

CASE STUDY: The Great Inland Floods, 1990

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From the Emergency Management of Australia database this event affected Queensland, New South Wales and Victoria and claimed 7 lives, caused 60 injuries and left 5,000 people temporarily homeless. The total estimated cost of these floods was \$415 million (in 1990 values), most of which was uninsured.

In the weeks prior to these floods heavy rain fell at times over inland parts of NSW and southern and Central Queensland. In Queensland 24 hour totals up to 117mm were recorded on 1 and 2 April 1990 and this continued to a lesser extent up to 6 April. Another similar wet period occurred through this part of Queensland from 9-12 April. NSW also received some good falls for example in the Nyngan region, Mudall, 33km S of Nyngan, recorded 24 hour totals of 52mm 9th, 66mm 11th and 101mm 14th April 1990.

Therefore the catchments were moist and ready for run off should the right weather system arrive. A potent weather system did arrive over eastern Australia from 18-22 April 1990. Figure 1 shows the mean sea level charts over this period when moist tropical northeast flow is indicated into eastern Australia culminating into the development of a deep low pressure system east of Bass Strait. A lifting mechanism is required to produce widespread heavy rain and a way to diagnose such ascent is to analyse the flow at 700hPa (elevation about 3km). When the winds at this level flow from warm to cool region it indicates that warm air is being lifted over a dense cool layer of the atmosphere. This can be seen to have occurred over large areas of inland Queensland and NSW from 10am 18 April 1990 to 10pm 19 April 1990 in Figure 2.

Over the period this system dumped torrential rain, with isolated daily totals to 212mm across large areas of central Queensland. Falling on saturated catchments, major flooding quickly developed on the Warrego and Maranoa Rivers, and many other inland systems. The towns of Jericho and Augathella were flooded, and on the 20th two-metre deep floodwaters bisected the town of Alpha as the Alpha Creek rose a metre above its previous record. A section of the Longreach railway was washed away.

Early on 21 April, Charleville residents were rudely awoken by the rapidly rising Warrego River. Many were forced to retreat to their rooftops and had to be rescued by helicopter. Late that day the river peaked at over 8.5 metres, 1.5 metres above the previous record. Levee banks were overwhelmed, and as floodwaters spread through the town, the entire population of 3500 was evacuated to the airport. Following an uncomfortable couple of days, residents returned to confront the damage: houses torn from stumps, gaping holes in roads, stinking mud over everything. Downstream, Cunnamulla residents fared better as the river stopped rising when it was 85cm below the top of the levee banks.

Details of the flood damage in Queensland

Warrego River

Augathella – 30 houses evacuated and more than 50 houses inundated.

Charleville – 1180 houses inundated from a total of 1470 houses. 2800 residents displaced from a population of about 4000. Inundation of all commercial and industrial premises in town.

Wyandra- 2 houses affected.

Thomson-Barcoo Rivers

Jericho – 20 houses inundated, 5 houses with major damage, population 170.

Blackall – 120 people evacuated from 29 houses. 15 business premises inundated.

Aramac – One houses flooded.

Alpha Creek-Belyando River

Alpha – Worst flood in history with water 3metre deep in lowest places. 68 houses flooded i.e. 75% of the town (population 600). 15 business premises flooded.

Maranoa-Balonne Rivers

St George – partial flooding of low areas of town, 2 houses evacuated.

Rural Damage (from DPI)

300,000 sheep lost. 11,000 cattle lost. 9,200km of fencing lost.

Impact at Nyngan NSW

There was major flooding on the Lachlan, Macquarie and Castlereagh Rivers, among others. As the Bogan River rose, residents in Nyngan desperately attempted to raise levee banks. Over 200,000 sandbags were laid in four days, but to no avail. The levees were breached on the 23rd, as the river surged to 5.2 metres, nearly a metre higher than the previous record. Most of the town was inundated, and the population of 2500 was evacuated by helicopter to Dubbo, 160km away. Residents could not return to their homes for three weeks, billeted by the people of Dubbo, about 160 km away.

