Record rainfall brings unprecedented flooding to Victoria in January 2011

Belinda Campbell, Harvey Stern, Blair Trewin and Shoni Maguire

Bureau of Meteorology, Melbourne, Australia

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Outline

- Context
- Synoptic situation
- Daily rainfall
- Rainfall records
- Widespread flooding
- Record river heights
- Summary

Creswick Creek at Clunes
Context

- 2010/11 - One of the strongest La Niña events on record
- Strong atmospheric circulation evidenced by OLR anomalies and record breaking SOI
- Cool sea surface and sub surface temperatures anomalies in the eastern Pacific Ocean

Sea surface temperature anomalies for the week ending 16th January 2011
Context

• Record warm sea surface temperatures in the Australian region for 2010

• Negative Indian Ocean Dipole (IOD) throughout spring 2010

• 2010 was the wettest year in Victoria since 1974 and the 5\textsuperscript{th} wettest on record
Synoptic situation

- Complex and persistent low pressure systems – broad slow moving trough
- Warm moist northeasterly flow – exceptionally high dewpoint temperatures and humidity
Synoptic situation 13th – 15th January
Exceptionally high moisture content of the atmosphere

Total precipitable water at Melbourne on the 13th was 65.0 mm (previous record of 54.5 mm on 5 February 1973)

Melbourne’s peak dewpoint temperature was 23.7°C at 6pm on the 13th (record of 24.0°C set on 24 January 1982)

In Melbourne, dewpoints remained above 21°C continuously for 30 hours and above 22°C for 9 hours (second to event on 12-14 February 1955)
Daily rainfall

10th – 12th January 2011

Rainfall [mm]
- 400 mm
- 300 mm
- 200 mm
- 150 mm
- 100 mm
- 50 mm
- 25 mm
- 15 mm
- 10 mm
- 5 mm
- 1 mm
- 0 mm

Rainfall Percentiles
- > 100th
- > 99th
- > 97th
- > 95th
- No Data

Daily Rainfall Extremes 24 hours to 9am on 10 Jan 2011

Daily Rainfall Extremes 24 hours to 9am on 11 Jan 2011

Daily Rainfall Extremes 24 hours to 9am on 12 Jan 2011
Daily rainfall

13th – 15th January 2011

• Daily rainfall totals greater than 100 mm were common during this event – unusual for Victoria
Rainfall records – 14th January 2011

Daily Extreme Rainfall in Victoria

13/01/2011 07:30 UTC AliceSp CompPPI Refl 0.5丝路
Rainfall records – entire event

- More than 70 stations observed highest ever daily rainfall on 12th or 14th Jan
- Rainfall of 100 – 300 mm across two-thirds of the state
Rainfall records - wettest January

- Ranked wettest January on record by the halfway point of the month
Widespread Flooding

- Record river heights observed at 13 sites in the west of the state
- Widespread riverine flooding and localised flash flooding
- Over 80 towns across Victoria affected – including major regional centres Echuca, Kerang, Charlton and Horsham

Map of flood levels and records for the January 2011 Flood event in Victoria. Source: Department of Sustainability and Environment, Victoria.
Record river heights

Loddon River at Cairn Curran
Loddon River at Laanecoorie
Charlton
Summary

• Large-scale atmospheric circulations contributed to event

• Broad slow moving trough brought warm moist air from the tropics triggering:
  — Unprecedented rainfall in both duration and intensity
  — Record flood levels for northwest Victoria

• Wettest January on record for Victoria
Thank you

Belinda Campbell
belinda.campbell@bom.gov.au

** More information about the January 2011 event can be accessed via Special Climate Statement 26 on the Bureau of Meteorology website***