south to central Australia, bringing heavy rains to that region.

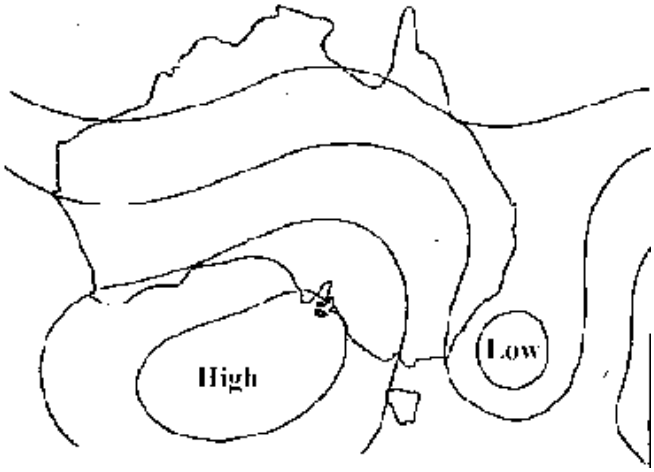
Tropical cyclones develop over the sea areas to the northwest and northeast of Australia, associated with the ITCZ, between November and April. Their frequency of occurrence and tracks they follow vary greatly from season to season. On average, about three Coral Sea cyclones per season directly affect the coast of Queensland, and about two Indian Ocean affects the north-west coast. Less frequently cyclones form in the Gulf of Carpentaria and some of these move across Cape York Peninsula and regenerate in the Coral Sea. Upper level air moisture often affects Hunter and Newcastle weather several days after Indian Ocean cyclones have moved inland, particularly in conjunction with southern fronts.

Towards the end of April, the anticyclone belt begins its seasonal movement to north and the westerly winds start to become significant to the south of NSW and extending to Hunter early June.