Impact Victoria

As the low moved off the Victorian east coast, generating torrential rains over Gippsland on 20 and 21 April - up to 350mm within 48 hours on the mountains. Major flooding occurred on the Thomson and Avon Rivers, and the Mitchell River flooded many hectares of vegetable crops on the river flats and cut the highway. People were evacuated from caravan parks and low-lying areas, and 150 homes were flooded. Though the damage bill ran to many millions of dollars, commercial centres, built on high ground in this flood-prone region, largely escaped.

Rainfall

Rainfall in the river and creek catchments in the Charleville area (Figure 3) show the very large totals registered on the 19 and 20 April over wide areas. Figure 4 shows the rainfall in the stream catchments affecting Nyngan and although not as heavy as the rain, which fell in the Charleville area, it was widespread and heavy throughout the catchments.

Other heavy rainfall Queensland

Aramac 188mm 18th 94mm 19th 74mm 20th

Jericho 26mm 18th 173mm 19th 129mm 20th

Alpha 4mm 18th 159mm 19th

Isisford 1mm 18th 31mm 19th 138mm 20th

Rainfall Victoria

Crooked River (54km SW of Omeo) 131mm 21st 163mm 22nd.

Hawkhurst (59km SW of Omeo) 131mm 21st 162mm 22nd.

Dargo 76mm 21st 132mm 22nd.

Lake Tyers 60mm 21st 93mm 22nd.

Mt Tamboritha (78km NNW of Sale) 83mm 21st 181mm 22nd.

Murderers Hill (38km N of Traralgon) 167mm 21st 204mm 22nd

River heights in Queensland Rivers

Warrego River heights:

Lochinvar	8.85m highest on record
Augathella	7.30m highest on record
Charleville	8.54m highest on record
Wyandra	10.0m highest on record
Cunnamulla Bridge	10.15m highest on record
Paroo River	5.80m at Eulo 2 nd highest on record.
Bulloo River at Adavale	5.00m 3 rd highest on record.

Thomson Barcoo Rivers and Cooper Creek catchments:

Muttaburra	7.15m 3 rd highest on record.
Longreach	6.37m 3 rd highest on record.
Jundah	7.55m 2nd highest on record.
Blackall	7.30m highest on record.
Isisford	9.20m highest on record.
Windorah	7.95m 2 nd highest on record.

Nappa Merrie	9.38m 2 nd highest on record
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Nebine, Mungallala and Wallam Creek catchments:

Bollon	1.53m 2 nd highest on record.
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Balonne River:

Mitchell	8.08m highest on record.
St George	12.24m 2 nd highest on record.
Dirranbandi	5.20m 2 nd highest on record.

