



ENSO Wrap-Up

Current state of the Pacific and Indian Ocean

El Niño continues to strengthen

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The 2015 El Niño continues to develop. Weakened (or reversed) trade winds have resulted in further warming over much of the tropical Pacific Ocean. All key ENSO ocean monitoring areas have been more than 1 °C above average for 10 successive weeks—two weeks longer than the record in 1997. The eastern tropical Pacific is now at or exceeding +2 °C. In the atmosphere, the past week has seen the Southern Oscillation Index (SOI) drop to around -20, the lowest values of the event so far.

All international climate models surveyed by the Bureau of Meteorology indicate El Niño is likely to strengthen, and is expected to persist into early 2016. El Niño events typically peak during the late austral spring or early summer, and then weaken in the new year.

El Niño often brings below average winter and spring rainfall over eastern Australia and above-average daytime temperatures over the southern half of the country during the second half of the year. However, other factors, such as temperatures to the north of Australia and in the Indian Ocean, also affect Australia's climate, meaning El Niño is not the only influence on rainfall and temperature changes. Read more about how [El Niño might affect Australia](#).

The Indian Ocean Dipole (IOD) is currently neutral. A positive IOD event remains possible, with three of the five international models suggesting a positive IOD is likely during late winter to spring. A positive IOD is typically associated with reduced winter and spring rainfall over parts of southern and central Australia.

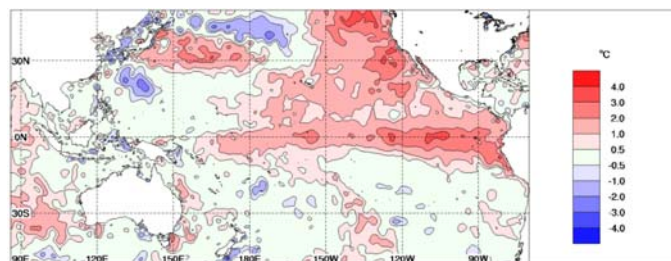
Next update expected on 4 August 2015 |

Weekly sea surface temperatures

Over the past fortnight, sea surface temperature (SST) anomalies have continued to increase over the eastern to central equatorial Pacific. Warm anomalies extend along the equator from the South American coastline to about 160°E. Anomalies for the week ending 19 July exceeded +2 °C across nearly all of the eastern equatorial Pacific, reaching more than +3 °C in small areas.

All five NINO indices again exceeded +1 °C this week, bringing the run to 10 consecutive weeks and exceeding the eight consecutive weeks recorded in 1997. Both NINO3 and NINO3.4 again recorded their warmest weekly value since the 1997–98 El Niño.

Warm anomalies persist across most of the northeast of the Pacific Basin, extending down the western coastline of North America, and have increased in the northwest of the Basin, between the coast of Japan and the Date Line. Warm anomalies are also present along parts of the east coast of Australia, in areas to Australia's west, and across much of the Indian Ocean.

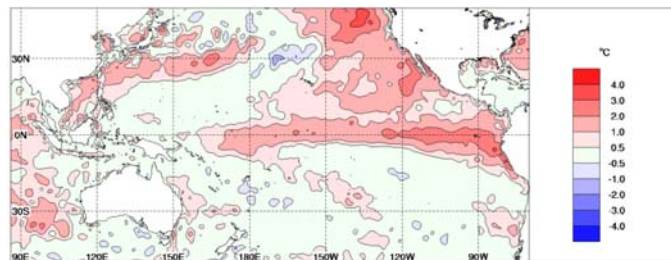


Index	Previous	Current	Temperature change (2 weeks)
NINO3	+1.8	+2.0	0.2 °C warmer
NINO3.4	+1.4	+1.6	0.2 °C warmer
NINO4	+1.0	+1.2	0.2 °C warmer

Baseline period 1961–1990.

