

# Weather and Ballooning in Australia

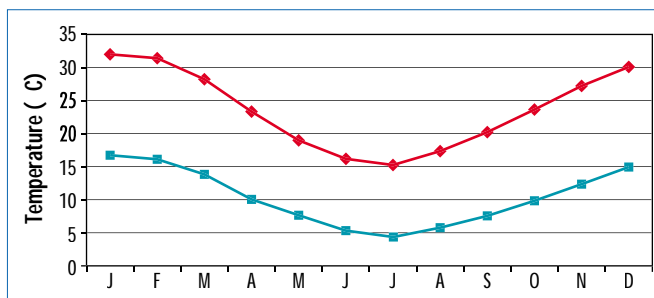
Luxembourg

The 16<sup>th</sup> Hot Air Balloon World Championship was held in Mildura south east Australia, on the border of New South Wales and Victoria, in June 2004. More than 140 balloons, amongst them 87 competition balloons and fiesta balloons, were participating at the games. The three Luxembourg teams asked me to participate as a crew member and meteorologist.

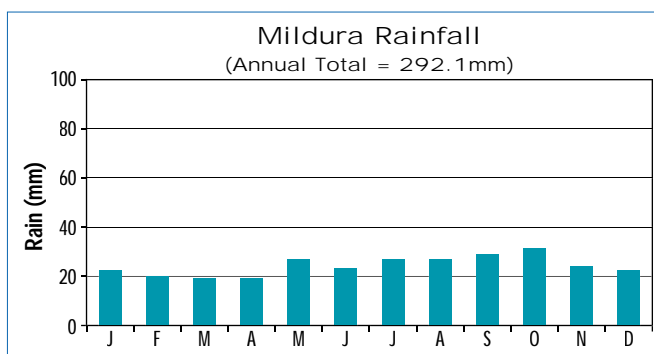


Mildura has a population of 20,000 inhabitants and is situated at an altitude of 50m in a flat area near the Murray River, in between vineyards and national parks. Between Mildura and Victoria on the coast, there are 450km of bush land or grass fields. Westerly winds penetrate across this terrain and cold fronts coming in from the coast are still active as they reach Mildura. Despite this, Mildura has a climate of persistently dry grassland.

The annual total rainfall of 292mm is evenly distributed through the year. October is the wettest month (31mm).



The annual average minimum temperature is 10.3°C, varying from 4.3°C in July to 16.5°C in January. Four nights per year are below 0°C on average. The average maximum temperature is 23.6°C. There is an average of 77 days per annum where the temperature exceeds 30°C.



The prevailing wind direction is southerly in summer, whilst in winter the prevailing northerly wind in the morning tends towards the west in the afternoon. Days with strong winds (21 per year) are more likely occur in the late winter and spring months. During dry years, strong winds associated with cold fronts generate dust storms, particularly in spring and summer.

Ballooning in competition requires specific knowledge from the pilots but also from the crew. The pilots have to accomplish different tasks during the competition flight, as for example a 'fly in', where the pilot has to look for a starting place 4-6 km away and drop a marker on a cross of 10m. The



Wind speed between 5 and 10 m/s in July at 850 hPa

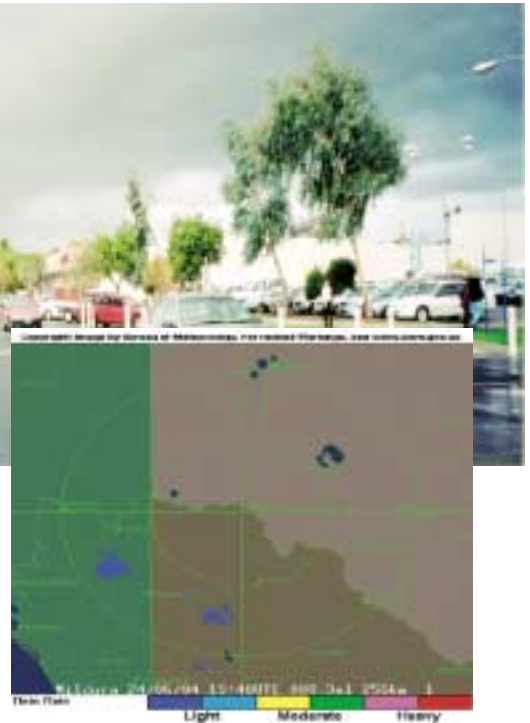
consultant meteorologist has to be accustomed to the local climate and weather conditions. His/her work is to produce a 'nowcast' for the next four hours. In Australia, a northern hemisphere forecaster has to change his habits since air moves in a clockwise direction around a low pressure and winds strengthen and back on the passage of fronts. Furthermore, the magnetic South Pole is not very far from Mildura, which means that most of the compasses do not work properly in that area. Orientation is difficult not only because of an unknown area but also because the sun moves across the northern half of the sky from east to west.

