



ENSO Wrap-Up

Current state of the Pacific and Indian Ocean

Strong El Niño and positive Indian Ocean Dipole persist

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A strong El Niño in the Pacific and a positive Indian Ocean Dipole are dominating the climate of countries that border the Pacific and Indian oceans.

In the central tropical Pacific Ocean, sea surface temperatures (SSTs) continue to warm, but at a markedly slower pace than earlier this year. All NINO indices have now been above +1 °C for 11 consecutive weeks, equalling the previous record. Recent bursts of westerly winds in the tropics means some further warming remains possible. All models indicate that the strong El Niño is likely to persist until the end of the year, before a marked decline during the first quarter of 2016.

International climate models also suggest the positive Indian Ocean Dipole (IOD) will persist into November, but then decline rapidly once the monsoon trough shifts south, changing wind patterns over the IOD region. So far in October the IOD index has averaged over +1 °C—the last month that this occurred was in 2006.

El Niño is usually associated with below-average spring rainfall over eastern Australia, and increased spring daytime temperatures south of the tropics. A positive IOD typically reinforces the drying pattern, particularly in the southeast. During summer, El Niño's influence on rainfall decreases, while warmer daytime and night-time temperatures tend to be more likely across the south and east.

Next update expected on 10 November 2015 |

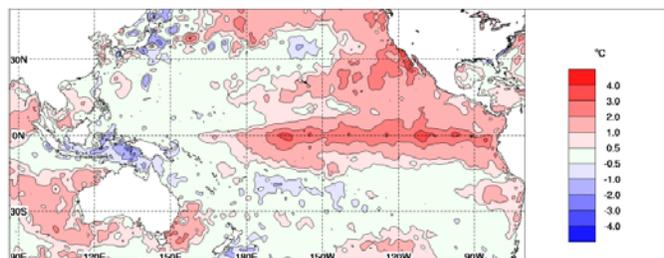
Weekly sea surface temperatures

Warm anomalies persist along the equator from the South American coastline to around 165°E—well into the central Pacific. Warm anomalies also remain across much of the Pacific Ocean in the northern hemisphere between the equatorial Date Line and the northeast of the Pacific basin, and across far northern latitudes; however, the extent of these warm anomalies has decreased since the beginning of October.

Anomalies for the week ending 25 October exceeded +2 °C across nearly all of the equatorial Pacific east of 170°W and parts of the northeast of the Pacific. Warm anomalies have increased in areas wrapping from Australia's southeast, around the Bight, to Australia's northwest. Warm anomalies also persist across large parts of the Indian Ocean.

Compared to two weeks ago, sea surface temperature (SST) anomalies have decreased slightly in the central equatorial Pacific and across the northeast of the basin. Cool anomalies have decreased in the southern tropics across the Pacific Ocean, but persist across the Indonesian archipelago and waters to Australia's north.

Please note: the data source for the Bureau's SST analysis system has been changed. This means the NINO region temperatures published in the tables for the week ending 11 October will be slightly different between this ENSO Wrap Up, and its previous issue.



Index	Previous	Current	Temperature change (2 weeks)
NINO3	+2.3	+2.2	0.1 °C cooler
NINO3.4	+2.1	+2.2	0.1 °C warmer
NINO4	+1.1	+1.3	0.2 °C warmer

Baseline period 1961–1990.

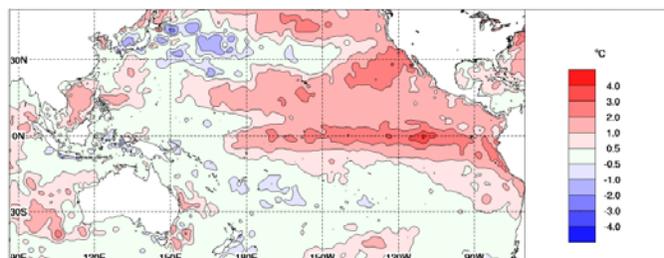
Monthly sea surface temperatures

The SST anomaly map for September 2015 shows warm SST anomalies extended across the equatorial Pacific from the South American coastline to just past the Date Line and also across much of the eastern half of the basin in the northern hemisphere.

