



**Australian Government**  
**Bureau of Meteorology**

Tasmania and Antarctica Regional Office  
Bureau of Meteorology  
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## **SPECIAL CLIMATE STATEMENT 30**

### **Heavy rainfall and flooding in northeast Tasmania**

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*Tasmania and Antarctica Climate Services Centre*  
*Bureau of Meteorology*

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## **Introduction**

Exceptionally heavy rainfall occurred in northeast Tasmania on 23 and 24 March 2011 as a complex area of low pressure moved near the state. Gray (Dalmaine Road) recorded 327.2 mm in 24 hours, making it Tasmania's third-highest daily rainfall total on record. The two-day totals were also extreme, with Gray's total of 452.4 mm having only been exceeded once before, on 4-5 April 1929.

The rain caused major flooding in the South Esk river basin, with peak heights in some places comparable to the floods of May 1969 and just slightly lower than the levels observed during the devastating floods of April 1929. There was also flash flooding and minor to moderate flooding in a number of other rivers in the northeast and central north.

Although the heaviest rain fell on the 23rd and 24th, there were also heavy falls in the northeast early on the 21st and in the northwest from late on the 21st until early on the 23rd. This rain has added to very heavy falls in the north during January (see Special Climate Statement 25 *Exceptional January rainfall in northern Tasmania*) and a wetter than usual February to make it the wettest start to a year on record for a number of sites in northern Tasmania.

## **Synoptic summary**

A complex and slow-moving area of low pressure over southeastern Australia combined with a ridge to the distant south to bring moist and fresh northeast to easterly winds across Tasmania from 21 to 25 March 2011. Individual low centres triggered locally very heavy rain falls in the northeast of the state.

Mean sea level pressure weather charts for the period are shown in figure 13, and show the main low centres. The first of these moved slowly eastwards from South Australia during the 21st to be off the New South Wales coast by the 22nd. A trough extended from that low, across Victoria and to the west of Tasmania. In this trough a second low developed over western Bass Strait on the morning of the 22nd, bringing moderate to locally heavy rainfall to northwest and northeast Tasmania.

Further lows developed over Bass Strait and near northwest Tasmania during the 23rd, further enhancing rainfall in the northeast of the state. The low that had been off the NSW coast approached Tasmania late on the 23rd, increasing easterly winds and bringing locally very heavy falls of rain into the northeast. This low continued to bring moderate rain and some heavy falls as it tracked slowly down the east coast of Tasmania during the 24th.

The area of low pressure moved away over the Tasman Sea during the 25th.

## **Weather events leading up to 23 March**

A line of heavy showers affected a narrow area extending from about Pyengana in the north to Swansea in the south from very late on Sunday 20 March 2011 to the early hours of the 21st. Moonameeta recorded 80.6 mm, most of which fell in the two hours around midnight. Around the same time, Fingal received 57.6 mm and Swansea 56.0 mm. The heavy falls were confined to a very narrow band — sites just 20 km to the west and east reported less than 10 mm.

Showers developed in the northwest on the afternoon of the 21st, increasing to rain on the morning of the 22nd with locally heavy falls around the far northwest tip and on King Island. Three Hummock Island recorded 112.4 mm in the 24 hours to 9 am on the 23rd, and over 50 mm fell over much of King Island and at some inland areas of the northwest. Cape Grim, with 50.4 mm, had its wettest March day on record. This rain moved away to the west by noon on the 23rd.

The area of low pressure to the north of Tasmania combined with a high pressure system to the south to direct very strong easterly winds over Tasmania on 22 and 23 March. The strongest winds were in the north, with gusts reaching 122 km/h at Cape Grim, 113 km/h at Hogan Island, 98 km/h at Smithton and 93 km/h on Flinders and King Islands. There were reports of felled trees and damaged roofs in the northwest, mainly during Tuesday evening and Wednesday morning, and over 8000 premises lost power.

### **Very heavy rain in the northeast on 23 and 24 March**

There were two bursts of heavy rain in the northeast. The first occurred on the morning of Wednesday 23 March, with much of the area receiving over 50 mm in the 24 hours to 9 am on the 23rd as shown in figure 3. Pyengana had 138.0 mm and Gray had 125.2 mm.

The rain eased for a few hours before increasing again during the late afternoon, and persisted until the morning of the 24th. This was when the heaviest rain fell, including 327.2 mm at Gray in the 24 hours to 9 am on the 24th. As shown in figure 4, most of the northeast had over 100 mm and at least 50 mm fell across the northeast third of the state.

The two-day rainfall totals were exceptional, with a total of 452.4 mm recorded at Gray. This is just short of the Tasmanian record of 467.8 mm at Mathinna in April 1929 (see table 3).

Nearly every site in the northeast third of the state had either its wettest or near wettest March on record, and some sites had over five times their usual rainfall for March. Table 2 lists the sites that had attained their highest March total rainfall on record.

### **Major flooding of the South Esk river basin**

The extremely heavy rainfall caused major flooding of the South Esk river basin, with peak heights attained in the upper reaches during Thursday 24 March 2011 and affecting the lower reaches on the 25th and 26th. Peak heights in the upper and middle reaches were comparable to the major floods of May 1969 and just slightly below those of April 1929. Significant peak heights are listed in table 4.

The peak at Fingal was a major flood of 7.82 metres, the third-highest river level on record behind the floods of 1929 (9.52 metres) and 1969 (8.59 metres). Downstream at Llewellyn the river also reached the major flood level, peaking at 11.02 metres and exceeding the May 1969 record of 10.82 metres (readings at Llewellyn only began around 1953). The flooding caused significant damage to bridges and roads, which had not been fully assessed at the time of writing.

Further downstream at Longford, a major stage flood was observed with a peak of 6.40 metres, the third highest level on record but well short of the events in 1929 (9.33 metres) and 1969 (7.95 metres). Moderate flood levels were observed at Trevallyn Pond, upstream of Launceston. Levees were not breached, but the Cataract Gorge flooded with damage to trees and footpaths, and a slalom course at Lake Trevallyn was washed away.

Rivers levels from several gauges are shown in figures 9 to 12.

### **Other flooding**

Moderate flooding also occurred throughout the lower reaches of the Macquarie River, with river levels remaining high throughout the weekend of 26-27 March and into the following week.

There was also moderate flooding in the Ringarooma River, and minor flooding in the North Esk River. The George, Scamander, Douglas, and Wye Rivers on the East Coast overflowed their banks.

### **Comparison with 12-14 January 2011**

As described in Special Climate Statement 25 *Exceptional January rainfall in northern Tasmania*, very heavy rainfall in the north between 12 and 14 January 2011 caused widespread flooding, including major flooding of the Mersey and Meander rivers. The total rain from the January event is shown in figure 7, for comparison with the March event in figure 6.

The main difference between the two events was the extent of the heavy rain. In January 2011 there were falls of over 200 mm in both the northeast and northwest, but during March 2011 such heavy falls were confined to the northeast. This meant that flooding in March 2011 was mostly confined to rivers that rise in the northeast, whereas in January 2011 there was also major flooding in the northwest.