The weather conditions at our arrival on the 24<sup>th</sup> June 2004 were marginal, which made test flights impossible.

Wind: WSW 7-10kts.  
 Gusting: 15-20kts.  
 Temperature: 11,0°C  
 Min 6,8°C / max 15,1°C  
 Rel. hum. 83%  
 Dew point: 3.0-7,1°C  
 Clouds: sctCb-bknCu  
 Weather: rain shower  
 Pressure: 1018 hPa



Mildura city centre  
 24.06.2004  
 late afternoon.



Mildura Radar 24.06.04 19 40 UTC

## Weather Information

Two main internet web sites are available for the meteorological information in this area.

### From the Australian Numerical Model.

NMOC National Meteorological & Oceanographic Centre. The numerical model in use is GASP (Global Analyses and Prediction) with 85km horizontal resolution, 29 levels and 7 day forecasts twice a day, providing surface winds used in the global sea state prediction scheme.

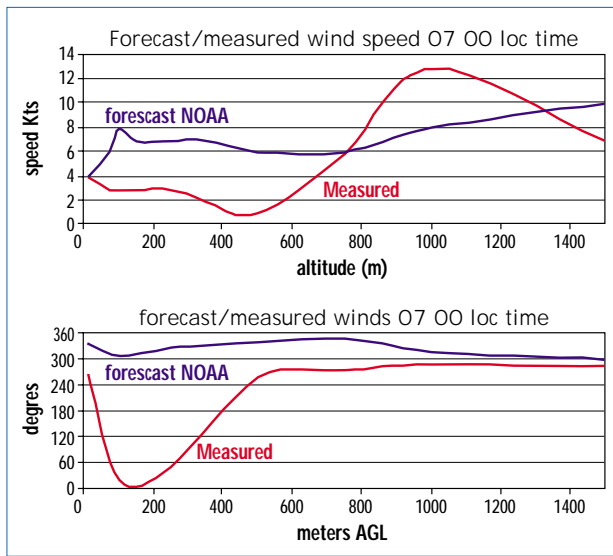
The LAPS (Limited Area Prediction System) has a higher horizontal resolution of 37km. Some Meso-LAPS forecasts run with a horizontal resolution of around 12 km.

**From the U.S. numerical model.**

READY (Real-time Environmental Application and Display sYstem). The GFS (Global Forecast System) short range model, 3 hourly steps up to T+84, updated every 6 hours with resolution of 80 km. This model was very useful for low level winds. The actual wind is measured with a pibal and the 'winds-way' wind reader. This system indicates the wind direction and speed up to 5000 ft in increments of 100 ft.