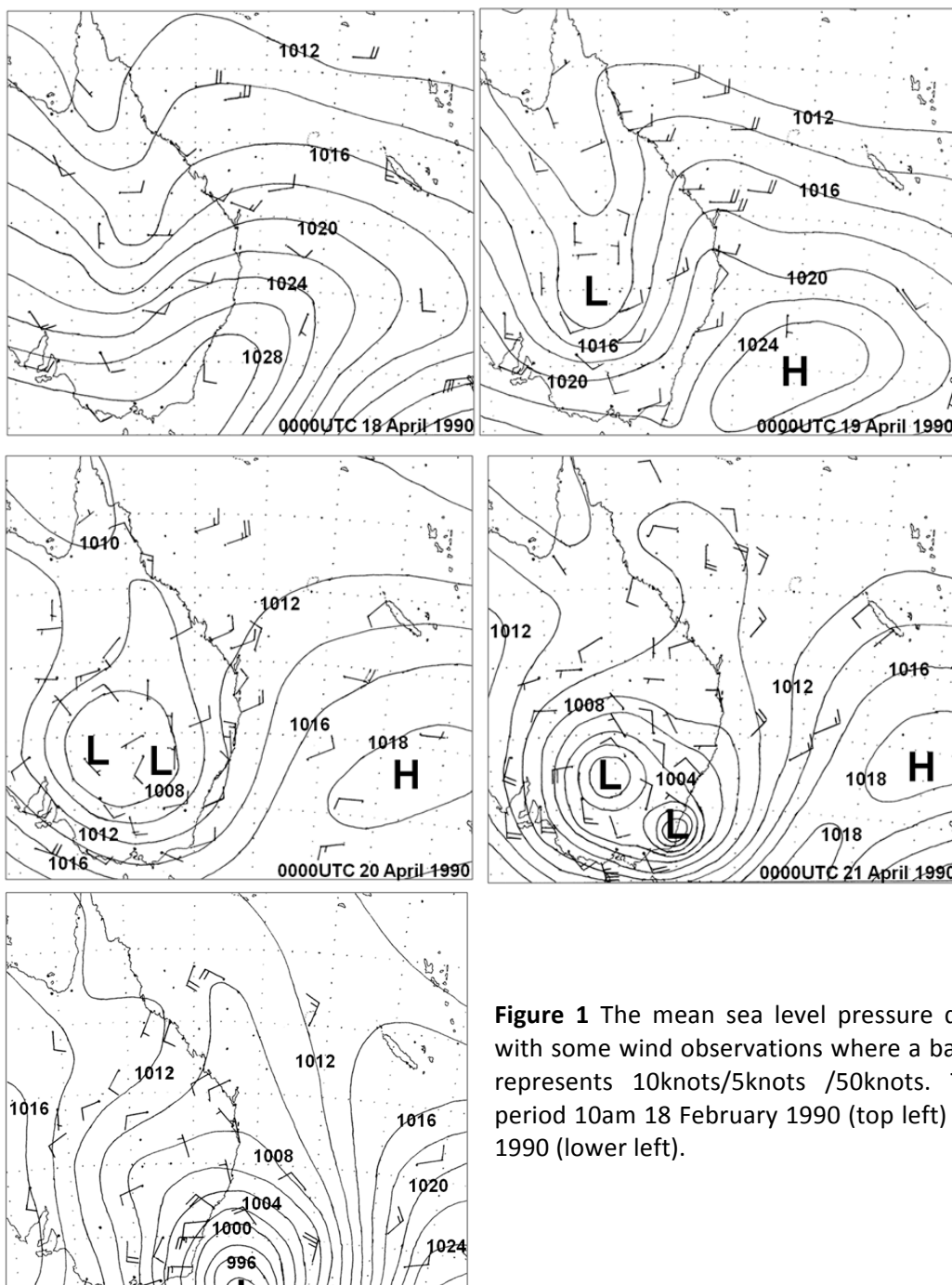


Figure 1 The mean sea level pressure distribution (hPa) with some wind observations where a barb/half barb/flag represents 10knots/5knots /50knots. This covers the period 10am 18 February 1990 (top left) to 10am 22 April 1990 (lower left).