Monthly sea surface temperatures

The SST anomaly map for June 2015 shows positive anomalies extended from the South American coastline, across the equatorial Pacific, past the Date Line to around 160°E. Compared to May, the strength of these anomalies had increased in the eastern Pacific. Strong warm anomalies also persisted across much of the northeast of the Pacific Basin, with weak warm anomalies to Australia's east, and moderate to strong warm anomalies across much of the Indian Ocean. The June anomaly for NINO3.4 ranks second warmest on record for June, behind June 1997 during the 1997–98 El Niño.



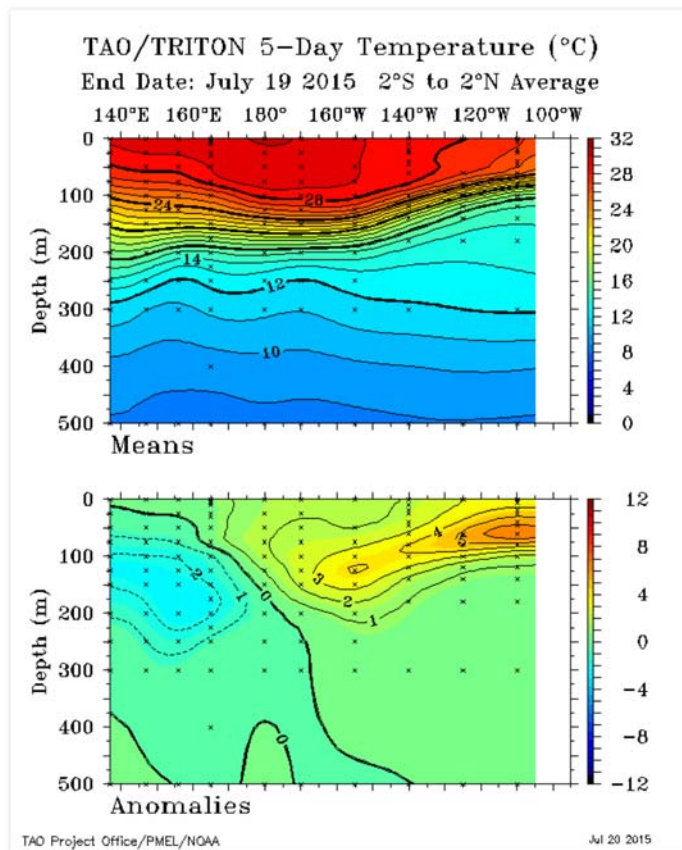
Index	May	June	Temperature change
NINO3	+1.2	+1.6	0.4 °C warmer
NINO3.4	+1.1	+1.3	0.2 °C warmer
NINO4	+1.1	+1.1	no change

Baseline period 1961–1990.

5-day sub-surface temperatures

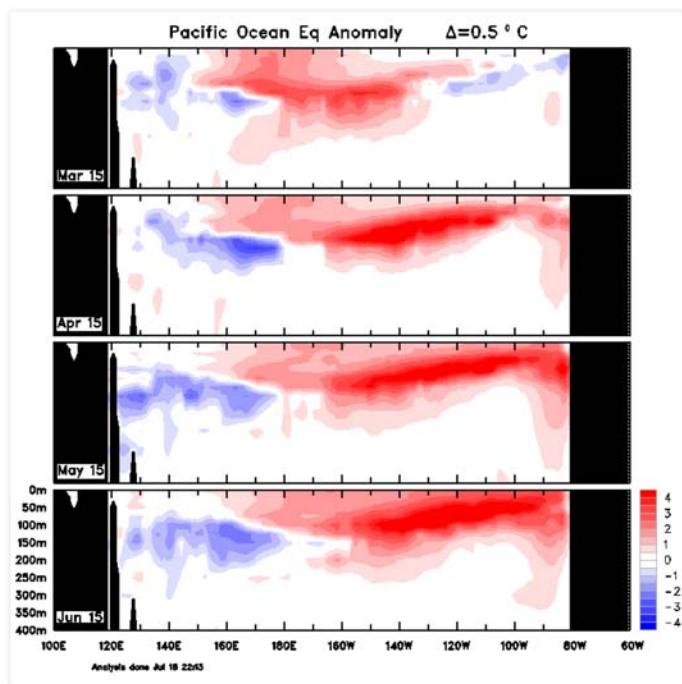
The sub-surface temperature map for the 5 days ending 19 July shows temperatures are warmer than average in the top 100 m of the central to eastern equatorial Pacific and cooler than average below the surface of the ocean in much of the western equatorial Pacific. Water in far eastern Pacific sub-surface is very much warmer than average, with anomalies around 75 m depth reaching more than 6 °C warmer than average. Warm anomalies in the central Pacific are somewhat stronger than they were two weeks ago.