The amount of rain falling in one area, however, was higher during the March 2011 event: both Gray (464.0 mm) and Pyengana (414.0 mm) received over 400 mm between 21 and 25 March 2011, while the highest total from 11 to 15 January 2011 was 376.8 mm at Falmouth. Hence although the area affected by flooding during March 2011 was smaller, the severity of the flooding was greater.

### **Heavy rainfall also in New South Wales and Victoria**

The complex area of low pressure was also associated with very heavy rain along the southern New South Wales coast and adjacent ranges (particularly on the far South Coast and in the Illawarra region), as well as in areas of eastern Victoria. A number of NSW locations recorded daily rainfalls in excess of 200 mm in the 24 hours to 9 am on 22 March, with the highest fall being 397.8 mm at Mount Darragh, west of Merimbula. Whilst such falls are not unprecedented in the region, it was the heaviest daily total in the South Coast district since 1985.

The next day, very heavy rainfall occurred in parts of eastern Victoria, with the heaviest falls in the afternoon and evening of the 22nd. The most intense falls were in Wilsons Promontory National Park and caused damaging flash flooding. The official gauge at Tidal River overflowed after receiving 250 mm, and totals in the 24 hours to 9 am on the 23rd in excess of 100 mm extended north to Fish Creek and Foster. A second area of intense rainfall affected parts of the Latrobe Valley and neighbouring ranges, with a number of daily totals in the 100-140 mm range in a belt extending from Thorpdale through to areas north of Moe.

### **Further Information**

This statement is based on information as of 31 March 2011. This is preliminary data, and may change as further observations are obtained and quality assurance is undertaken.

Some of the river height observations are provided by external agencies.

Further information on this statement can be obtained from:

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Station number	Name	Highest daily rainfall in March 2011 (mm)	Previous wettest for March (mm)	Years of record
091245	Cape Grim BAPS (Comparison)	50.4 on the 23rd	34.8 on the 8th in 2010	24
092002	Avoca (Railway House)	92.4 on the 24th	68.6 on the 3rd in 1981	105
092003	Bicheno (Council Depot)	128.0 on the 24th	104.9 on the 26th in 1946	84
092011	Gladstone (Old Post Office)	149.8 on the 24th	90.6 on the 19th in 1974	68
092030	Pioneer (Main Road)	142.4 on the 24th	93.7 on the 31st in 1959	97
092051	Pyengana (Forest Lodge Road)	200.0 on the 24th	96.0 on the 22nd in 1970	50
092094	Scamander	118.0 on the 24th	77.2 on the 23rd in 1974	29

Table 1. Sites with more than 20 years of observations that reported record highest March daily rainfall in 2011. The value from Pyengana is also a record for any time of year, exceeding the 197 mm received on 29 January 2004. Some sites with very high totals, including Gray (Dalmaine Road), have less than 20 years of observations and so are not shown in this table.

Station number	Name	Total rainfall for March 2011 (mm)	Previous wettest for March (mm)	Years of record	Average for March
091255	Deviot Jetty	112.2	104.0 in 2001	22	39.3
092011	Gladstone (Old Post Office)	262.4	253.6 in 1931	83	56.8
092027	Orford (Aubin Court)	142.8	123.9 in 1970	58	46.4
092051	Pyengana (Forest Lodge Road)	431.6	269.1 in 1970	50	80.2
092094	Scamander	171.2	156.9 in 1974	29	66.6

Table 2. Sites with more than 20 years of observations that had record highest March total rainfall. The average shown is the mean over all available years of record. . Some sites with very high totals, including Gray (Dalmaine Road), have less than 20 years of observations and so are not shown in this table.

Station number	Name	Date	2-day rainfall total (mm)	Rainfall on day 1 (mm)	Rainfall on day 2 (mm)
092024	Mathinna (Fingal Road)	4-5 April 1929	468.7	132.1	336.6
091083	Riana (Pine Road)	4-5 April 1929	459.7	178.3	281.4
092016	Goulds Country Post Office	4-5 April 1929	458.5	150.4	308.1
092141	Gray (Dalmaine Road)	23-24 March 2011	452.4	125.2	327.2
092009	St Marys (Cullenswood)	4-5 April 1929	429.7	147.3	282.4

Table 3. The five highest two-day rainfall totals in Tasmania

<b>River and station</b>	<b>Peak height (metres)</b>	<b>Flood stage</b>	<b>Comments</b>
South Esk at Mathinna	4.47	—	New record (since 1991)
South Esk at Fingal (M)	7.82	Major	3rd highest (behind 1929 and 1969)
South Esk at Avoca (M)	10.62	Major	2nd highest (behind 1929)
St Pauls at Lewis Hill	3.70	Major	2nd highest on record (behind 1969, records back to 1960)
St Pauls above Avoca (D)	8.11	Major	
South Esk at Llewellyn (H)	11.02	Major	New record (records back to 1953)
South Esk at Perth (D)	9.86	Major	2nd highest on record (behind 1969, records back to 1950)
South Esk at Longford	6.40	Major	3rd highest on record (behind 1929 and 1969)
St Patricks at Nunamara	1.50	Minor	
North Esk at Ballroom (D)	2.60	—	2nd highest (records back to 1991)
North Esk at Corra Linn	3.36	Minor	4th highest on record (behind 1929, 1936 and 1988)
Macquarie at Morningside (D)	4.08	Minor	
Macquarie above Westmoor (H)	3.44	Moderate	1st peak
Macquarie above Westmoor (H)	3.62	Moderate	2nd peak
Macquarie at Cressy Pumps (H)	4.00	Moderate	1st peak. 4th highest (since 1985)
Macquarie at Cressy Pumps (H)	3.47	Moderate	2nd peak

Table 4. Significant peak river heights. Sites marked with (M) are manual observations; those marked (D) are operated by the Tasmanian Department of Primary Industries, Parks, Water and Environment; those marked (H) are operated by Hydro Tasmania.

