
RPS

Hydrology of Recent Flooding in South East Queensland

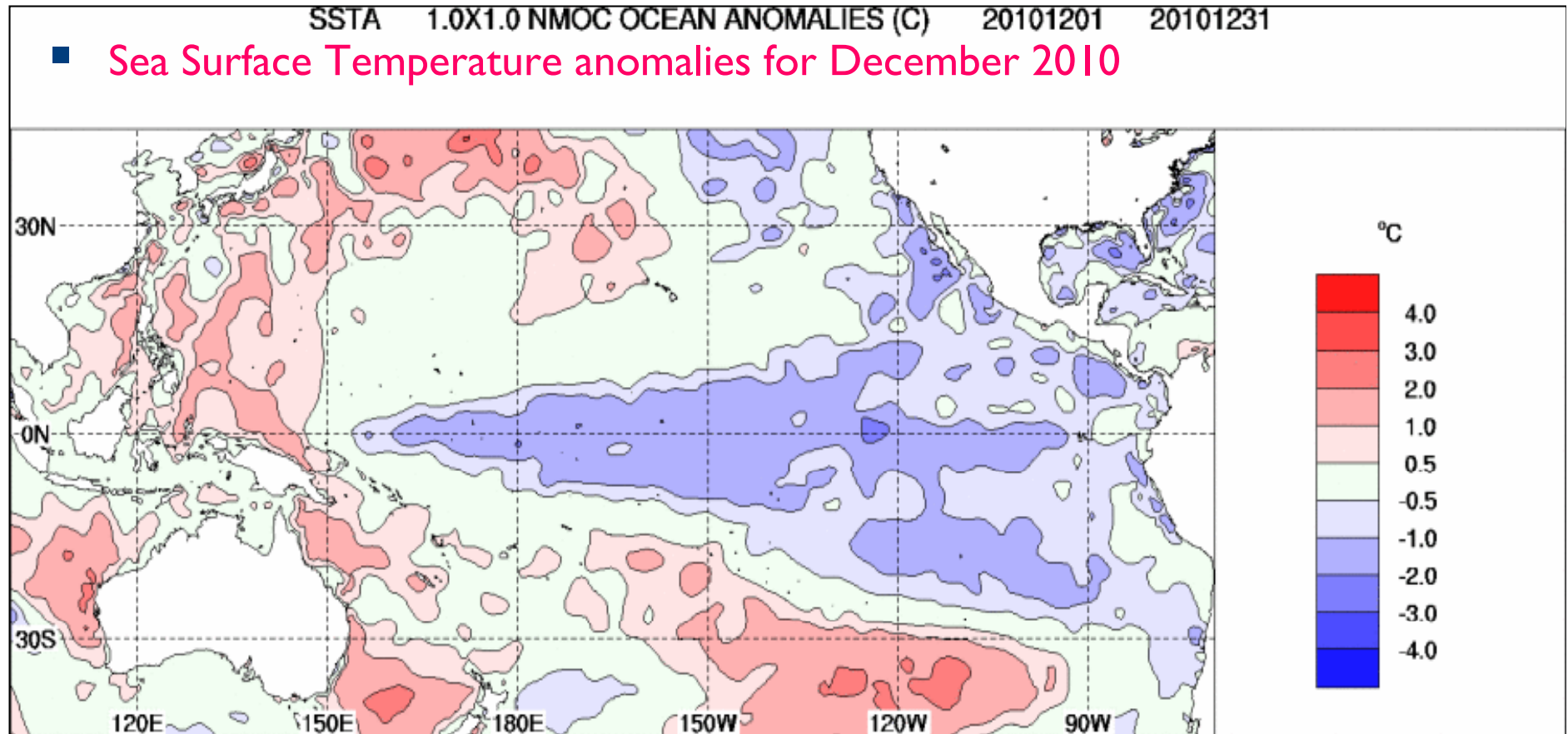


G. Hausler

TOPICS

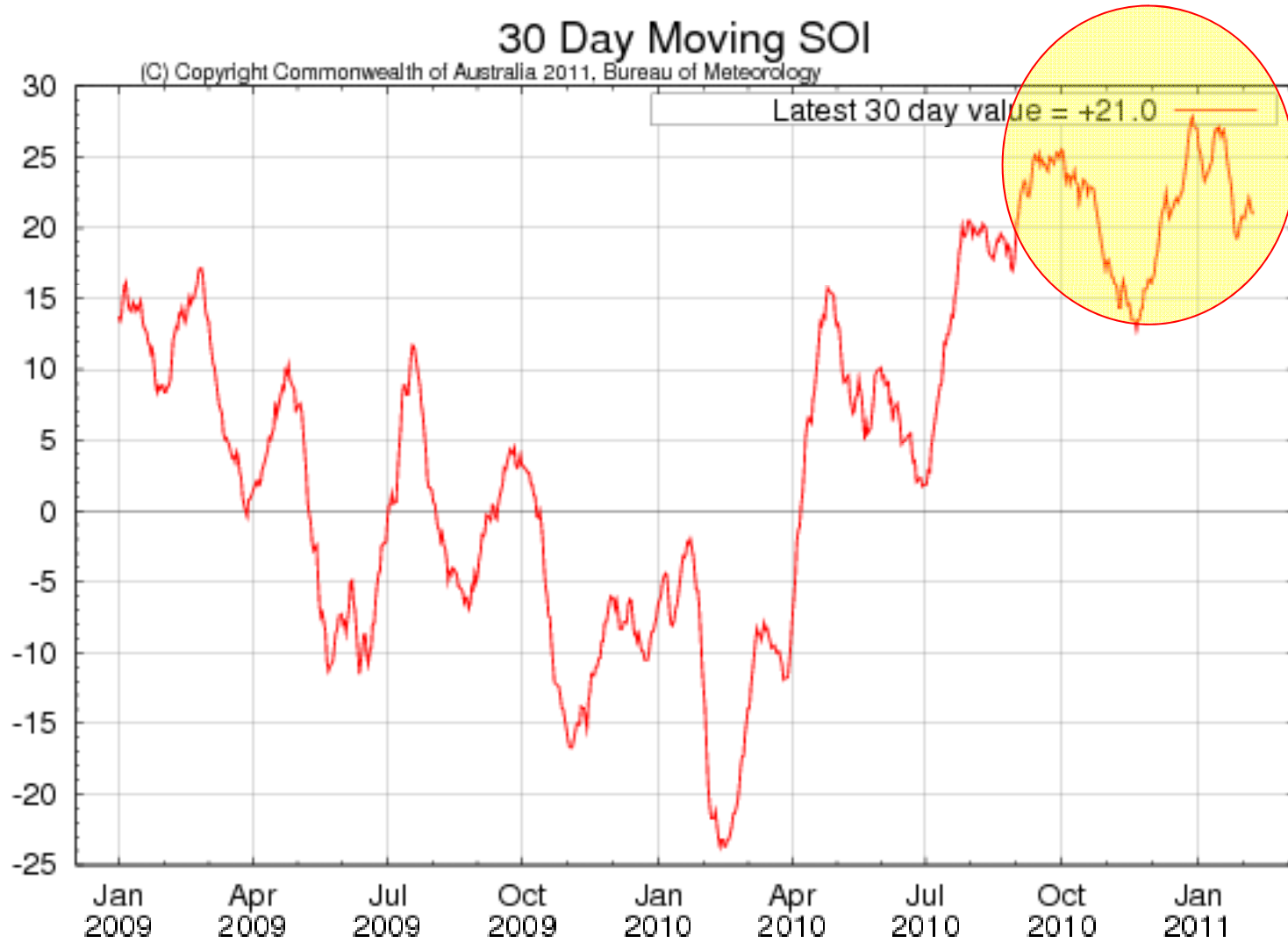
- Prelude
- Rainfalls
- Catchments
- Flooding
- Aftermath