Cool anomalies in the western equatorial Pacific have also strengthened when compared to two weeks ago, having reached more than 2 °C cooler than average between around 100 m and 200 m depth.



Monthly sub-surface temperatures

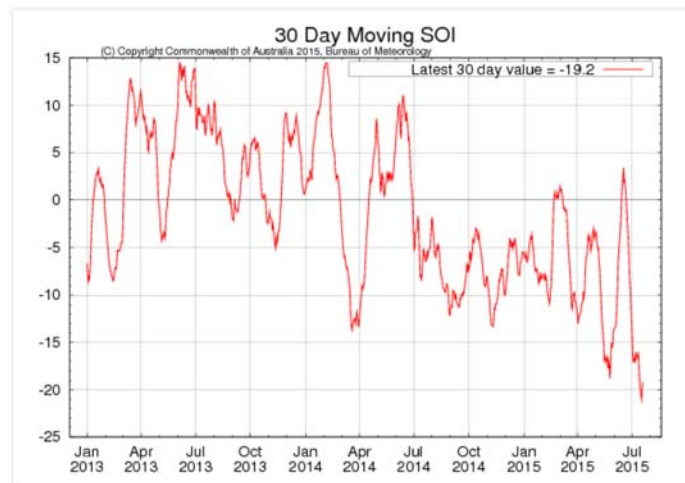
The four-month sequence of sub-surface temperature anomalies (to June) shows a generally consistent pattern of anomalies throughout the past three months. Warm anomalies were evident for June across the top 100 m to 200 m of the equatorial Pacific sub-surface between about 160°E and the South American coast. Anomalies across large areas of the eastern half of the equatorial Pacific reached more than +4 °C. Cool anomalies persisted in the sub-surface of the western equatorial Pacific.



Southern Oscillation Index

The Southern Oscillation Index (SOI) has continued to drop over the past two weeks, returning to moderate-to-strong negative values. The latest 30-day SOI value to 19 July was -19.2.

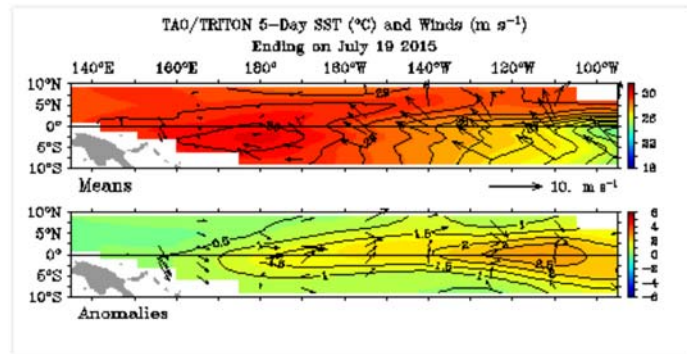
Sustained positive values of the SOI above +7 may indicate La Niña, while sustained negative values below -7 may indicate El Niño. Values of between about +7 and -7 generally indicate neutral conditions.



Trade winds

Trade winds for the 5 days ending 19 July showed westerly anomalies over nearly the entire equatorial Pacific, although anomalies were weak over the far eastern equatorial Pacific. Trade winds were weakly reversed (i.e. westerly winds) over the western equatorial Pacific.