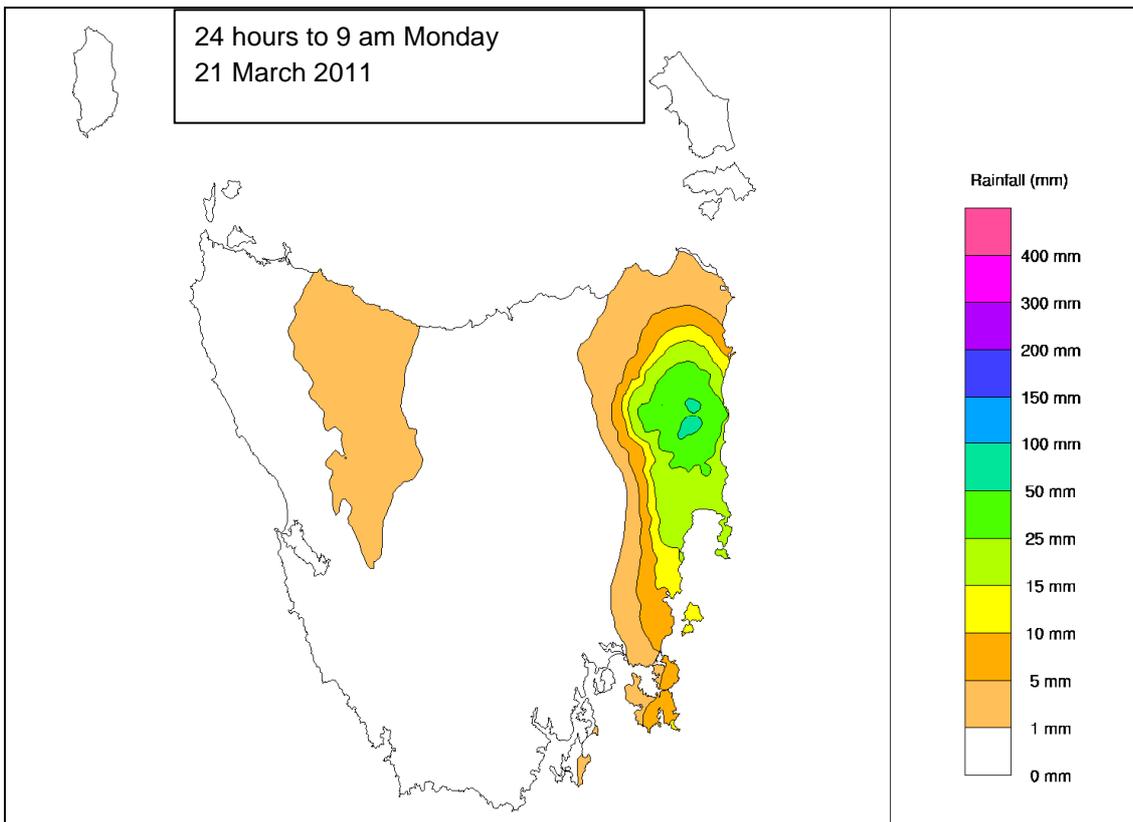


Figure 1. Rainfall to 9 am on Monday 21 March 2011, showing a relatively narrow band of moderate falls from about Pyengana to Swansea. These preliminary automated analyses may not have captured all of the detail.

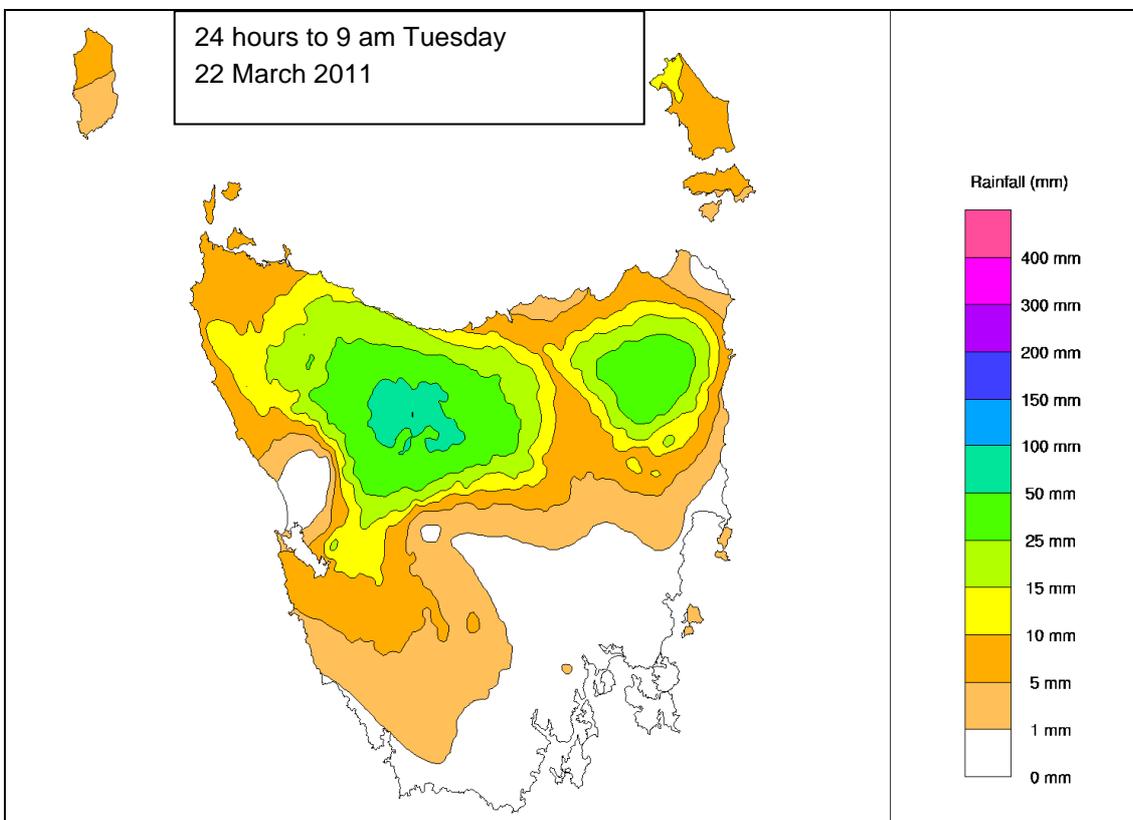


Figure 2. Rainfall to 9 am on Tuesday 22 March, showing areas of moderate totals in the northwest and the northeast.