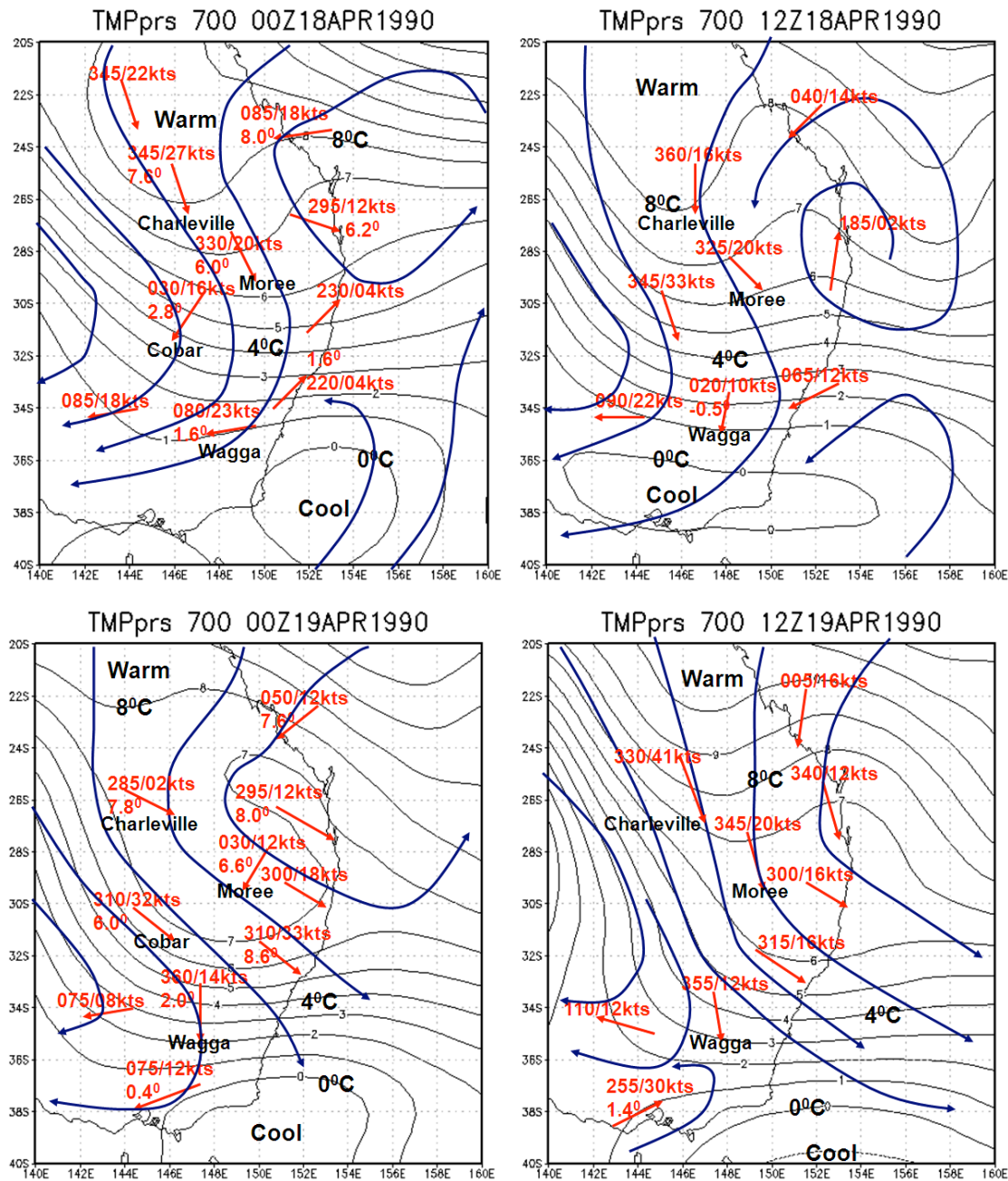


Figure 2 Wind flow (blue arrows) at 700hPa (elevation approximately 3km) with isotherms (degrees Celsius) and observations of wind and temperature at 700hPa from Australian upper air observation sites. This covers the period 10am 18 April 1990 (top left), 10pm 18 April 1990 (top right), 10am 19 April 1990 (lower left) and 10pm 19 April 1990 (lower right).