Compared to August, warm anomalies have increased along the equator, while cool anomalies have increased in the northwest of the basin. Weak warm anomalies also persisted to Australia's east, and moderate to strong warm anomalies across much of the Indian Ocean.

Both NINO3 and NINO3.4 continued to warm, reaching anomalies of +2.2 °C and +2.0 °C respectively for September 2015.

NINO3.4 still remains well behind the peak monthly



Index	August	September	Temperature change
NINO3	+2.0	+2.2	0.2 °C warmer
NINO3.4	+1.9	+2.0	0.1 °C warmer
NINO4	+1.1	+1.1	no change

Baseline period 1961–1990.

anomaly value reached during either 1982 or 1997 (+2.8 °C and +2.7 °C respectively). Note: peak values are typically recorded late in the year.

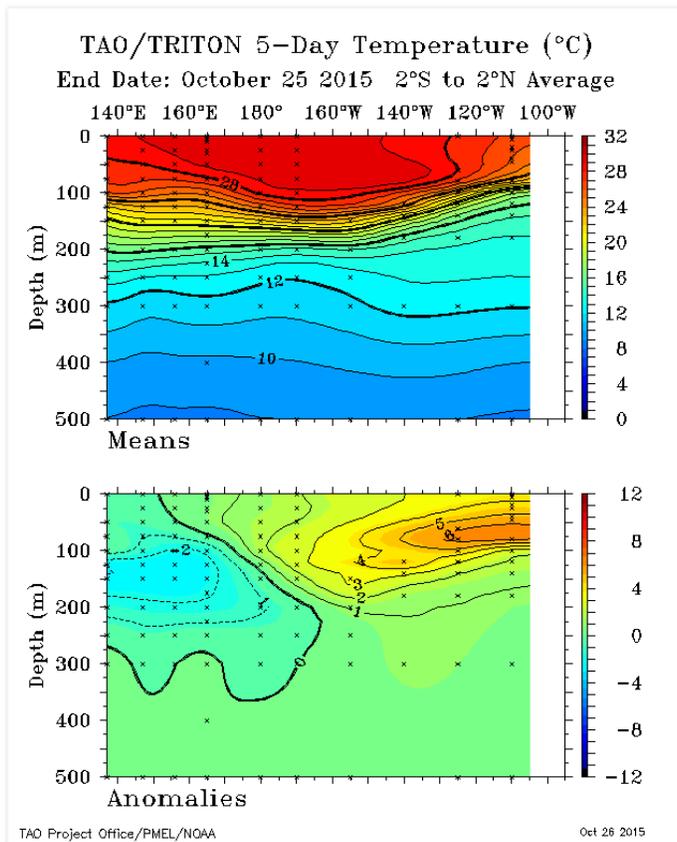
5-day sub-surface temperatures

The sub-surface temperature map for the 5 days ending 25 October shows temperatures were warmer than average in the top 150 m of the central to eastern equatorial Pacific and cooler than average below the surface of the ocean in the western equatorial Pacific. Water in far eastern Pacific sub-surface remains much warmer than average, but has cooled slightly compared to two weeks ago. An area around 75 m depth is more than 6 °C warmer than average.

Cool anomalies in the western equatorial Pacific have increased slightly when compared to two weeks ago. An area around 150 m depth remains more than 2 °C cooler than average.