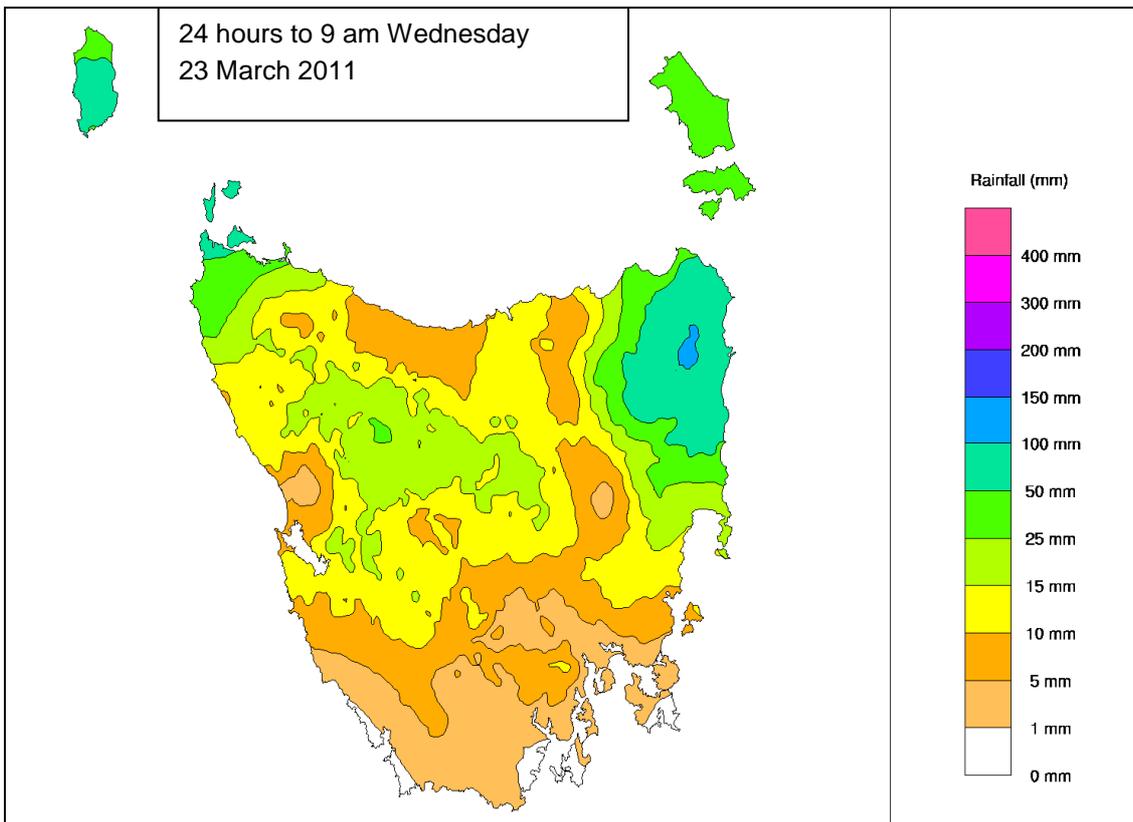


Figure 3. Rainfall to 9 am on Wednesday 23 March, showing an area of moderate falls in the northeast, with a small patch over 100 mm.

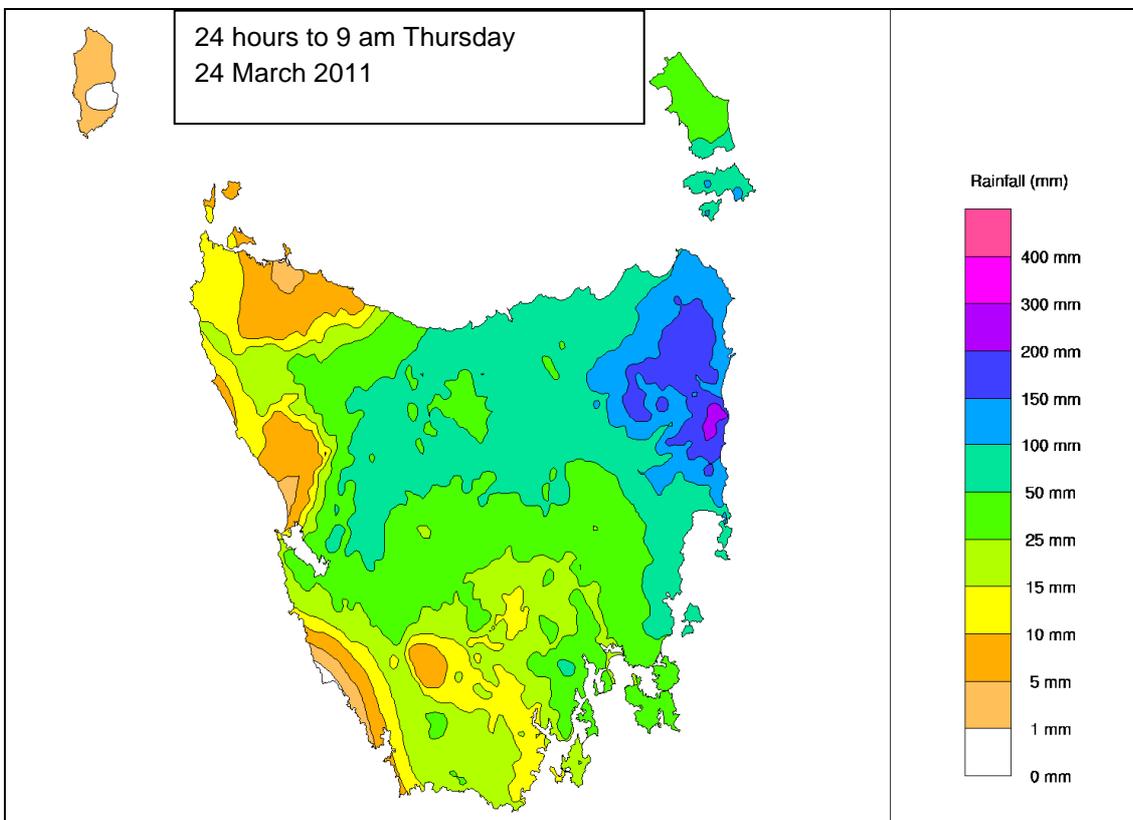


Figure 4. Rainfall to 9 am on Thursday 24 March showing totals over 100 mm in much of the northeast and some heavier falls, and moderate falls extending further west and south.

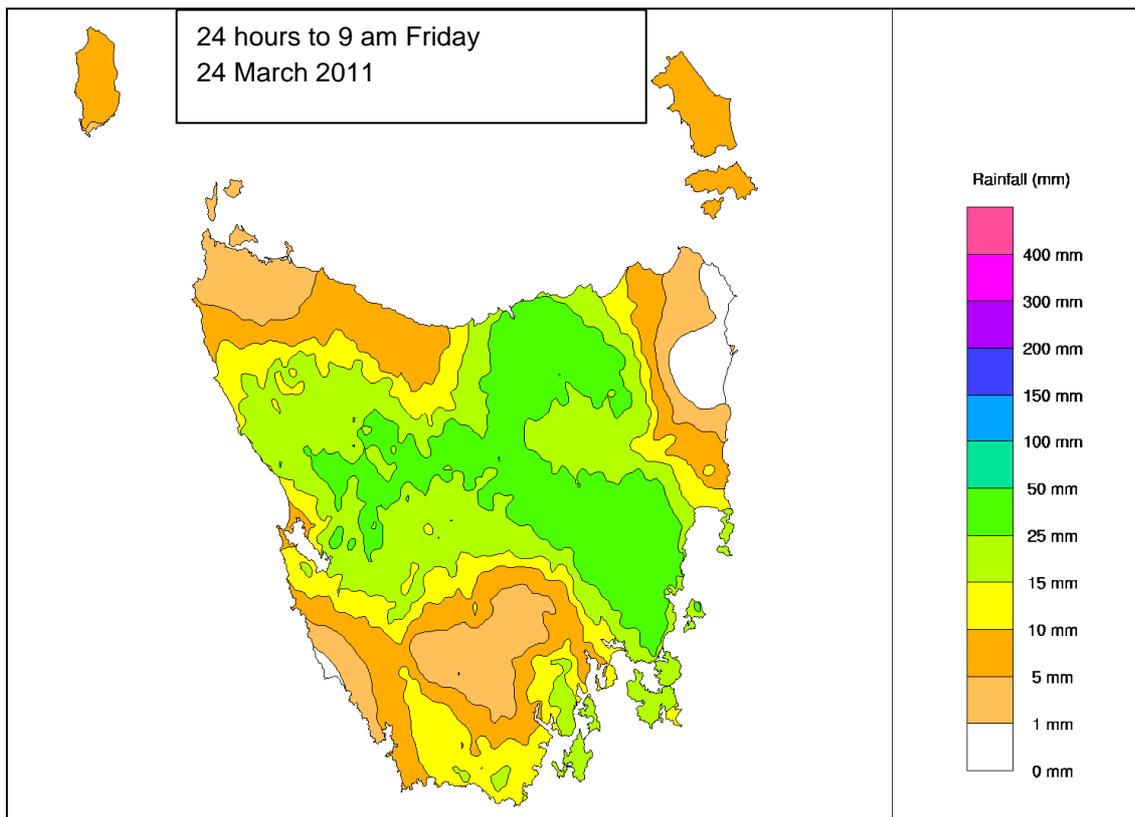


Figure 5. Rainfall to 9 am on Friday 25 March, with moderate falls on the southern East Coast and through the Midlands, but little in the northeast.