Prelude

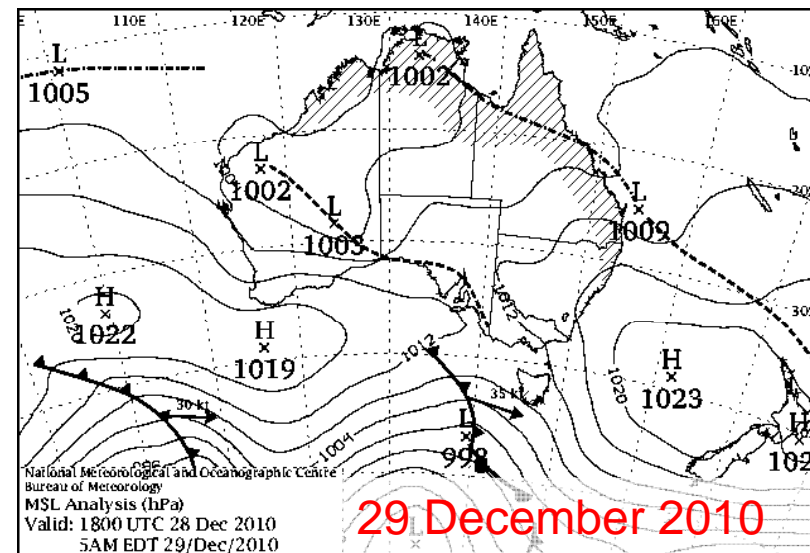
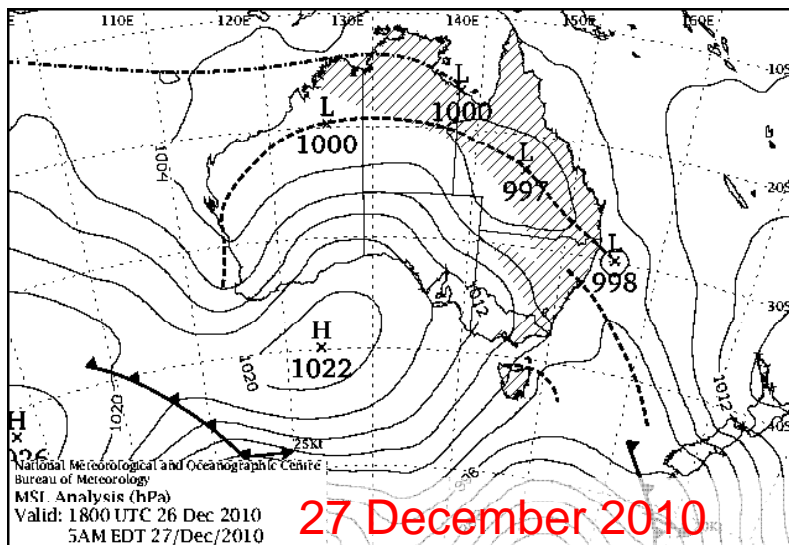
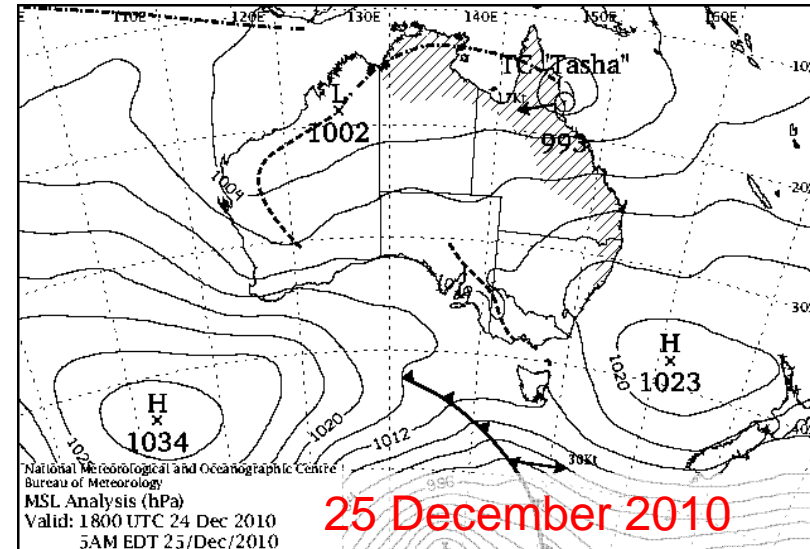
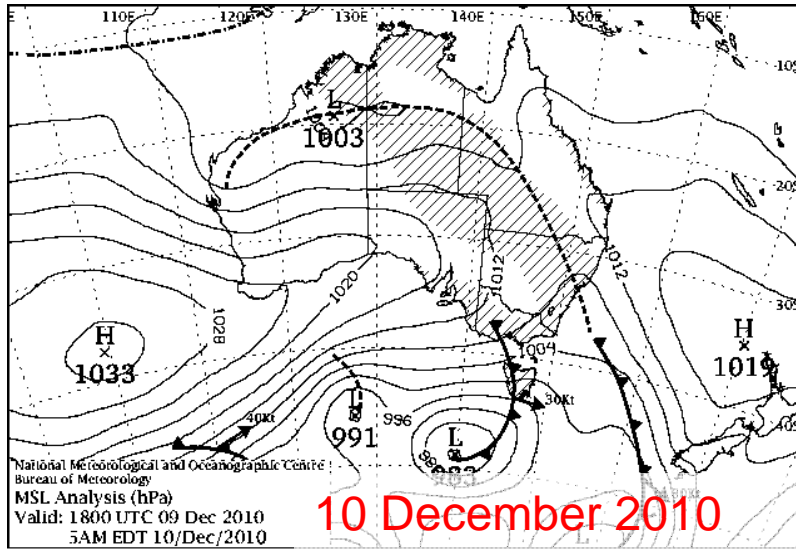


Most likely return to neutral conditions from now

SOI



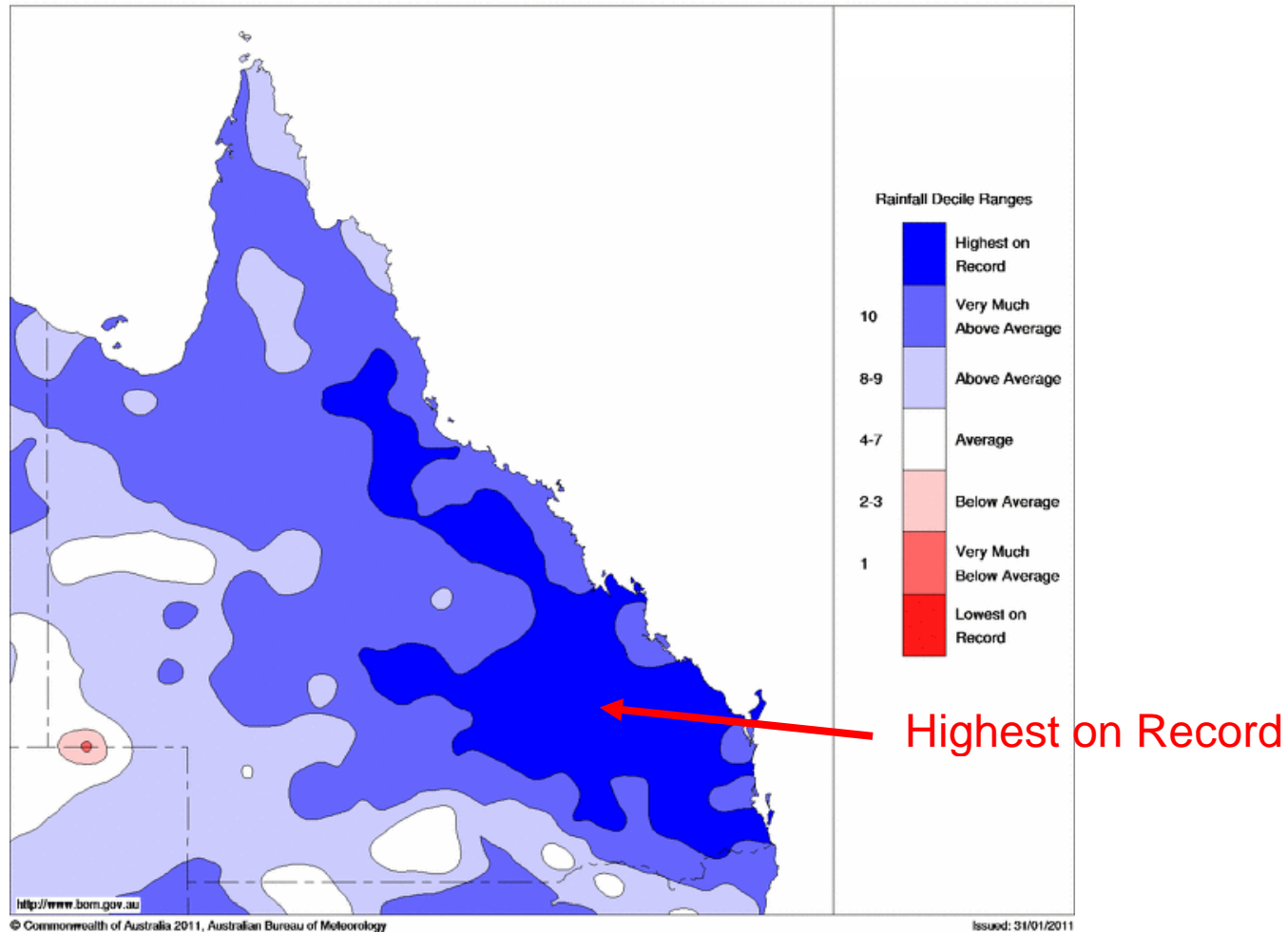
December Weather Patterns



December 2010 Rainfall (Deciles)

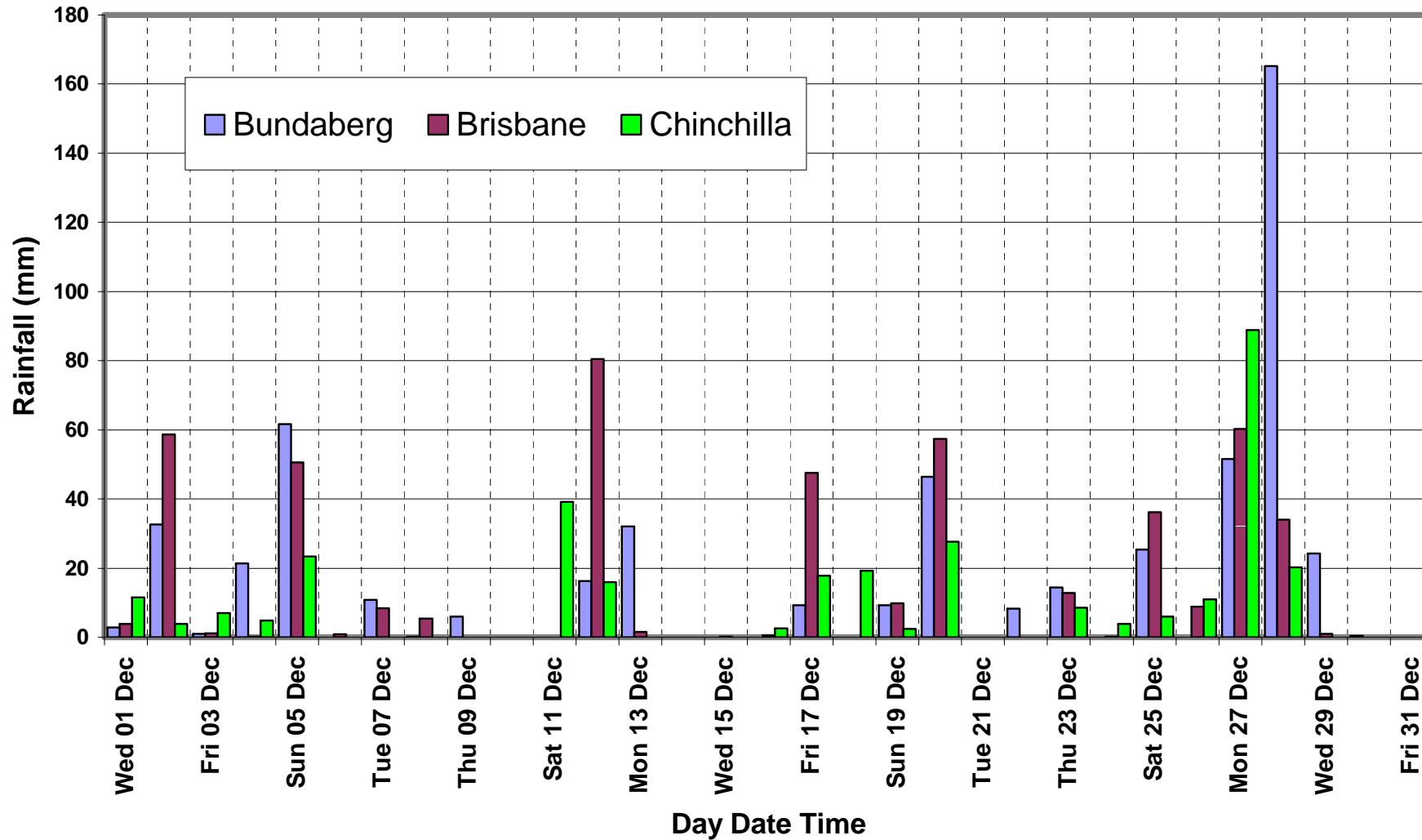
Queensland Rainfall Deciles December 2010