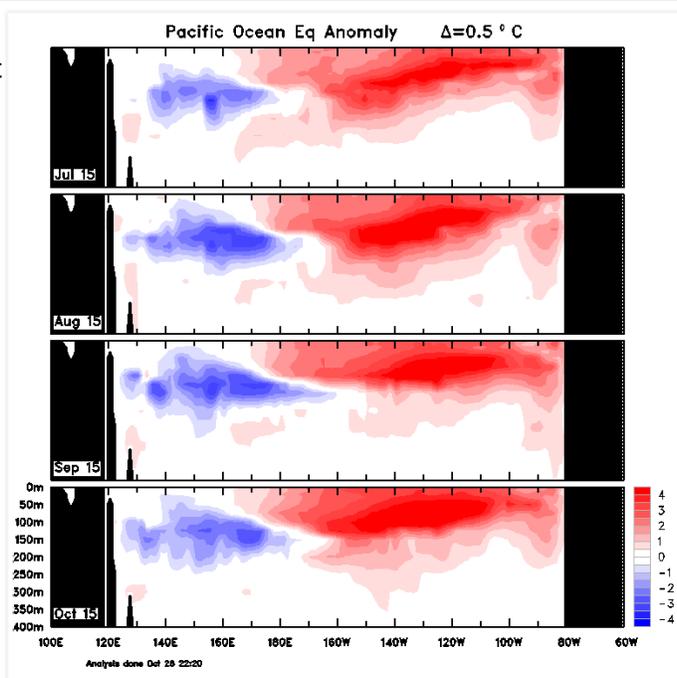
The pattern of warm anomalies in the eastern sub-surface and cool anomalies in the west is consistent with a well-established El Niño.

In the mean 5-day values (upper panel), the thermocline remains almost flat. The thermocline sits around the 20 °C region, and is considered mid-point between the warmer surface waters, and cooler subsurface waters. An almost flat thermocline tends to only occur during strong El Niño events.



Monthly sub-surface temperatures

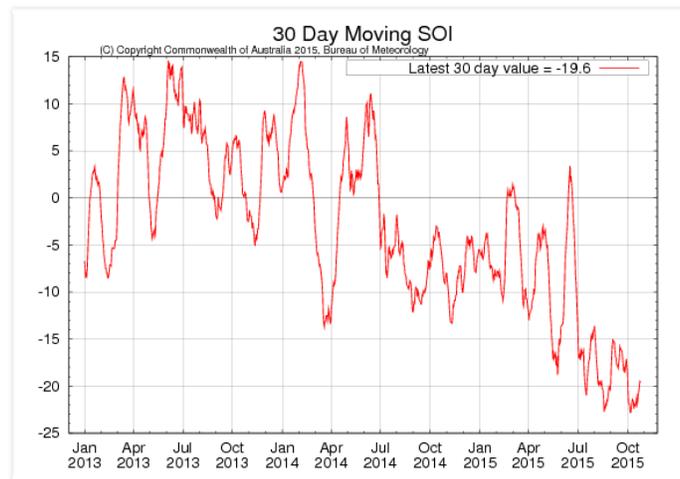
The four-month sequence of sub-surface temperature anomalies (to 26 October) shows a generally consistent pattern of anomalies throughout the past four months. In October, warm anomalies were present in the top 200 m of the equatorial Pacific sub-surface, extending between about 170°E and the South American coastline. Monthly anomalies across large areas of the eastern half of the equatorial Pacific reached more than +4 °C. Cool anomalies persist in the sub-surface of the western equatorial Pacific.



Southern Oscillation Index

During the past two weeks the Southern Oscillation Index (SOI) has remained strongly negative, but has risen slightly compared to two weeks ago. The 30-day SOI value to 25 October was -19.6 .

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

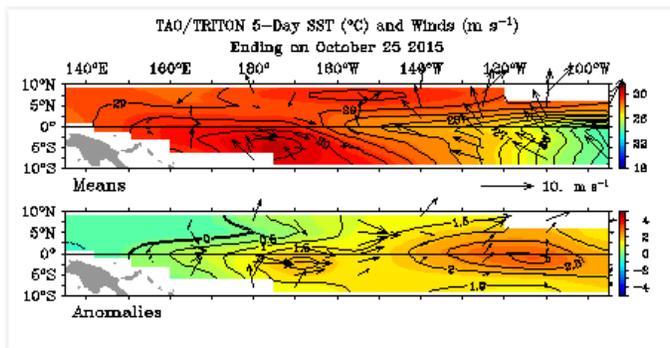


Trade winds

Trade winds for the 5 days ending 25 October show westerly anomalies across the central equatorial Pacific. The area of westerly anomalies has shifted slightly eastward compared to two weeks ago as a westerly wind burst tracks across the Pacific. Trade winds were reversed (i.e. westerly winds) in the western Pacific in a region centred about the Date Line.