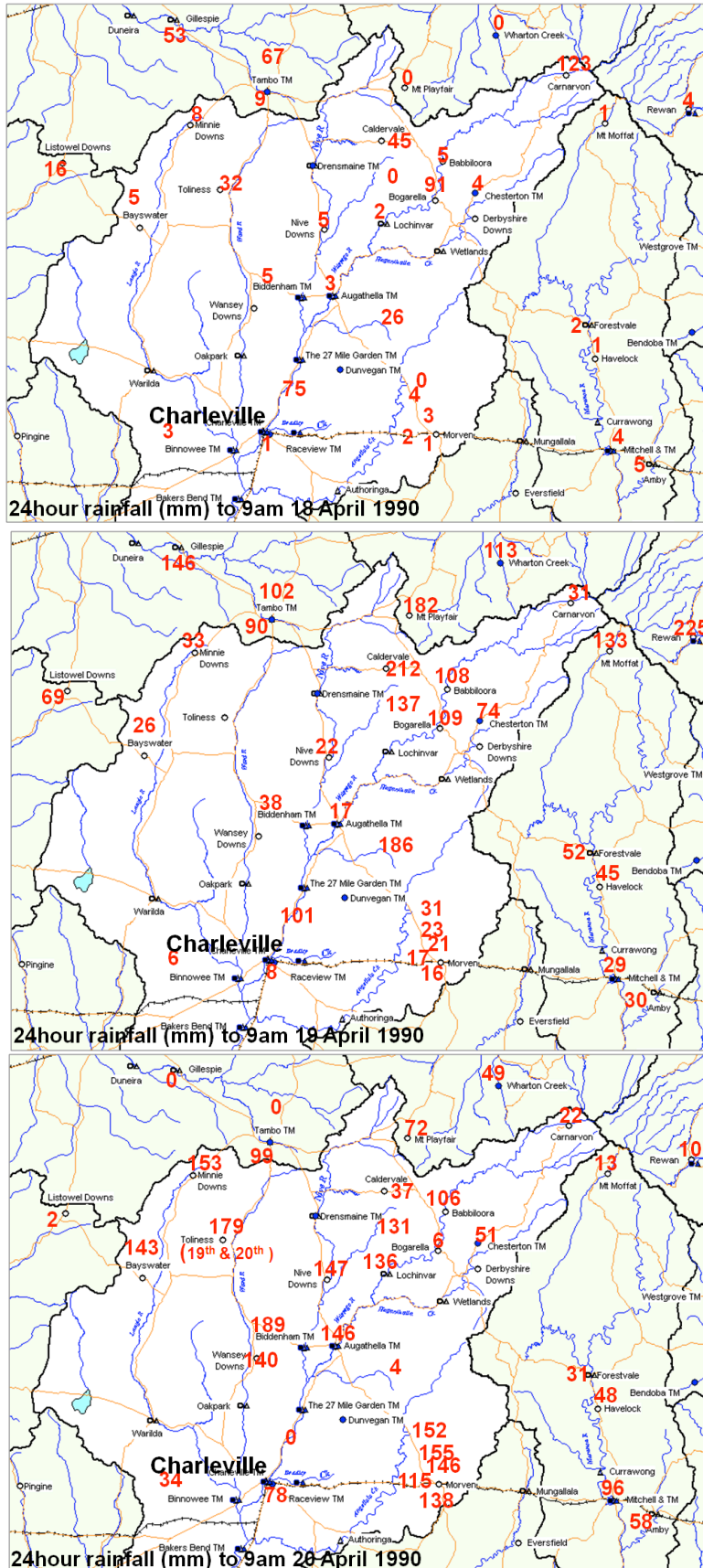


Figure 3 Twenty four rainfall totals (mm) in the catchments in the Charleville area read at 9am 18 April 1990 (top), 9am 19 April 1990 (centre) and 9am 20 April 1990 (bottom).