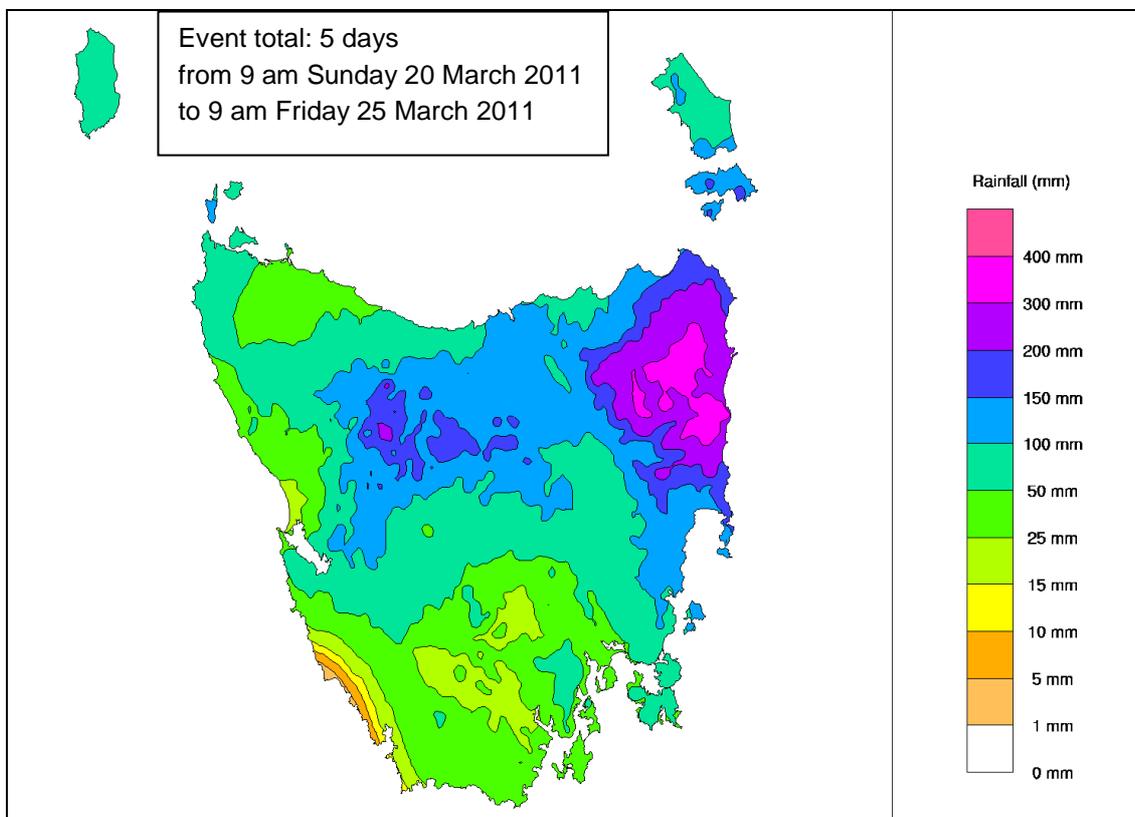


Figure 6. Event total rain, showing much of the northeast with at least 200 mm and areas receiving in excess of 300 mm. Some individual sites received over 400 mm.

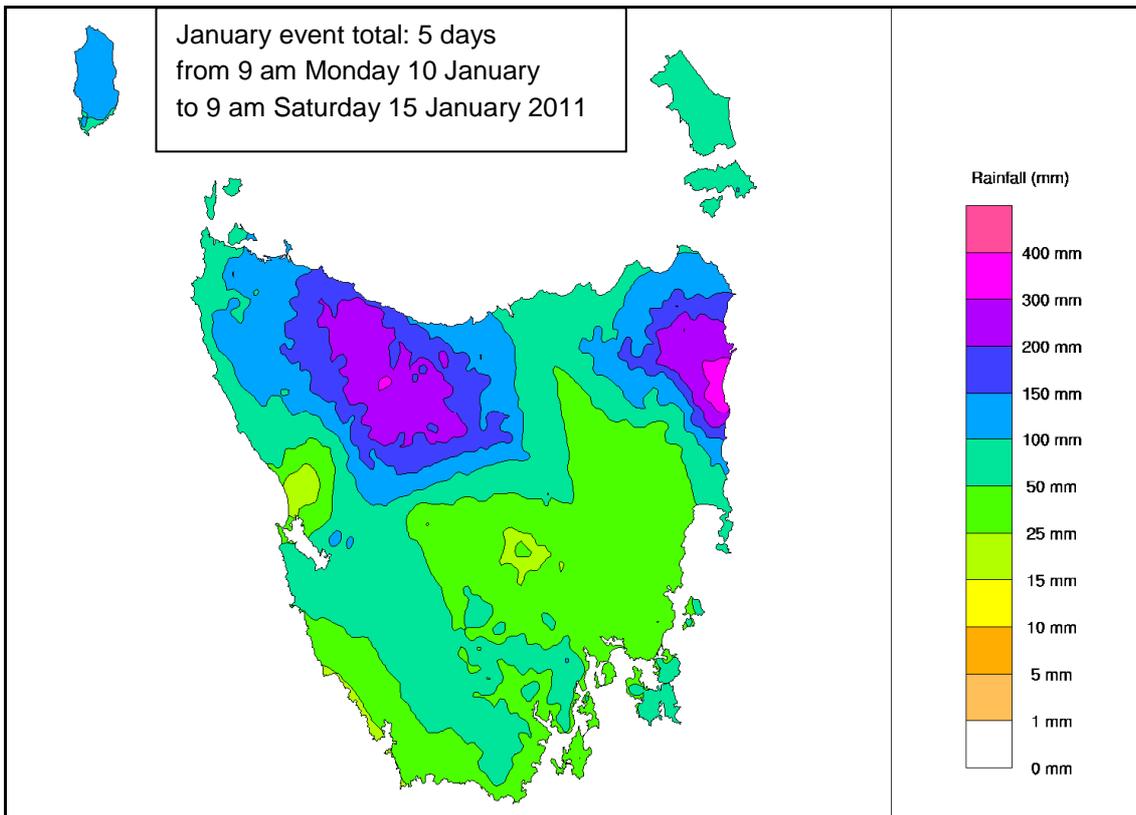


Figure 7. Total rain from the event in January 2011. The area in the northeast receiving over 200 mm was less in January than in March 2011, but the January event also saw a large part of the northwest receive more than 200 mm.