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.

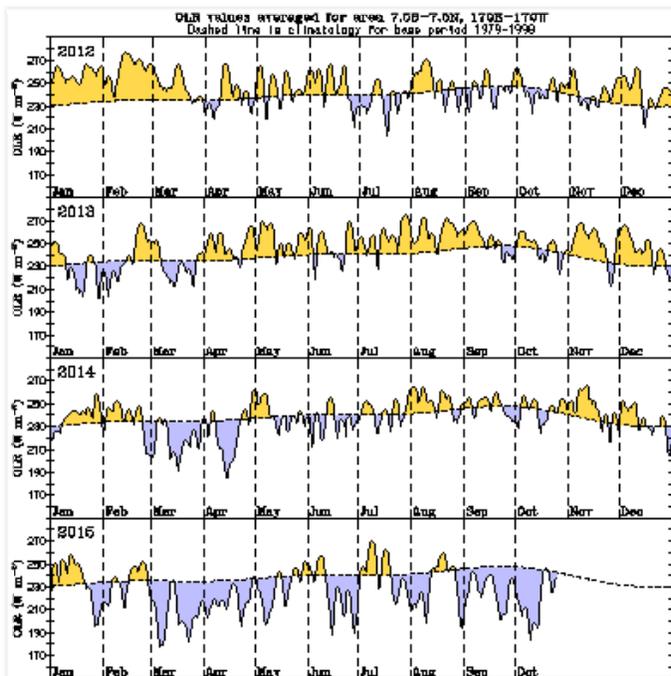
During La Niña events, there is a sustained strengthening of the trade winds across much of the tropical Pacific, while during El Niño events there is a sustained weakening of the trade winds.



Cloudiness near the Date Line

Cloudiness near the Date Line has remained generally above-average during October, continuing the pattern generally observed since March.

Cloudiness along the equator, near the Date Line, is an important indicator of the El Niño–Southern Oscillation (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.