Distribution Based on Gridded Data
Product of the National Climate Centre

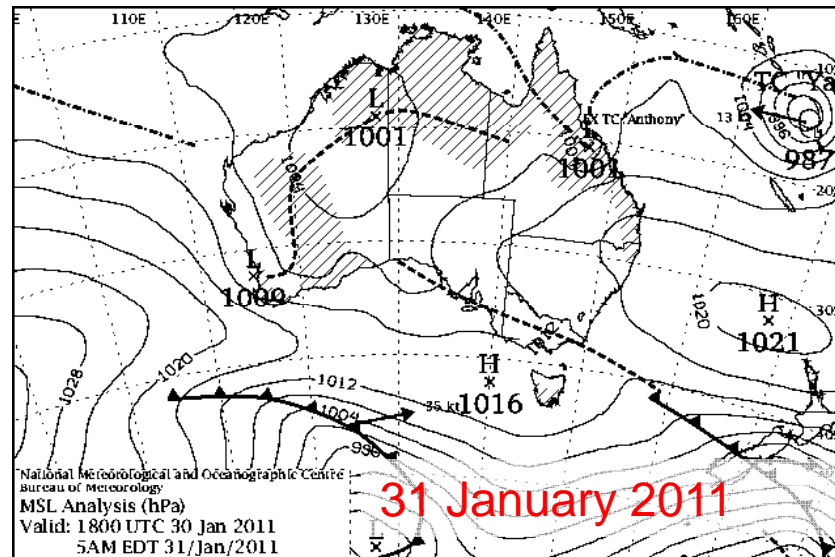
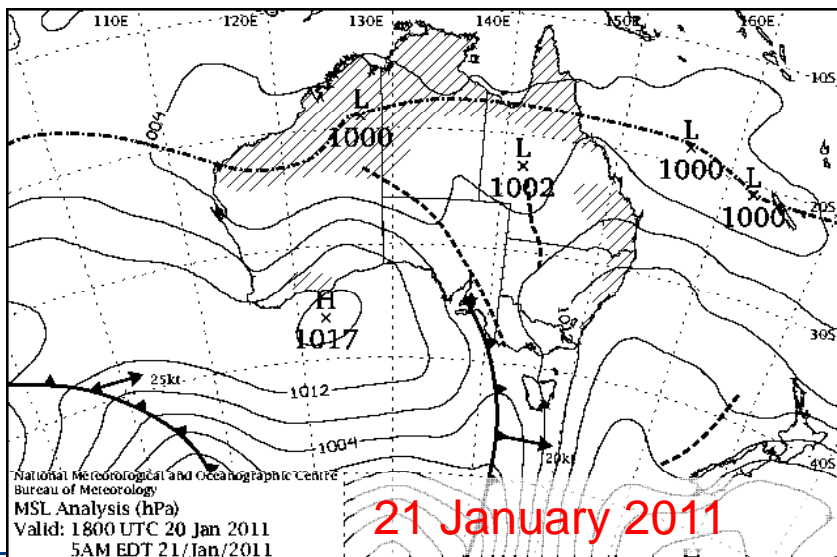
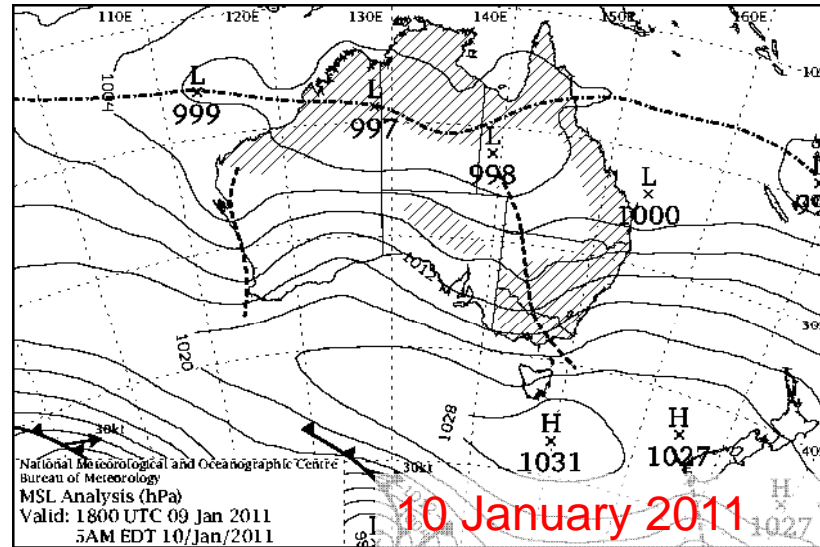
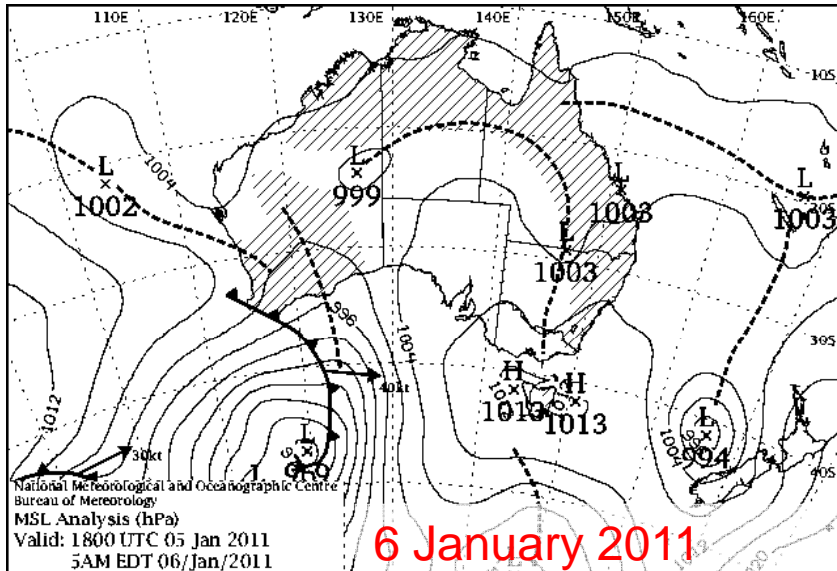


December 2010 Rainfalls S.E.Qld

Daily Rainfalls - December 2010

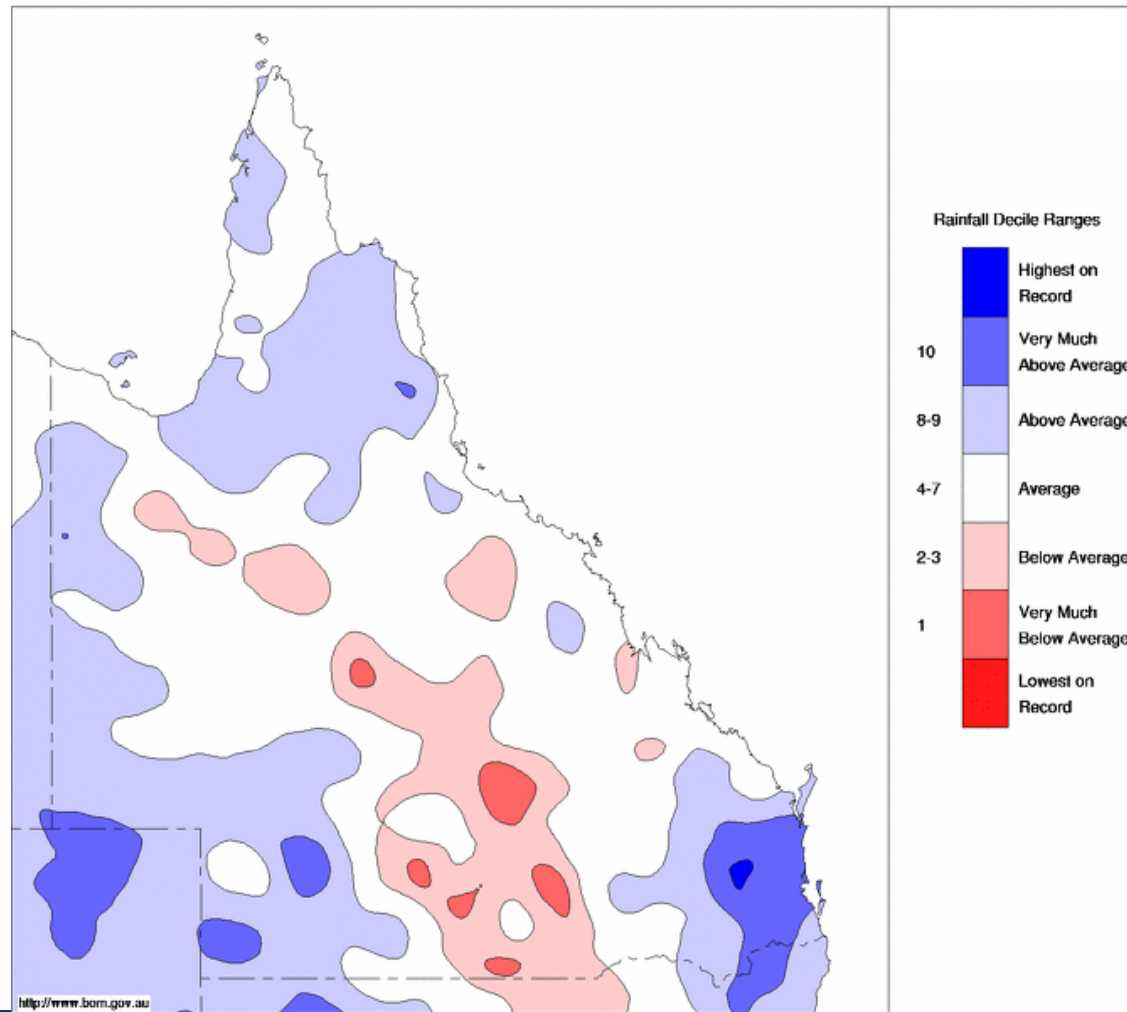


January Weather Patterns



January 2011 Rainfall (Deciles)

Queensland Rainfall Deciles January 2011
Distribution Based on Gridded Data
Product of the National Climate Centre