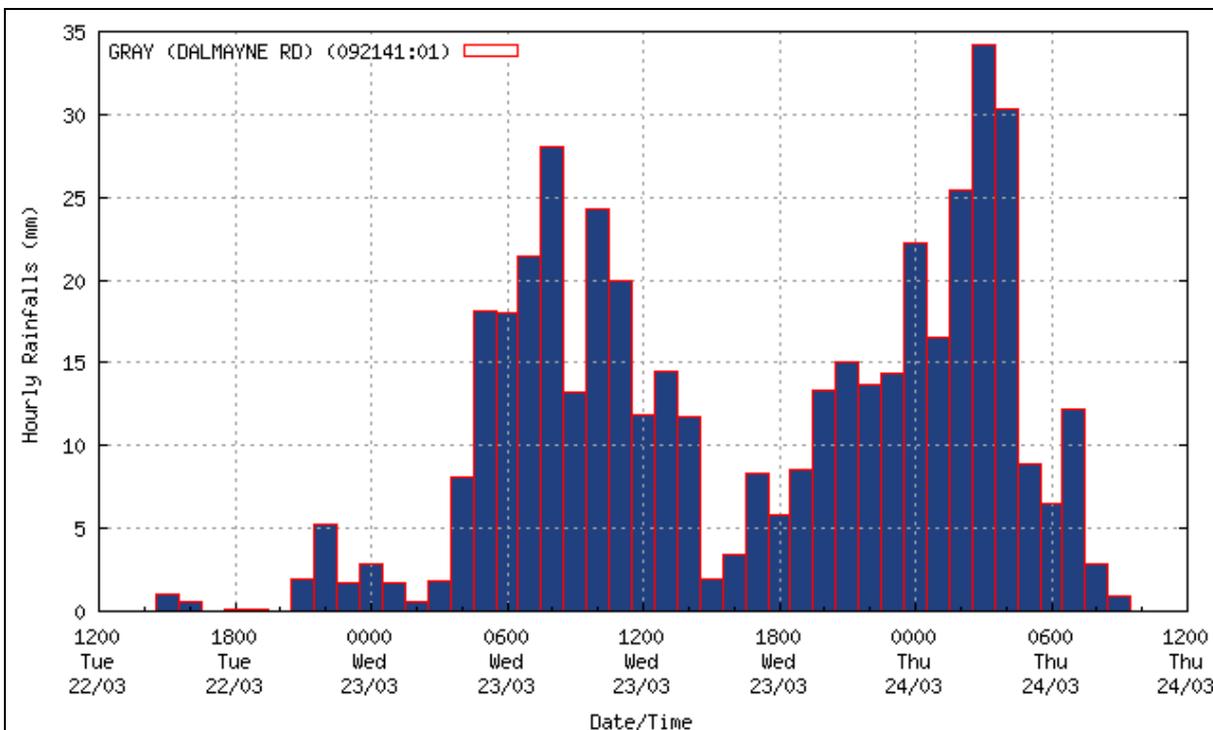


Figure 8: Hourly rainfall from Gray (Dalmaine Road), showing rates exceeding 25 mm per hour on several occasions. The heaviest rainfall occurred in two main periods: on the morning of Wednesday 23 March and a second, more intense burst in the early hours of Thursday.

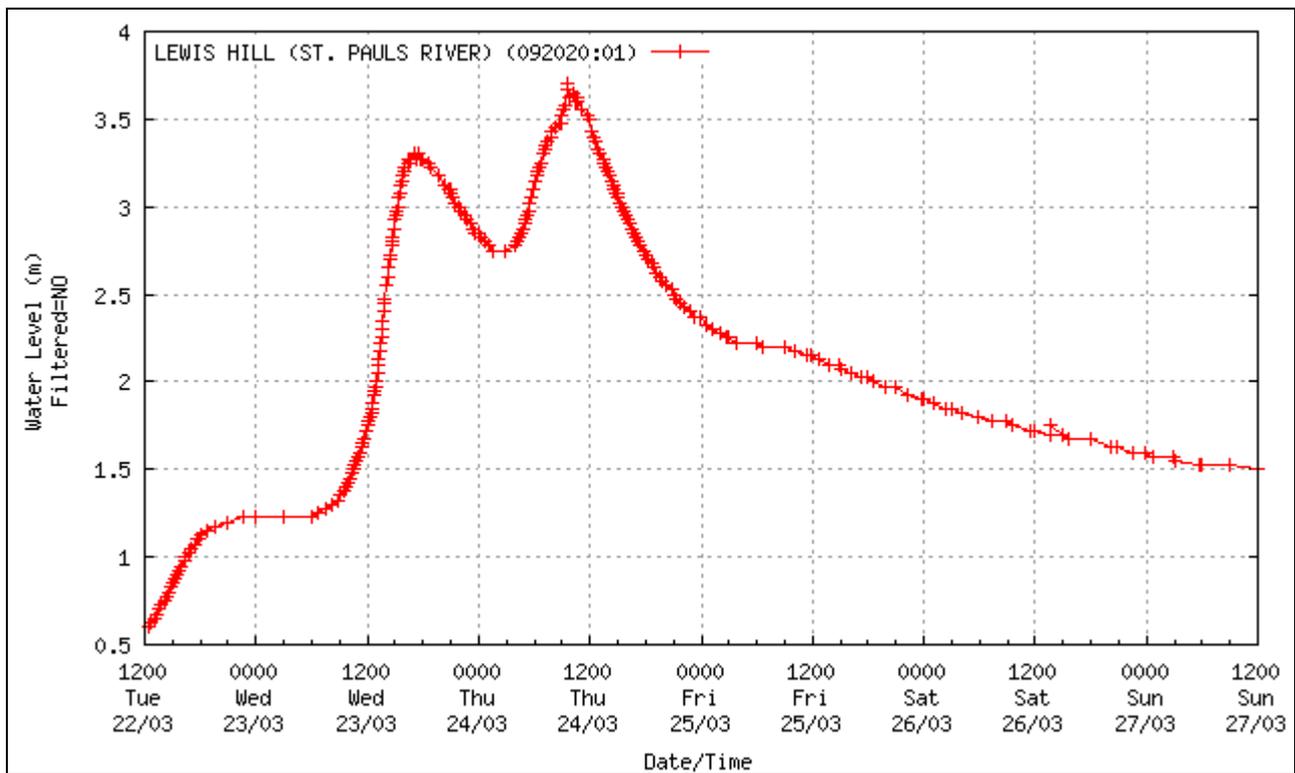


Figure 9: River height observations from the St Pauls River at Lewis Hill, showing a rapid rise on the afternoon of Wednesday 23 March, followed by a slight decrease but then a larger peak of 3.70 m at 9:30 am on Thursday 24th.