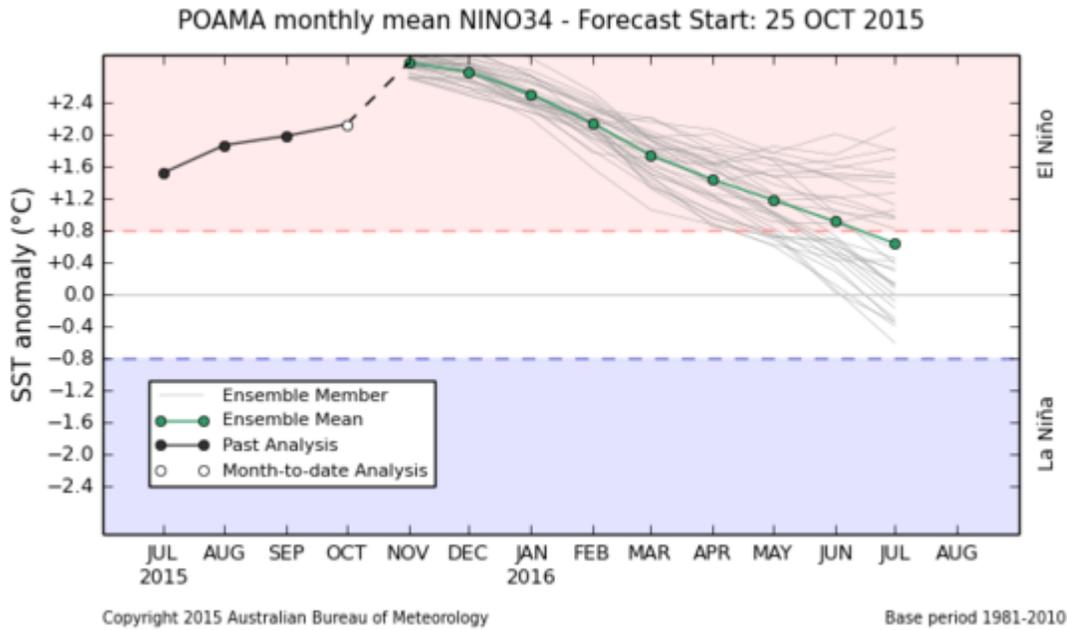


Model outlooks

All of the eight international [climate models](#) surveyed by the Bureau indicate that the peak values of this event in the central Pacific Ocean are likely to be reached in either November or December.

About half the models indicate the event may plateau during the southern hemisphere spring and early summer, while about half indicate a steady decline from the start of 2016 once peak values are reached later this year.

All surveyed models indicate that NINO3.4 will remain above El Niño thresholds through the first quarter of 2016. The surveyed models indicate values of NINO3.4 are likely to remain above the threshold value until at least the middle of the southern hemisphere autumn.



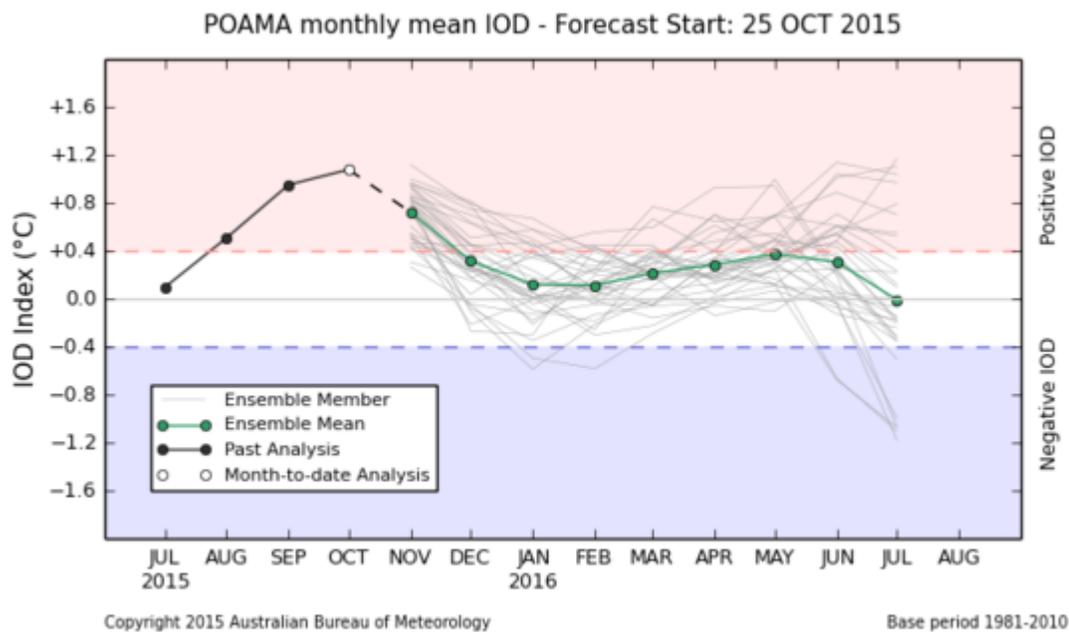
Indian Ocean Dipole

The positive Indian Ocean Dipole (IOD) event persists, with the weekly index value to 25 October strongly positive at +1.08 °C.

Sea surface temperatures (SSTs) in the Indian Ocean are warmer than average over much of the basin, while waters around the Indonesian archipelago and to Australia's north are cooler than average.

Positive IOD events are often associated with lower rainfall in parts of central and southeastern Australia (see [About the Indian Ocean Dipole](#)). Positive IOD events are more likely to occur during El Niño, which also is typically associated with a reduction in winter–spring rainfall in eastern Australia.

All surveyed international [climate models](#) indicate this event is likely to begin to decay in late spring. IOD events typically decay by early summer.



See also: [IOD forecasts](#)

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