<http://www.bom.gov.au>

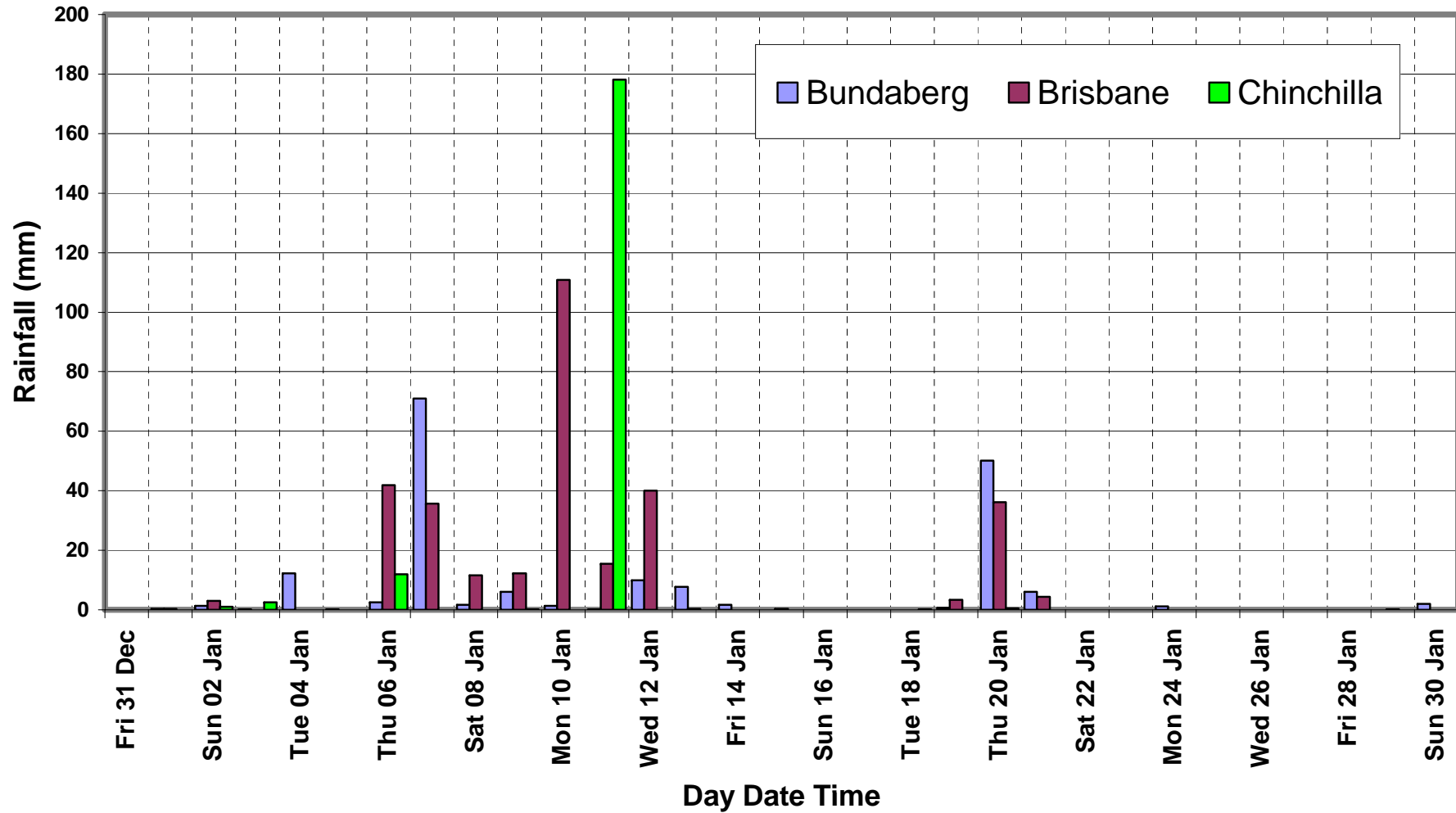
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January 2011 Rainfalls S.E.Qld

Daily Rainfalls - January 2010



Flood Events SE Qld (Not complete)

- Condamine at Warwick 27th Dec 2010 & 11th Jan 2011
- Myall Ck at Dalby 27th Dec 2010 & 10th Jan 2011
- Charleys Ck at Chinchilla 28th Dec 2010 & 12th Jan 2011
- Burnett at Gayndah/Bundaberg 29th – 30th Dec 2010
- Condamine R at Condamine 1st Jan 2011 & 14th – 17th Jan
- Balonne at St George 9th Jan & 23rd Jan 2011
- East Ck/Gowrie Ck at Toowoomba 10th Jan 2011
- Lockyer Ck at Helidon and Grantham 10th Jan 2011
- Murphys Ck at Postmans Ridge 10th Jan 2011
- Oakey Ck at Oakey 11th Jan 2011
- Caboolture R at Caboolture 11th Jan 2011
- Mary R at Gympie & Maryborough 11th Jan 2011
- Laidley Ck at Laidley 11th Jan 2011
- Bremer R at Ipswich 12th Jan 2011
- Brisbane R at Fernvale & Brisbane 13th Jan 2011
- McIntyre at Goondiwindi 14th Jan 2011

Condamine Catchment - Flooding

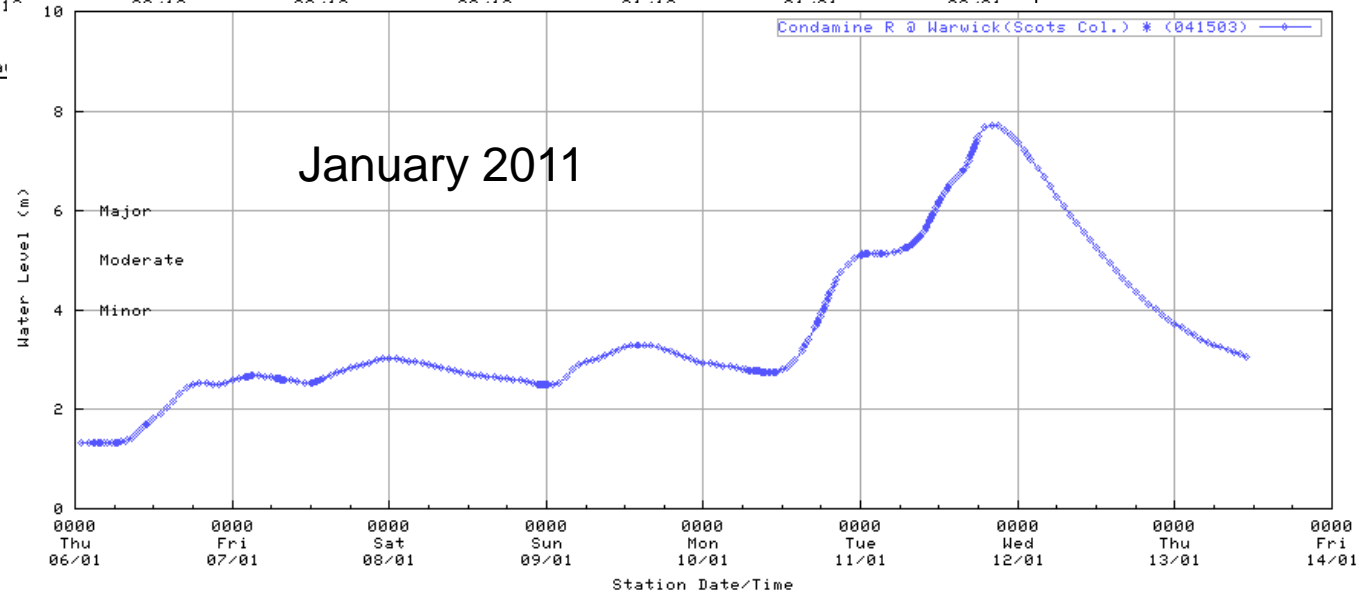
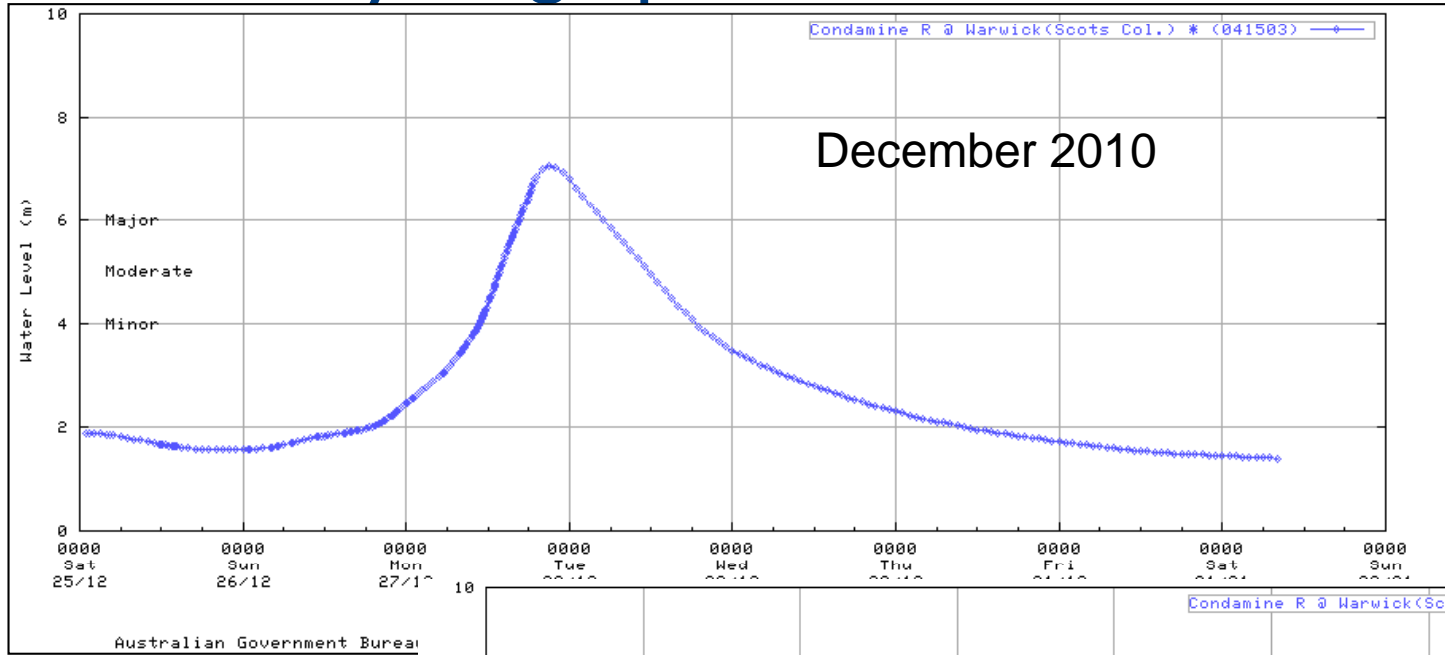


Gowrie Creek Toowoomba – Where East and West Creeks meet

Condamine River at Warwick

- Condamine R at Warwick – Catchment area of 1,360 sq. km.
- Two flood events
 - » Monday 27th December 2010
 - » Tuesday 11th January 2011
- Up to 50 homes affected
- Highest flood at Warwick since 1976.
- Possibly 4th largest flood in about 130 years