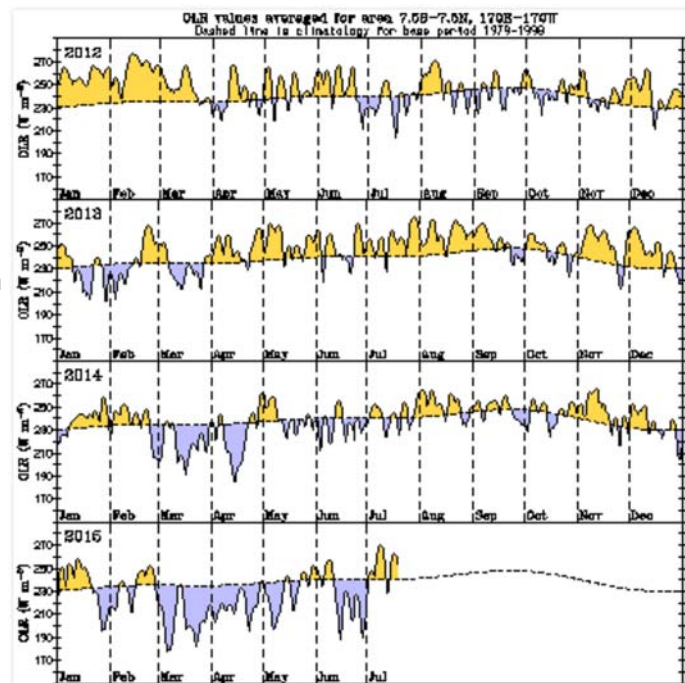
Trade winds have been consistently weaker than average, and on occasion reversed in direction (i.e. westerly rather than easterly), since the start of 2015.



Cloudiness near the Date Line

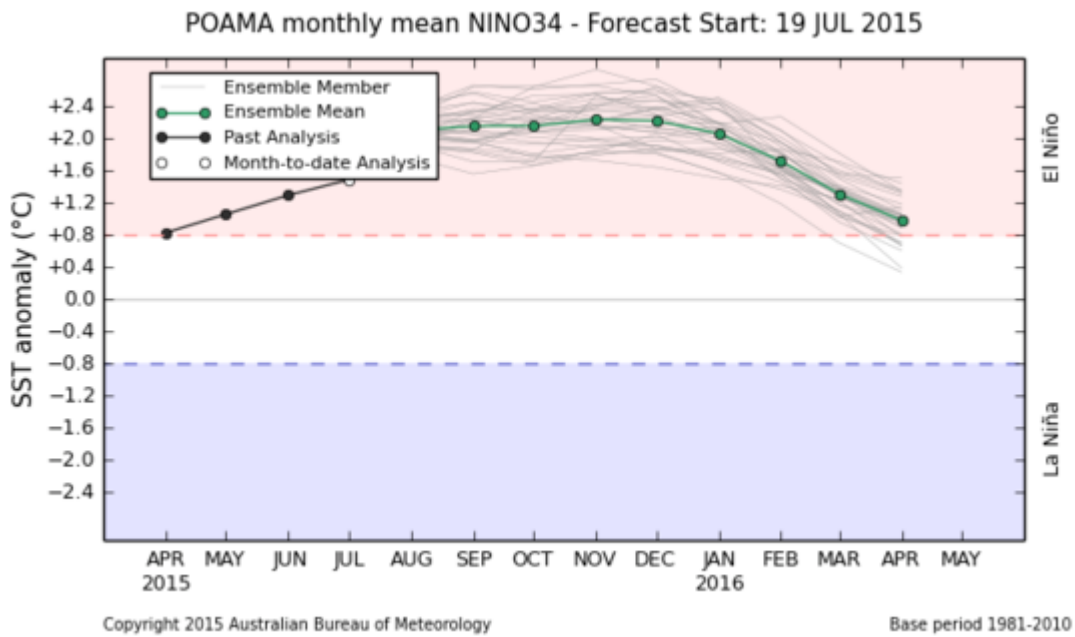
Cloudiness near the Date Line has been generally below-average since early July. The [Madden–Julian Oscillation \(MJO\)](#) is currently in phase 1, and is likely responsible for part of this recent reduction in cloudiness as this phase is associated with reduced cloudiness over the western tropical Pacific.