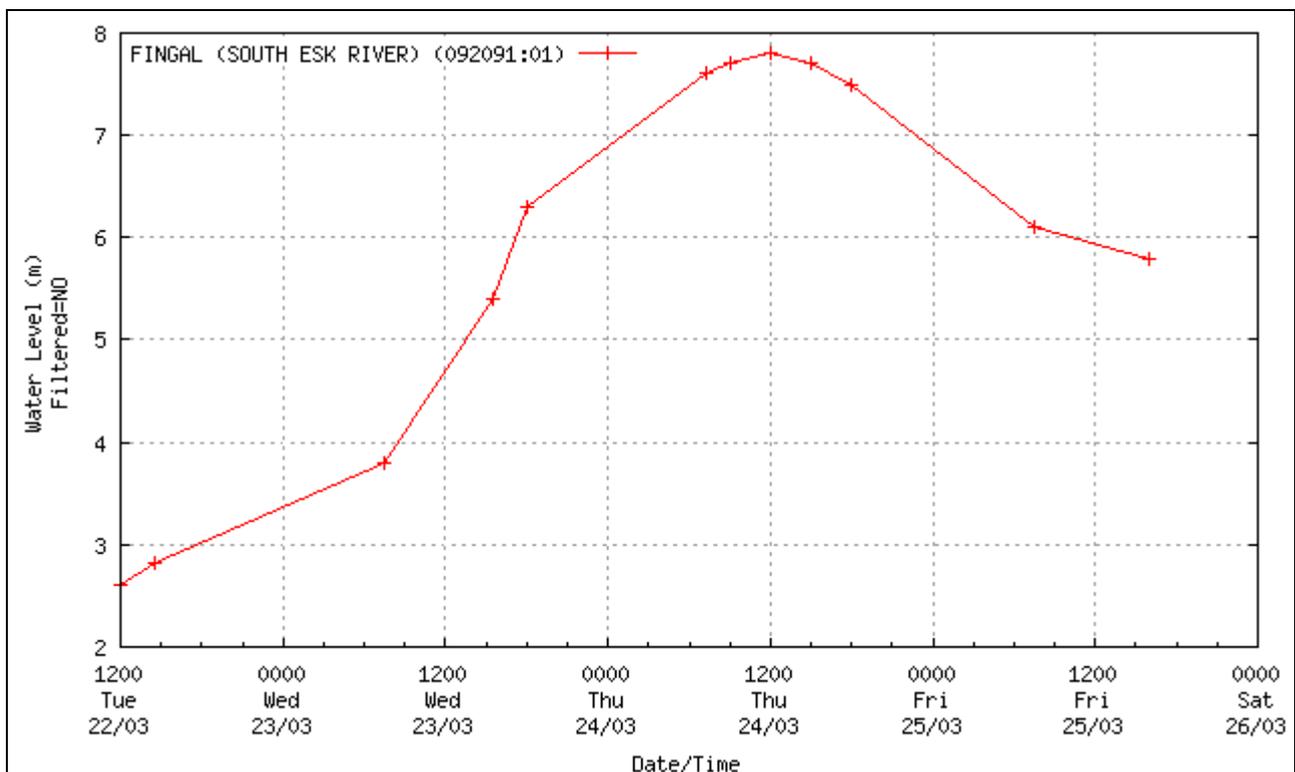


Figure 10: River height observations from the South Esk River at Fingal showing the peak of 7.8 metres at noon on Thursday 24 March. These manual observations are only made when required.

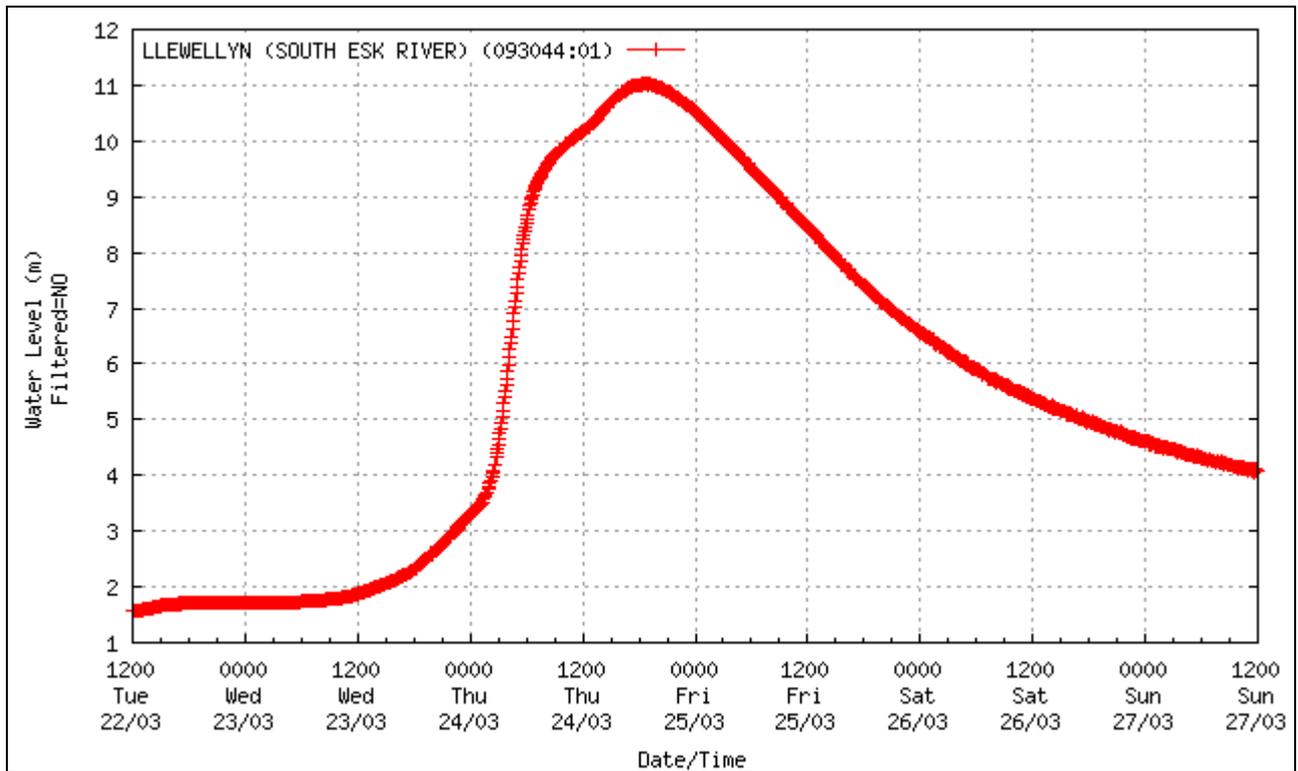


Figure 11: River height observations from the South Esk River at Llewellyn, showing a sharp rise during the morning of Thursday 24 March and the peak of 11.02 m at 7:05 pm that evening.