Flood Hydrographs Condamine at Warwick



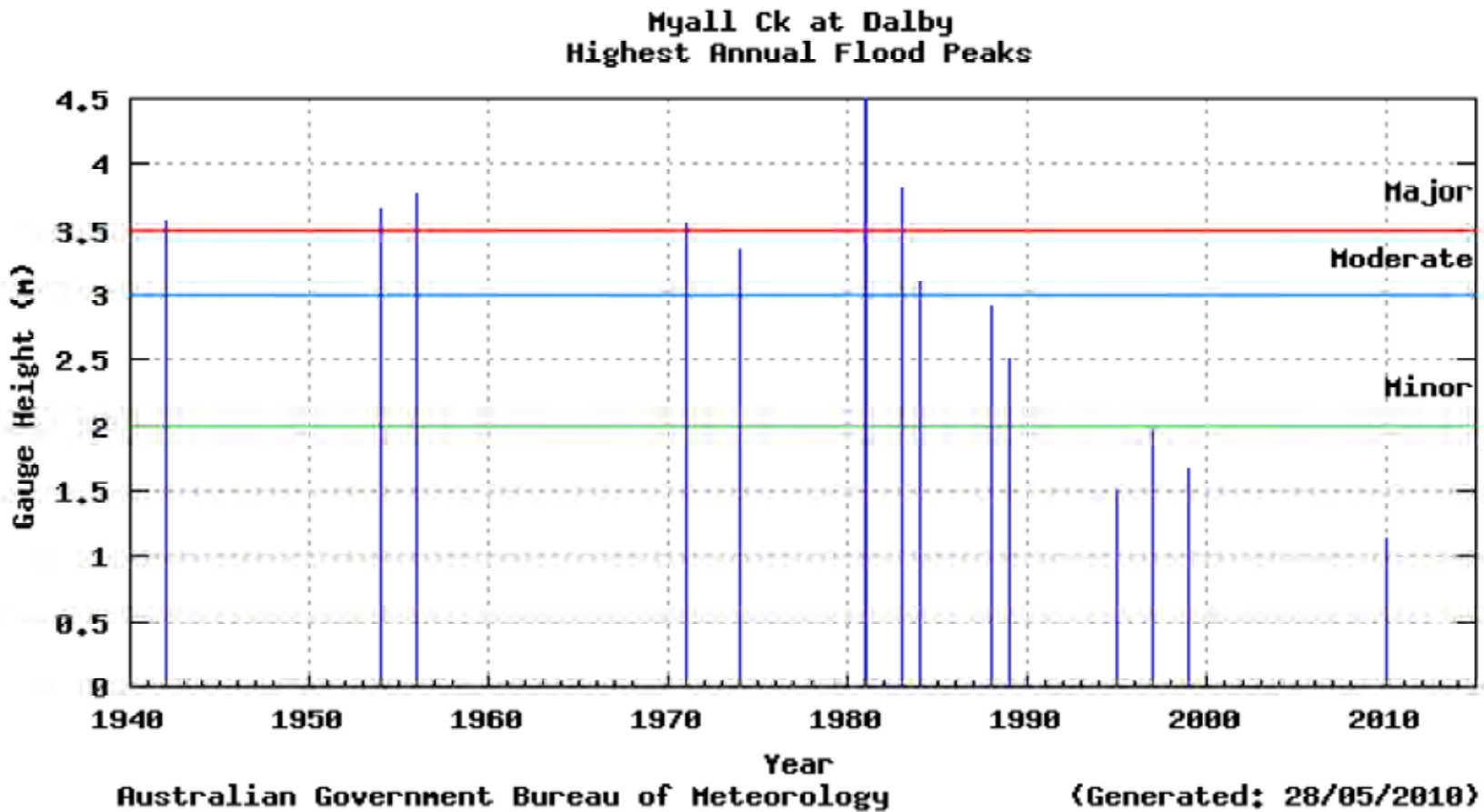


Myall Ck at Dalby

- Tributary of Condamine River
- Catchment Area around 1560 sq km
- Flows through Dalby township
- Two flood events – 2nd event largest
 - » 27th Dec 2010 - about 3.5 metres on gauge
 - » 10th Jan 2011 - about 3.75 metres on gauge
- About 50 to 100 homes affected (from newspaper reports)



Flooding in Dalby from Air Tuesday 28th December (courtesy Dalby Herald)



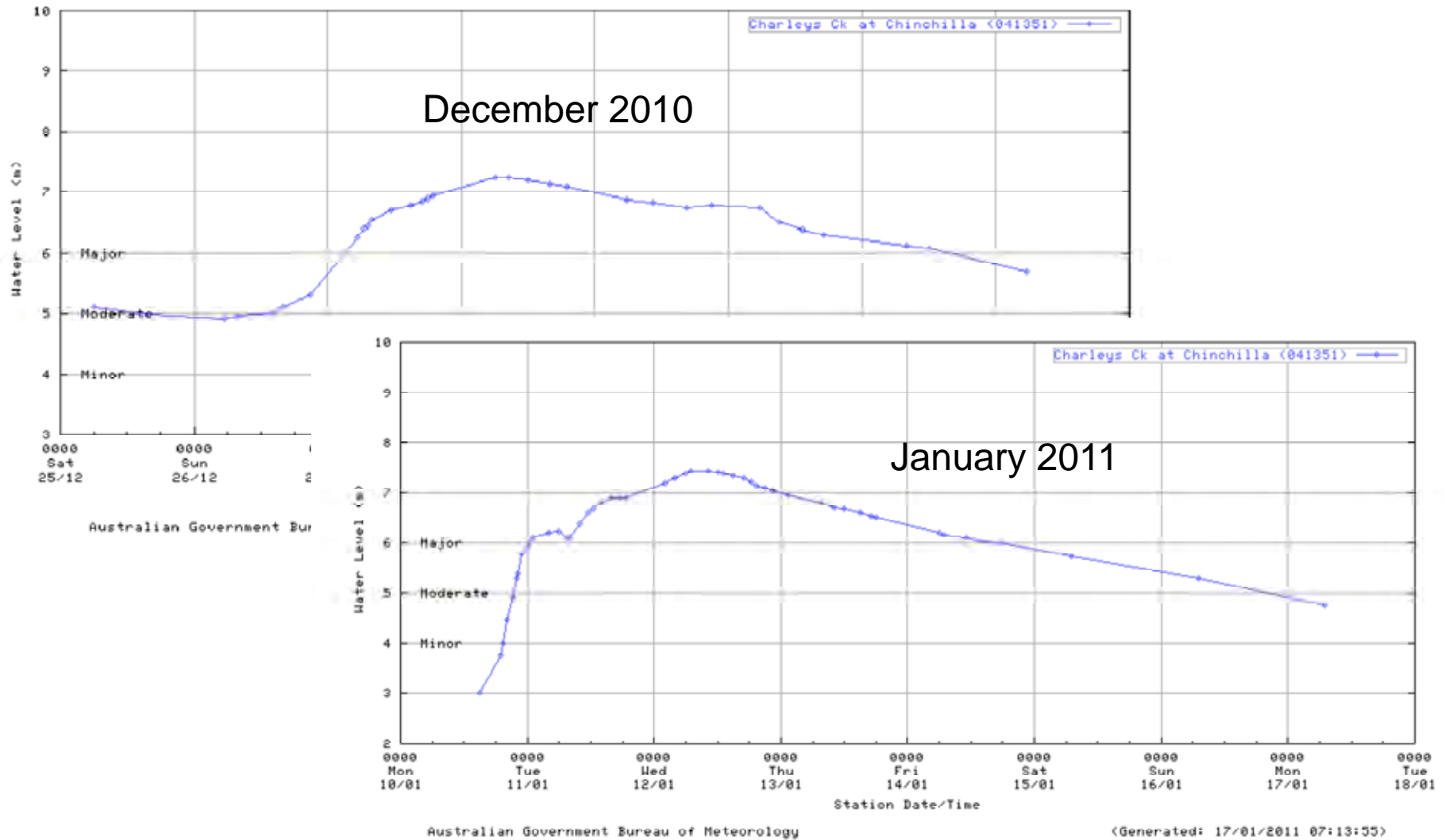
January 2011 event – 3rd largest in 70 years of record



Flood Events at Chinchilla

- Charleys Ck at Chinchilla catchment area – 3,460 sq km.
- Tributary of Condamine River.
- Two flood events:
 - » Tuesday 28th December
 - » Wednesday 12th January
- Many houses evacuated.
- The December and January flood events exceeded the 1983 flood (6.75 metres peak gauge height) but did not exceed the record flood event of 1942 (7.95 metres peak gauge height).