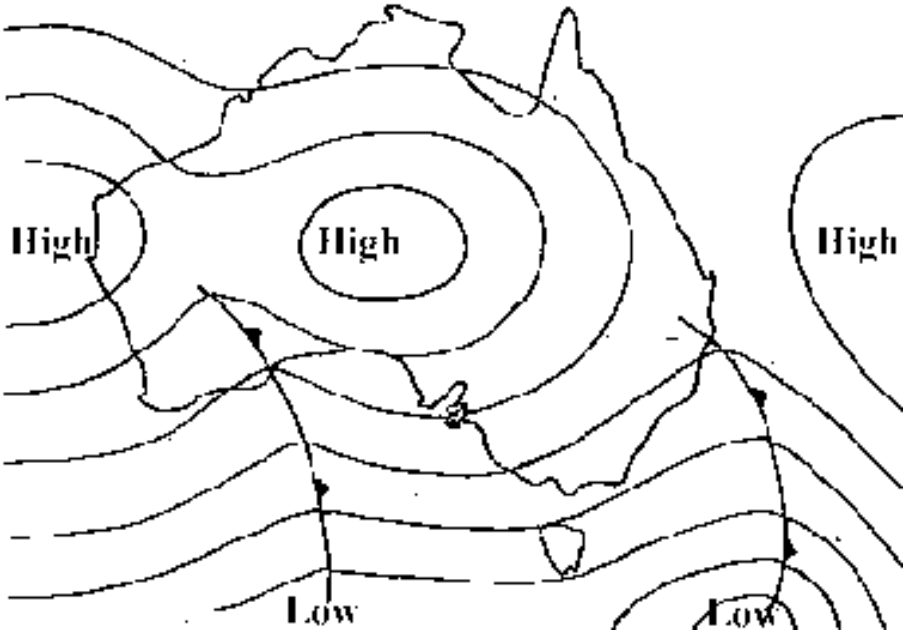
Map1. Autumn Anticyclone



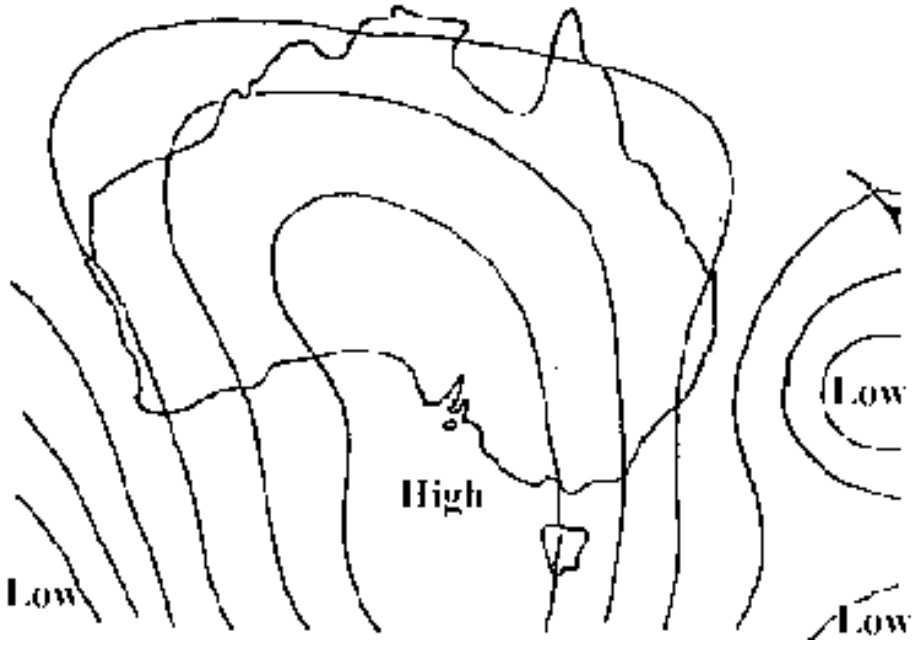
Map2. The east coast depression



Map3. The winter westerlies

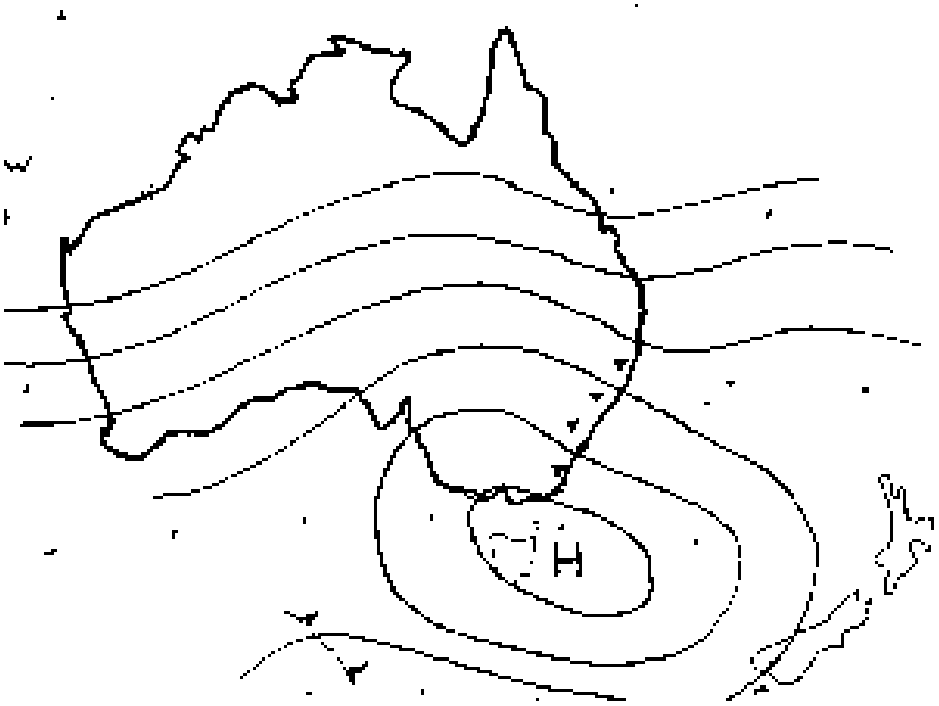


Map4. Polar maritime airflow in winter



Map 5. Surface trough thunderstorms over eastern NSW

Map 6. Cool SE flow , High keeping south



Map 7. Recurving T.C. ("Nancy" 3/2/90)