Cloudiness along the equator, near the Date Line, is an important indicator of ENSO, as it typically increases (negative OLR anomalies) near and to the east of the Date Line during El Niño and decreases (positive OLR anomalies) during La Niña.



Model outlooks

All eight of the surveyed international [climate models](#) indicate the central Pacific Ocean will warm further during the coming months. All surveyed models indicate that NINO3.4 will remain above El Niño thresholds until at least the end of 2015.

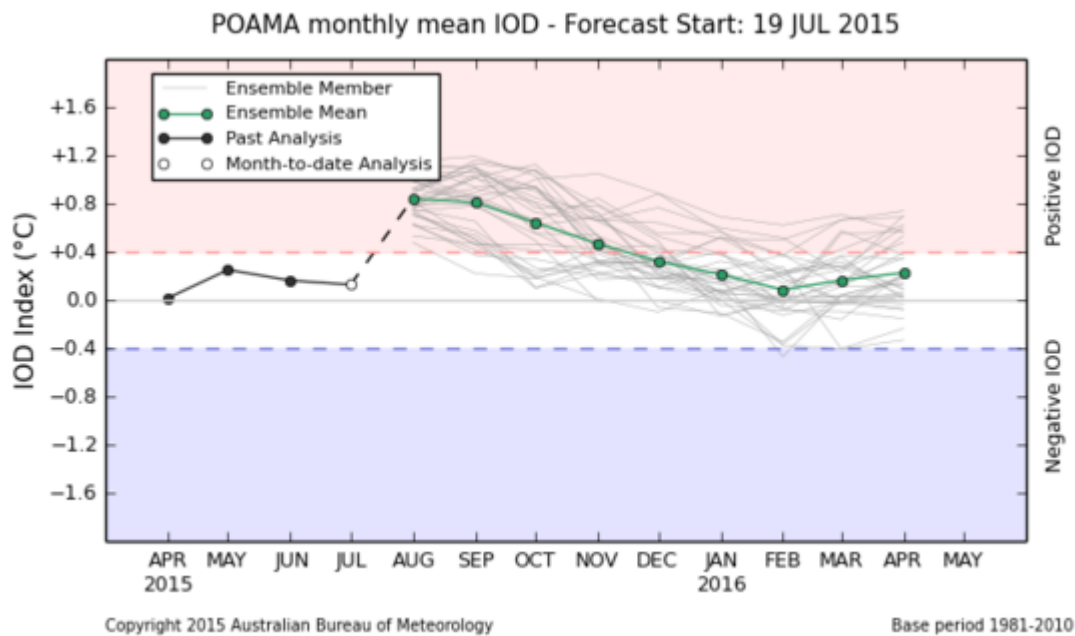


Indian Ocean Dipole

The Indian Ocean Dipole (IOD) is currently neutral. The latest weekly value of the IOD index to 19 July is +0.02 °C. Temperatures in the Indian Ocean are warmer than average over much of the basin.

Three of the five surveyed international [climate models](#) indicate a positive IOD event will occur during the southern hemisphere winter and spring.

Positive IOD events, often associated with lower rainfall in central and southeastern Australia, are more likely to occur during El Niño. Between 50% and 60% of all historical El Niño events have seen a positive IOD develop at the same time. Positive IOD events are often associated with lower rainfall in parts of central and southeastern Australia. Conditions will be monitored closely.



See also: [IOD forecasts](#)

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