Flood Hydrographs – Charleys Creek



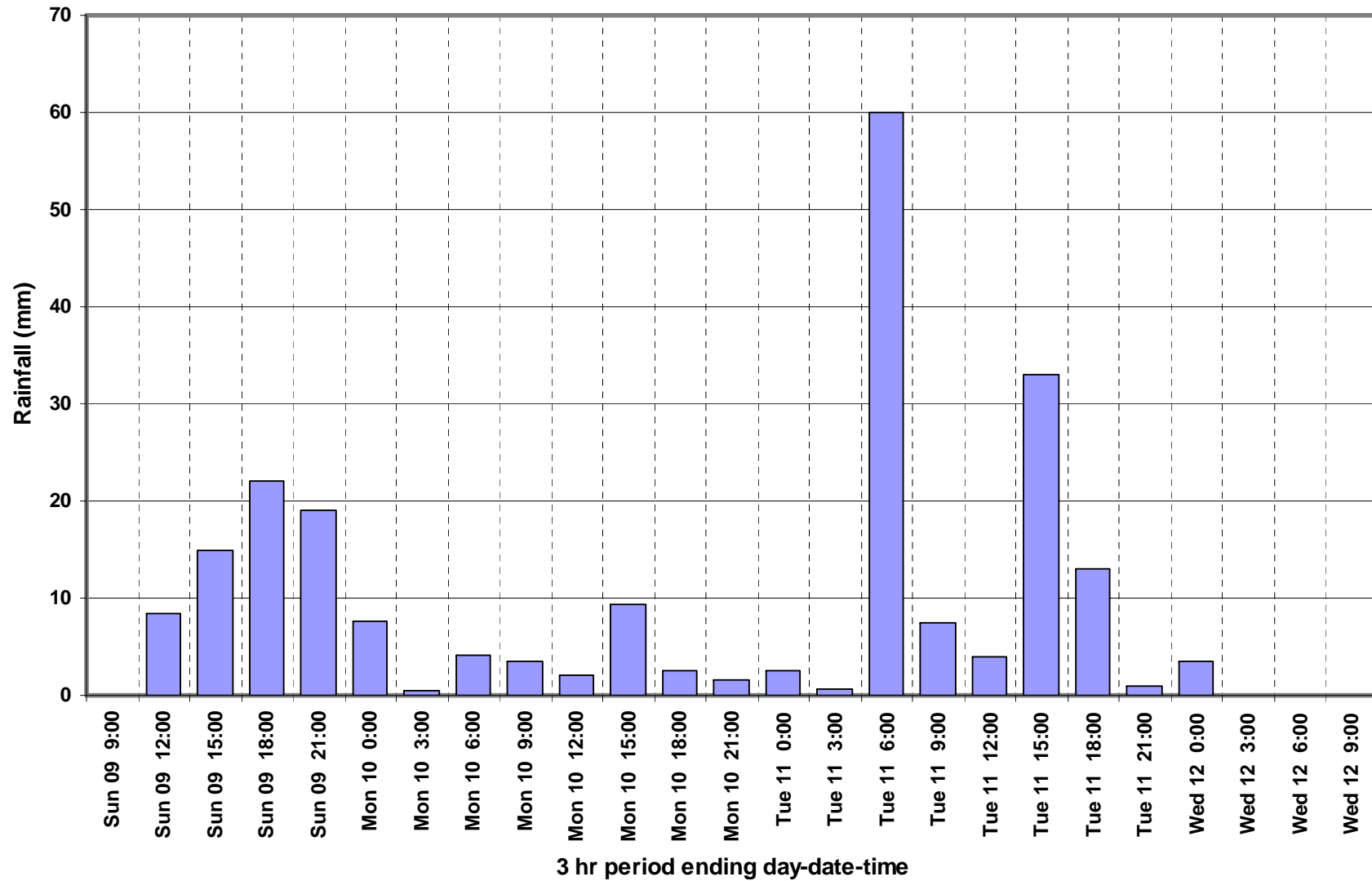


Lockyer Ck Flooding

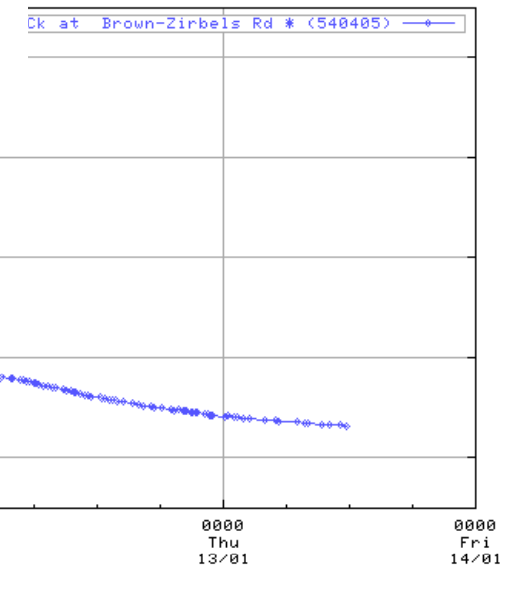
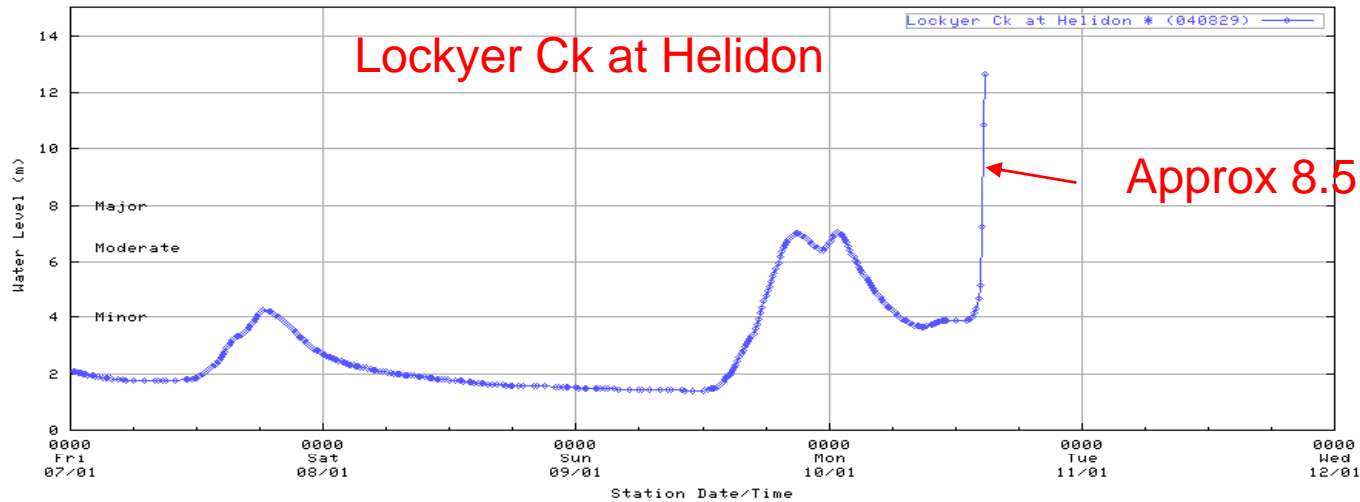