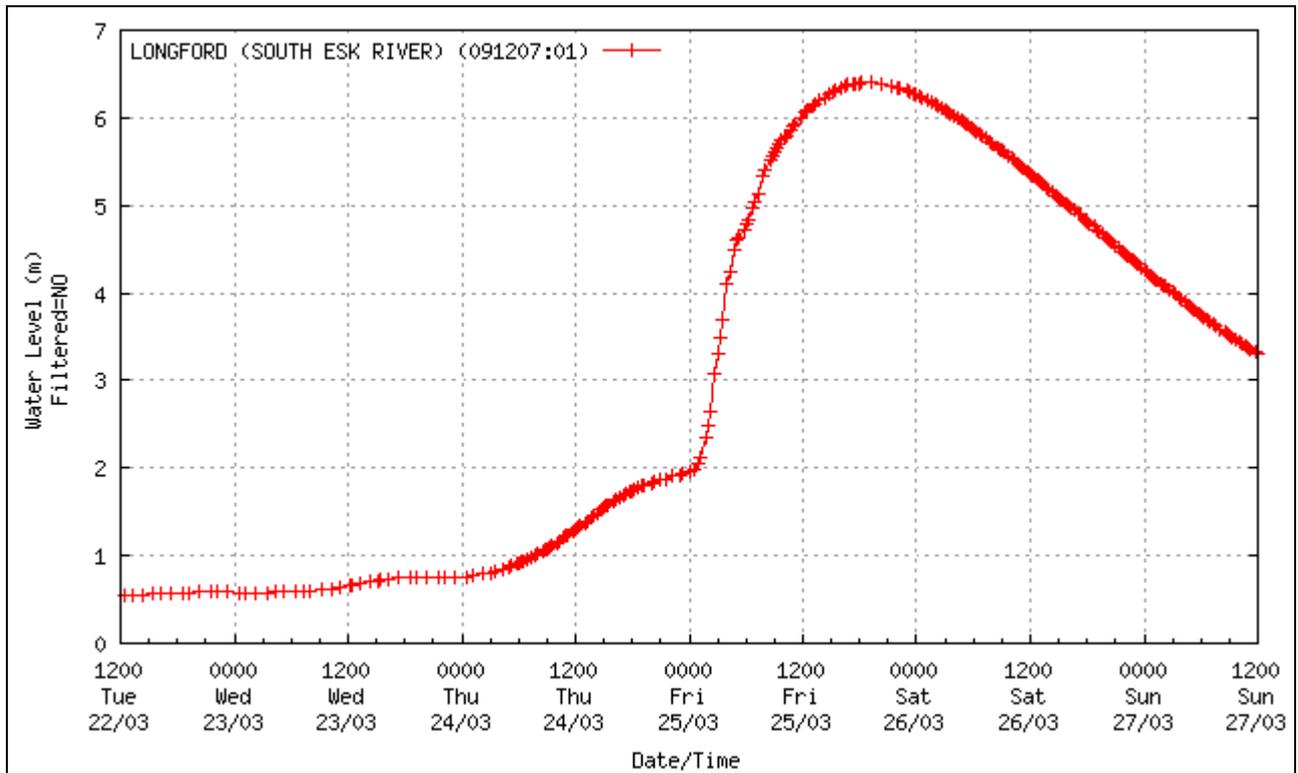


Figure 12: River height observations from the South Esk River at Longford, showing a sharp rise during the morning of Friday 25 March and the peak of 6.40 m at 6:15 pm that evening.

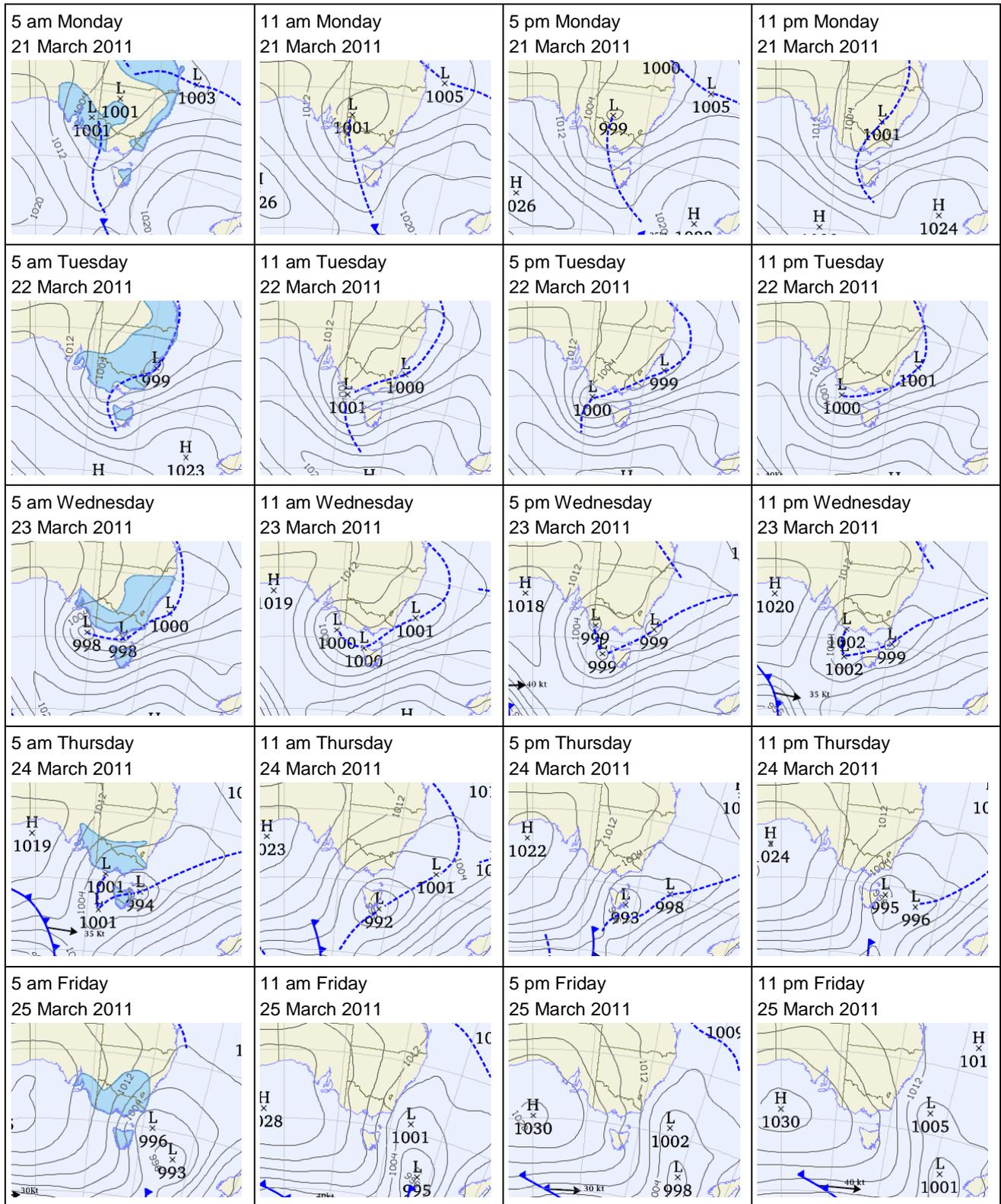


Figure 13: Mean Sea Level Pressure charts every 6 hours from Monday 21 to Friday 25 March, showing the complex area of low pressure across southeastern Australia, with numerous individual centres. These are extracts from the Bureau of Meteorology's standard analyses. The contour interval is 4 hPa. Shading on the 5 am charts indicates areas of rain in the previous 24 hours.