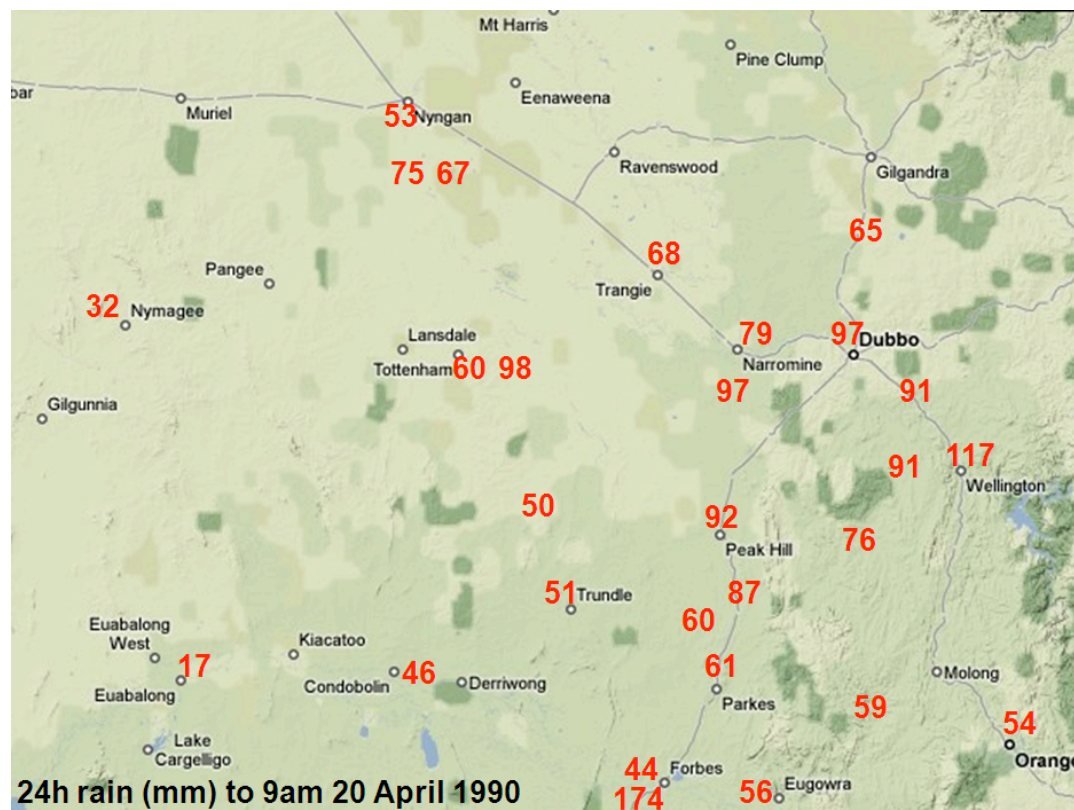
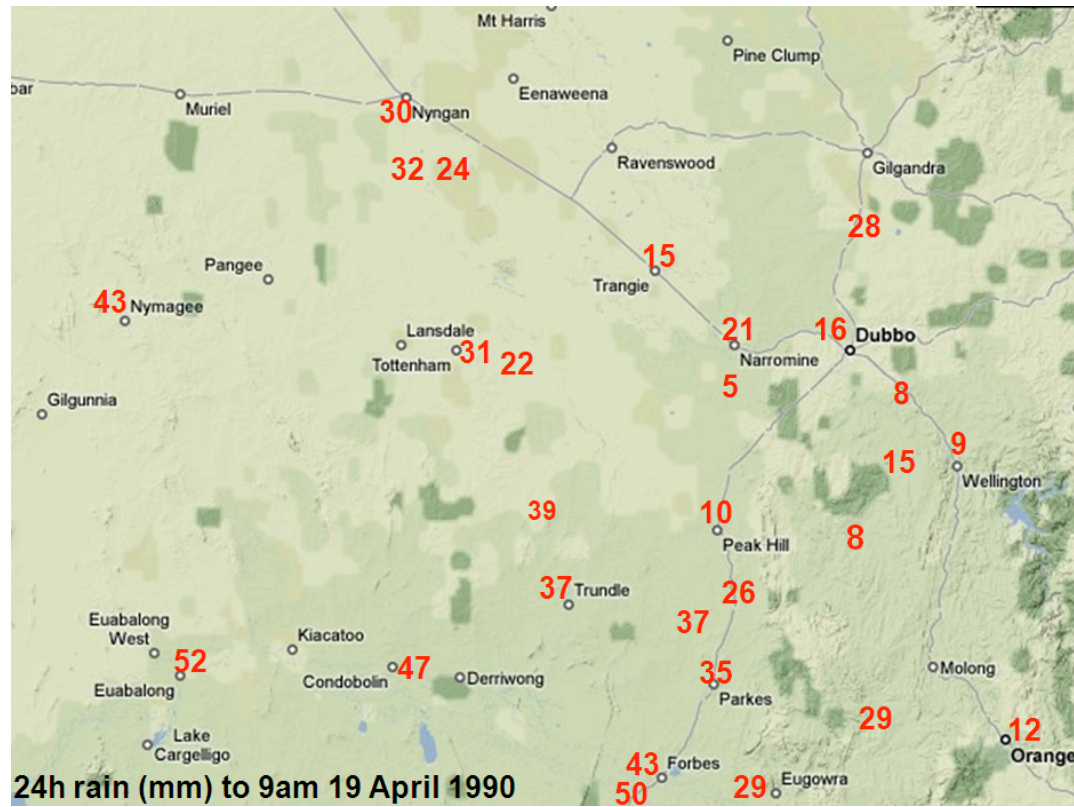


Figure 4 Twenty four rainfall totals (mm) in the catchments flowing into the Nyngan region read at 9am 19 April 1990 (top) and 9am 20 April 1990 (bottom).