Lockyer Ck downstream Gatton-Helidon Road Bridge

Sandy Ck AL 3-hourly rainfall 9 – 11th January 2011



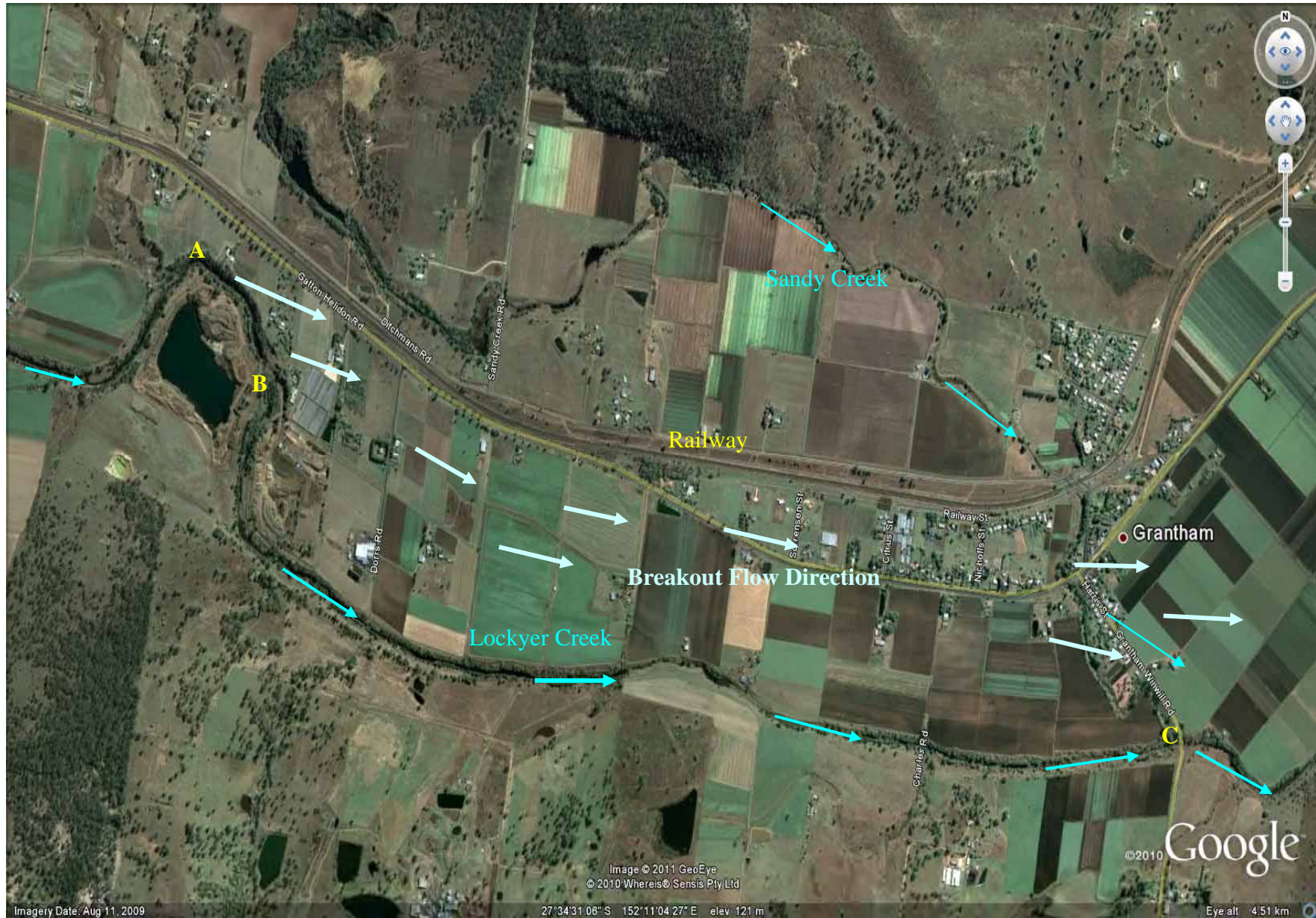
River Heights -



Australian Government Bureau of Meteorology

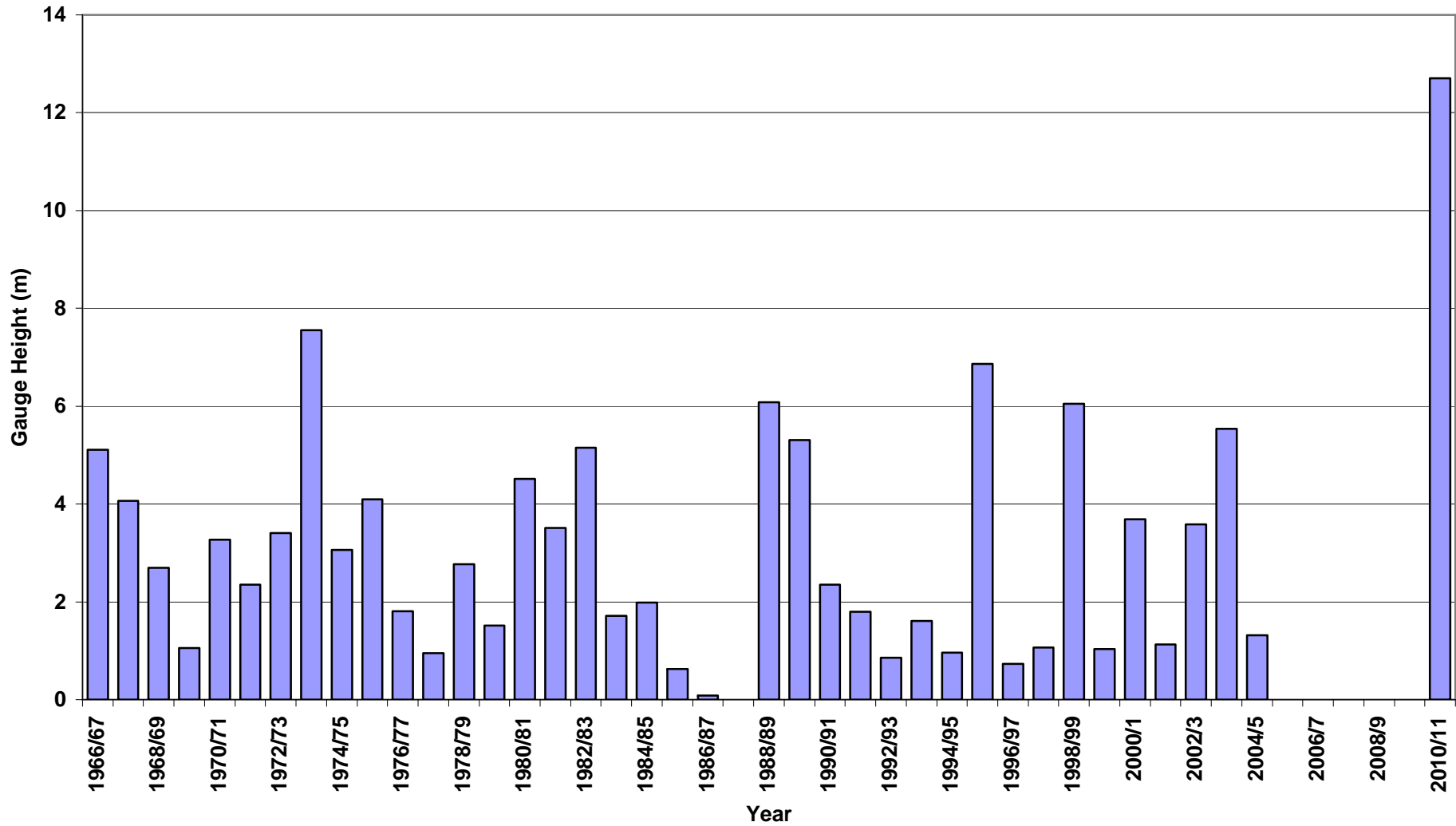
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Annual Maximum Gauge Heights for Lockyer Ck at Helidon

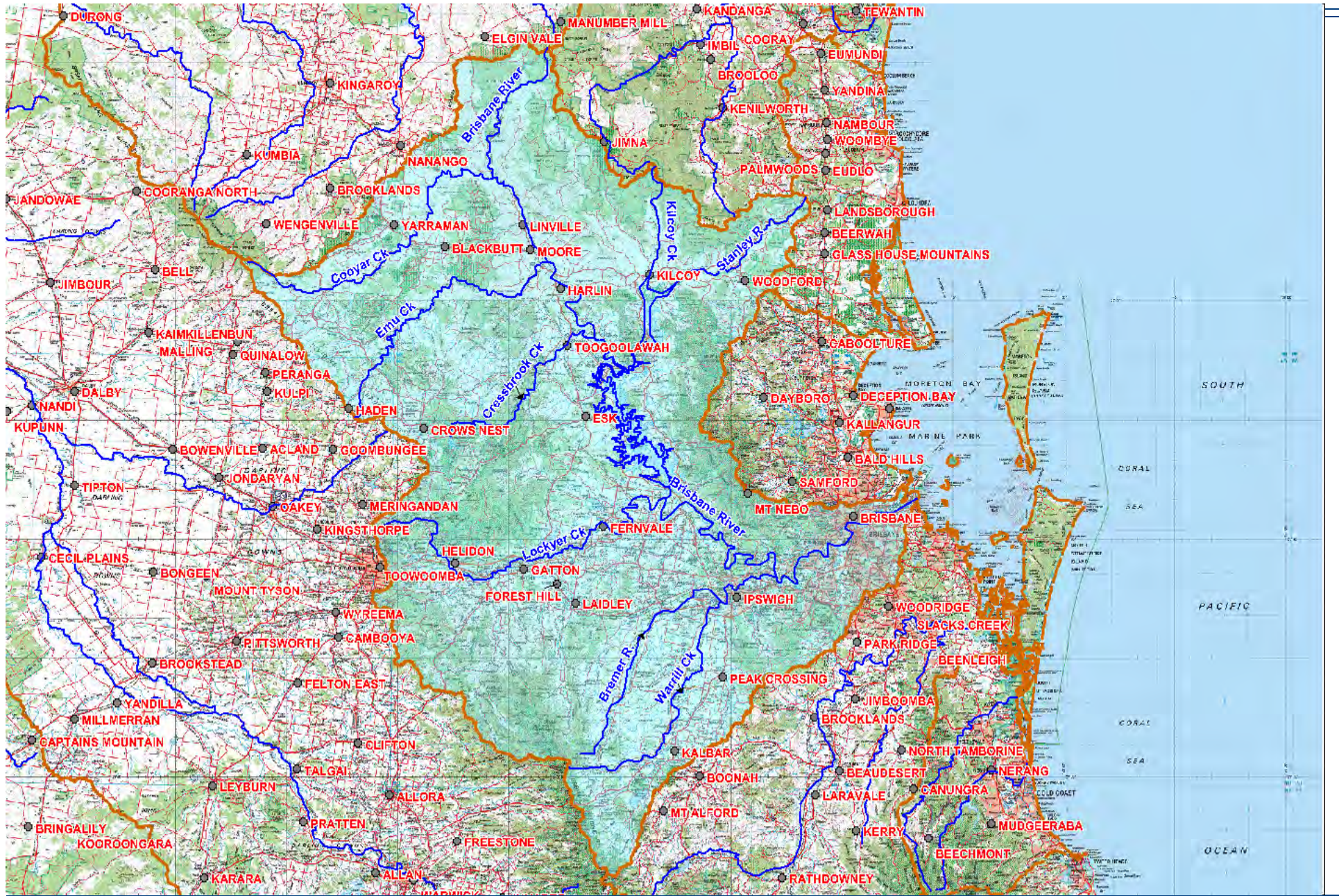
Approximate only. Helidon 2 adjusted 1966-1987 + Helidon 3 1988 - 2011



Brisbane River Catchment



Brisbane River at Mt Crosby Pump Station



Brisbane River Catchment

- Total catchment area \approx 14,000 sq. km
- 50% catchment area upstream of Wivenhoe Dam
- Major tributaries upstream of Wivenhoe Dam
 - » Stanley River
 - » Cooyar Ck
 - » Emu Ck
 - » Cressbrook Ck
 - » Kilcoy Ck
- Major Tributaries downstream of Wivenhoe Dam
 - » Lockyer Ck
 - » Warrill Ck
 - » Bremer River
 - » Oxley Ck

