

Madden–Julian Oscillation

in Australia

The Madden–Julian Oscillation (MJO) is an eastward moving pulse of cloud and rainfall in the tropics that circles the globe. It impacts global monsoons and rainfall in northern Australia.

Climate impacts



Wind

Typically generates a westerly wind pattern across northern Australia, favourable for widespread rainfall



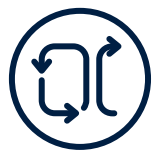
Rainfall

can significantly increase or decrease depending on MJO location



Temperature

can be significantly warmer or cooler than average depending on MJO location



La Niña and El Niño

MJO can help reduce La Niña or strengthen El Niño events



Monsoon

MJO can drive bursts and breaks in monsoon rainfall



Tropical cyclones

are more likely when MJO is active



When does the MJO occur?

The MJO can occur at any time of year but influences Australia mostly during the northern wet season


from October to April

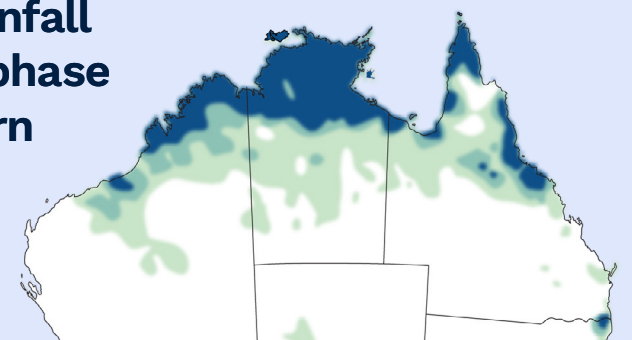
Typically the MJO circles the globe about **every 30 to 60 days**

An MJO can be **forecast up to three weeks ahead**

Weekly rainfall

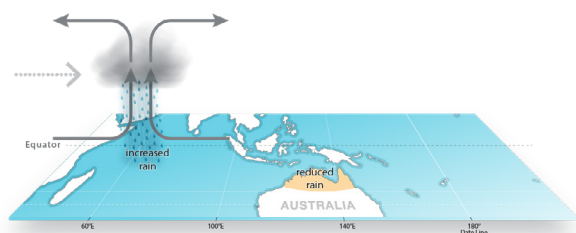
Typical weekly rainfall in an active MJO phase during the northern wet season

 Wetter than usual



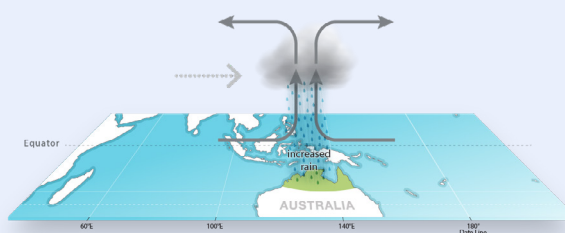
The MJO cycle example timeframe

Week 1: Emerging over Africa



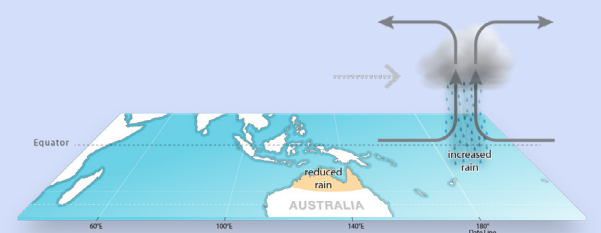
- More rainfall over Indian Ocean
- Less rainfall over northern Australia
- Easterly winds over northern Australia

Week 2–3: Entering the Australian region (active phase)



- More rainfall over northern Australia and south-west Pacific Ocean
- Less rainfall over Indian Ocean
- Westerly winds over northern Australia

Week 4–5: Shifting into the Pacific Ocean



- More rainfall over central equatorial Pacific Ocean
- Less rainfall over northern Australia
- Easterly winds over northern Australia

The MJO is only one factor in a complex system that influences Australia's climate. The long-range forecast is the best guide to the season ahead.



Australian Government
Bureau of Meteorology



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