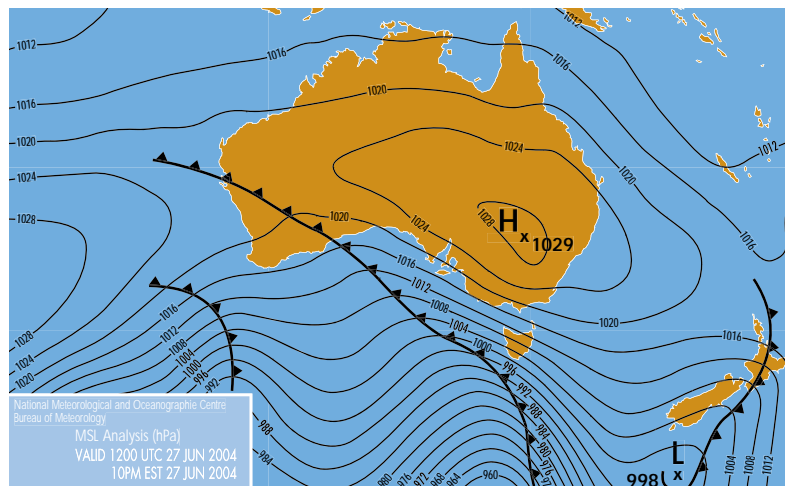


Due to strong winds the days before, the first flight was only possible in the morning of 27<sup>th</sup> of June. The weather conditions were excellent; low wind speed at the ground (4-8kts) with a direction between 240° to 360° up to 1600 ft.



The influence of the high pressure in the Mildura area did not last for long. The wind speed was increasing and this increased the turbulence at ground level. The next flight was only possible in the evening of 29<sup>th</sup> following the passage of the cold front. A maximum wind of 160 kts at 35000 ft across the south-west coast of Australia was approaching Mildura .

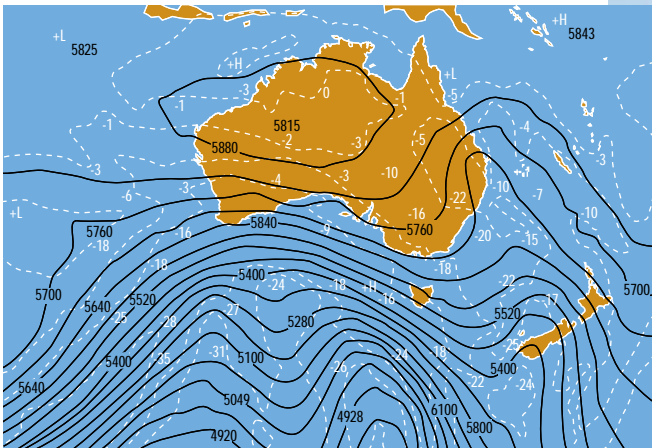
Meanwhile, the organiser's meteorological crew from the



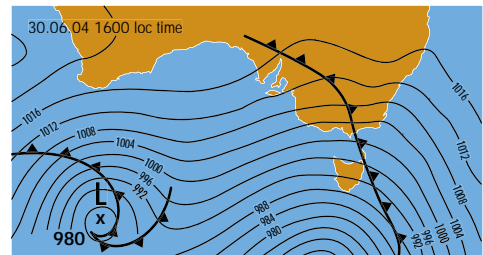




Winds 29.06.04 10kt gusting 15kt upper limit.



Australian Bureau of Meteorology in Melbourne were waiting for better conditions...



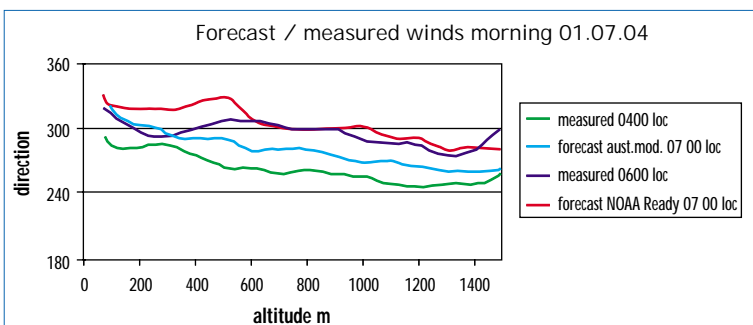
... whilst the crews spent time exploring the Murray River and visiting the surrounding national parks.



Monica Long, and Jon Whitford.



A further cold front passed through on 1<sup>st</sup> of July with a ridge of high pressure following. Winds of less than 5kts (between 280° and 320°) allowed the competition to continue and four tasks were completed.



Friday morning (2<sup>nd</sup> of July) was the last day of the competition with high pressure maintained, low wind speeds of 5kts and enough steering for four more tasks.

Claude Sales