Brisbane River Catchment Rainfalls

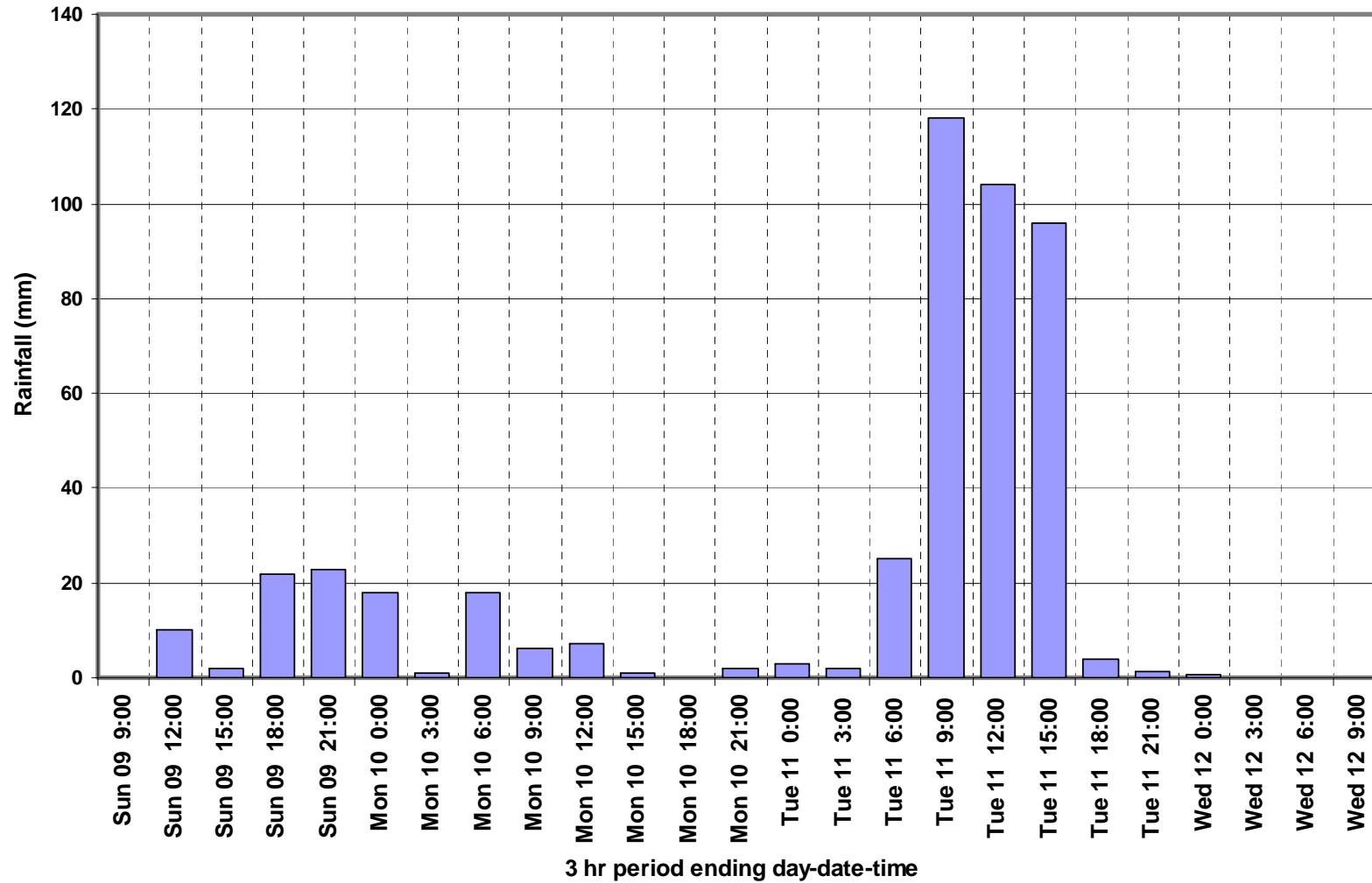
January 2011

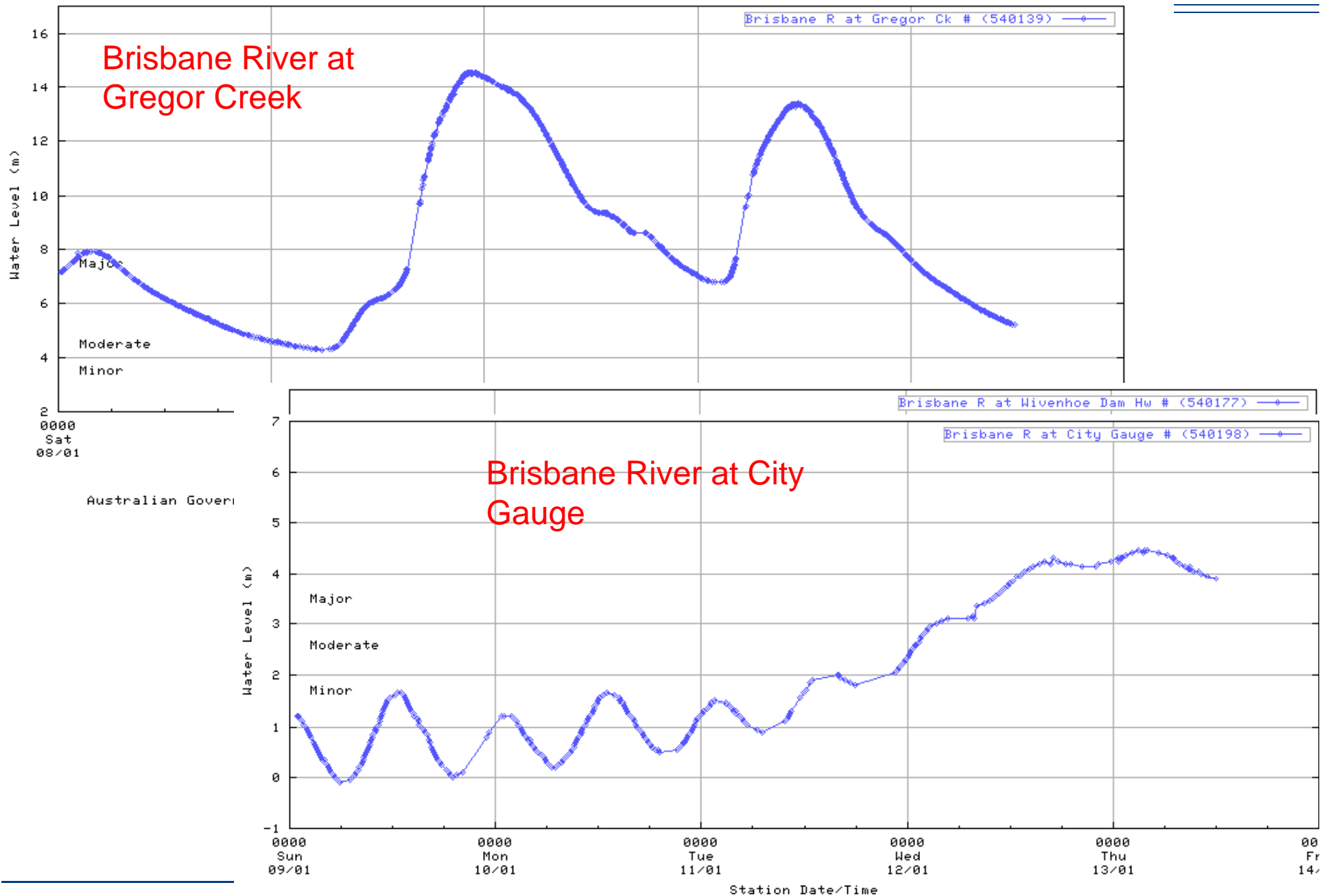
Station Name	24 hours to 9am -December 2010						
	7	8	9	10	11	12	13
Brisbane River catchment upstream Wivenhoe Dam							
Peachester	45	32	124	298	155	211	
Woodford	36	27	74	219	115	224	6.8
Kilcoy AL *	37	19	24	183	99	61	2
Somerset Dam Hw AL-B *	20	43	24	159	136	66	2
Top Of Brisbane AL *	46	71	17	41	39	1	0
Blackbutt	54	40	31	149	110	15	2.6
Yarraman AL *	40	21	19	116	131	1	1
Cooyar Creek TM *	60	34	22	126	132	3	1
Crows Nest	19	26	14	148	162	27	0.4
Esk	29	28	5.4	131	150	39	
Wivenhoe Dam Hw AL-B *	29	7	4	89	136	199	0
Wivenhoe Dam Tw AL-B *	32	8	4	100	157	207	
Brisbane River catchment downstream of Wivenhoe Dam							
Toowoomba AL *	19	26	9	79	117	22	1
Tenthill TM *	48	30	1	67	76	67	1
Gatton AL *	36	21	4	87	68	88	0
Lowood	32	13	6	102	181	203	
Marburg AL *	17	23	5	86	187	170	0
Kalbar Weir AL *	39	7	5	15	69	55	0
Amberley AL-P *	15	16	3	67	34	86	1
Jindalee AL *	36	8	8	74	27	47	0
Brisbane City AL *	36	12	16	106	21	40	0

- Wivenhoe Dam – 300+ mm in 12 hours on Tuesday 11th December

Wivenhoe 3-hourly rainfall

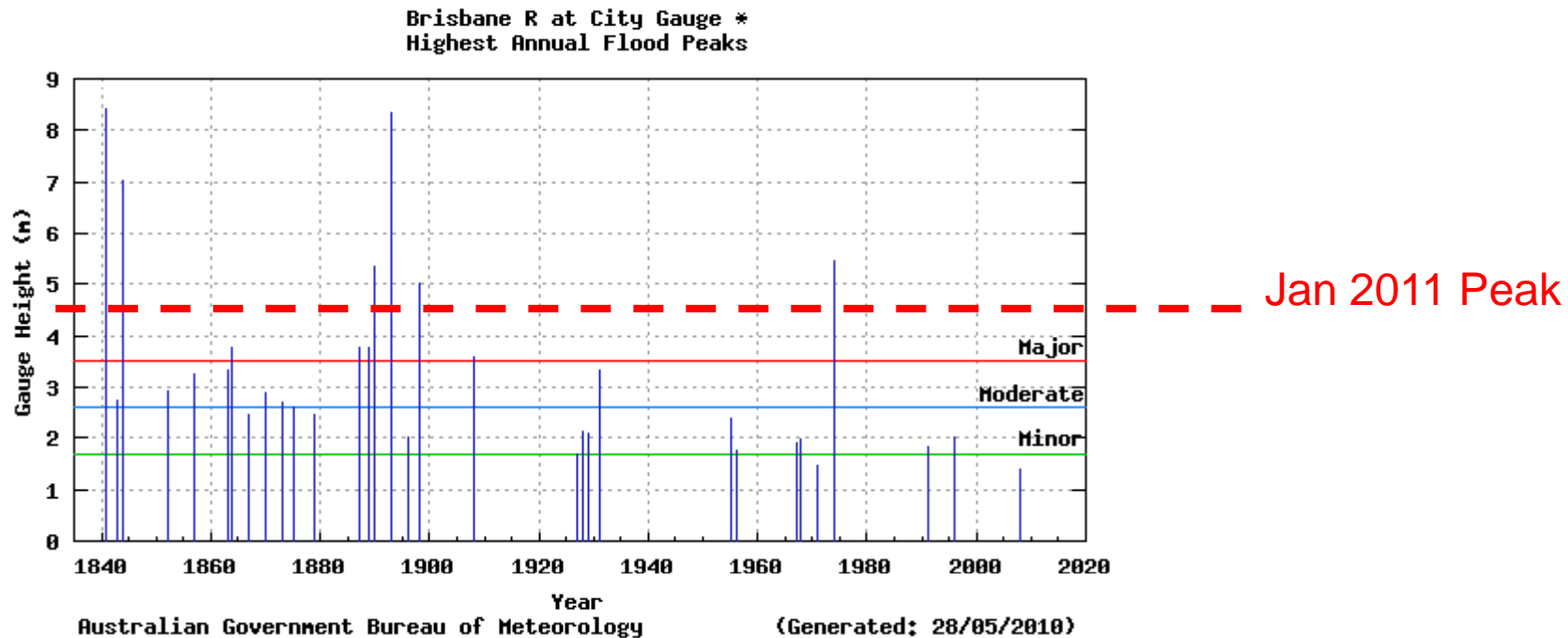
9 – 12 January 2011





Brisbane Flooding January 2011

- Flood peaked at 4.45 m on City Gauge
- Major flood event – rainfalls in parts of catchment exceeded 100 yr ARI magnitudes - but
- 1 metre less than 1974 flood
- 3 to 4 metres lower than 1893 and 1841 floods



General Observations Flooding SE Qld

- Major flooding in many catchments
- In many catchments the Dec and January 2011 flood events were only the 3rd to 5th largest on record.
- Exceptions were:
- Condamine – largest flood on record
- Lockyer Ck at Helidon and Grantham – much larger than any previously recorded.

SE Qld Dec. and Jan. floods in context

- Recent flood possibly most significant in terms of property and infrastructure damage ---- but ...
- Most catastrophic flood event in Australia was Gundagai flood of 1852.
 - » Town washed away, rebuilt elsewhere
 - » 70 to 90 people (1/3 towns population killed)
- 1916 Clermont flood in Qld
 - » 65 people killed
 - » Town rebuilt in different location
- “Black February” 1893 flood in Brisbane
 - » Two cyclones crossed coast
 - » Victoria and Indooroopilly bridges washed away,
 - » 11 people killed; 190 hospitalised
- Our variable climate and development on floodplains guarantees that these events will be repeated, climate change or no climate change.



AFTERMATH

- Significant volumes of bank and bed material has been shifted from streams in South East Queensland
- In particular



Brisbane River Downstream of Wivenhoe Dam



Lockyer Ck at Helidon



Laidley Ck downstream of Laidley - Forest Hill Road Bridge



Tenthill Ck upstream of Gatton-Helidon Road Bridge



Flagstone Creek downstream Duncan's Bridge



Murphys Creek before



Murphys Creek after



Gully Erosion – Darling Downs

Fin

