



ENSO Wrap-Up

Current state of the Pacific and Indian Ocean

El Niño in the tropical Pacific

Issued on 12 May 2015 | Product Code IDCKGEWW00

The tropical Pacific is in the early stages of El Niño. Based upon model outlooks and current observations, the Bureau's ENSO Tracker has been raised to El Niño status.

El Niño–Southern Oscillation (ENSO) indicators have shown a steady trend towards El Niño levels since the start of the year. Sea surface temperatures in the tropical Pacific Ocean have exceeded El Niño thresholds for the past month, supported by warmer-than-average waters below the surface. Trade winds have remained consistently weaker than average since the start of the year, cloudiness at the Date Line has increased and the Southern Oscillation Index (SOI) has remained negative for several months. These indicators suggest the tropical Pacific Ocean and atmosphere have started to couple and reinforce each other, indicating El Niño is likely to persist in the coming months.

International climate models surveyed by the Bureau indicate that tropical Pacific Ocean temperatures are likely to remain above El Niño thresholds through the coming southern winter and at least into spring.

El Niño is often associated with below-average winter and spring rainfall over eastern Australia, and above-average daytime temperatures over the southern half of the country. However, the current May to July outlook suggests much of Australia is likely to be wetter than average. This is because a warmer-than-average Indian Ocean is dominating this outlook. El Niño is expected to become the dominant influence on Australian climate during the second half of the year.

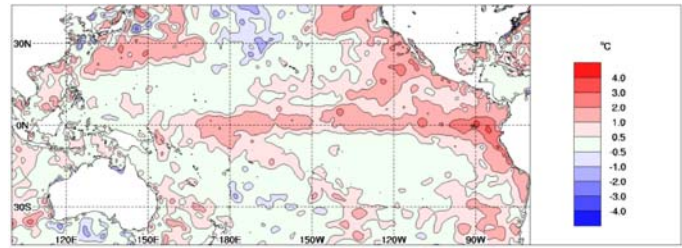
Next update expected on 26 May 2015 |

Weekly sea surface temperatures

Over the past fortnight, sea surface temperature (SST) anomalies have increased in the eastern equatorial Pacific and decreased slightly in the far western equatorial Pacific. The SST anomaly map for the week ending 10 May shows warm anomalies in excess of +2 °C in parts of the far eastern equatorial Pacific and along part of the South American coast, with anomalies in excess of +1 °C present across most of the remaining equatorial Pacific. NINO indices have been above El Niño thresholds for four weeks.

All five NINO indices exceeded +1 °C last week. This is the first time all weekly values have exceeded +1 °C since February 1998.

Warm anomalies remain across a large part of the northeast of the Pacific Basin, extending down the western coastline of both North and South America. Warm anomalies around Australia’s east coast and to Australia’s north and southwest remain, but have decreased in strength over the past two weeks.

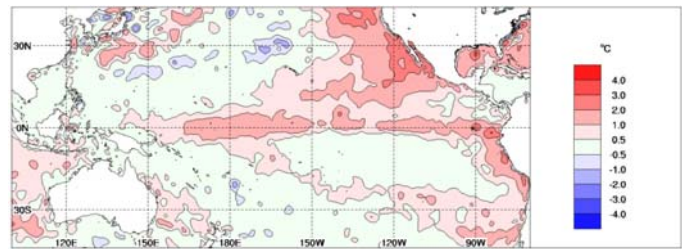


Index	Previous	Current	Temperature change (2 weeks)
NINO3	+1.0	+1.2	0.2 °C warmer
NINO3.4	+1.0	+1.0	no change
NINO4	+1.2	+1.1	0.1 °C cooler

Baseline period 1961–1990.

Monthly sea surface temperatures

The SST anomaly map for April shows water across the entire equatorial Pacific east of 150°E was warmer than average. Water was also warmer than average over much of the northeastern Pacific Basin, along the coastline of South America, adjacent to Australia’s east coast, and across large parts of the Indian Ocean.



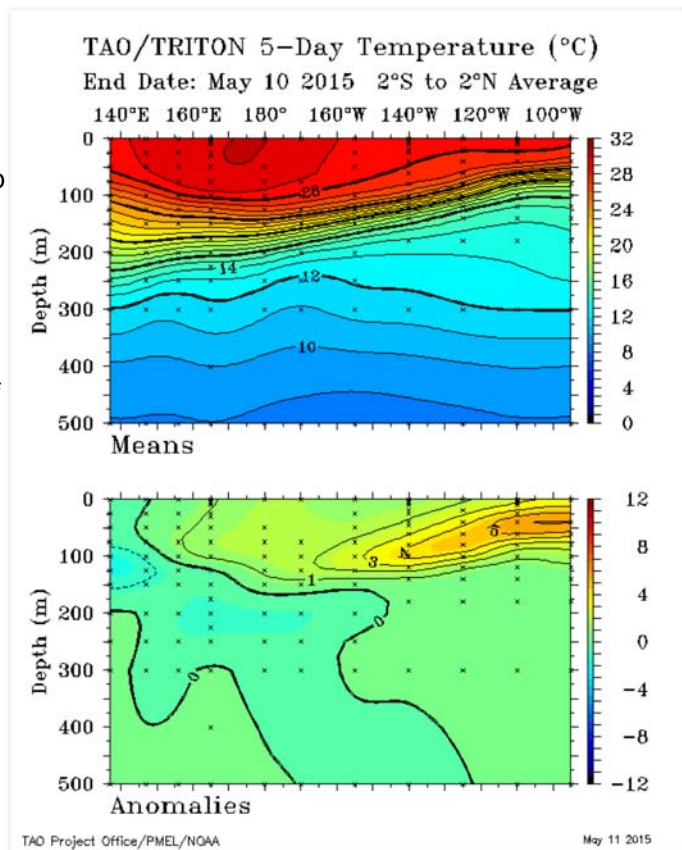
Index	March	April	Temperature change
NINO3	+0.3	+0.8	0.5 °C warmer
NINO3.4	+0.6	+0.8	0.2 °C warmer
NINO4	+1.1	+1.1	no change

Baseline period 1961–1990.

5-day sub-surface temperatures

The sub-surface temperature map for the 5 days ending 10 May shows temperatures are near average below the surface of the ocean in the western equatorial Pacific and warmer than average in the top 150 m of the eastern equatorial Pacific. Water in the top 75 m of the far eastern Pacific is more than 5 °C warmer than average.

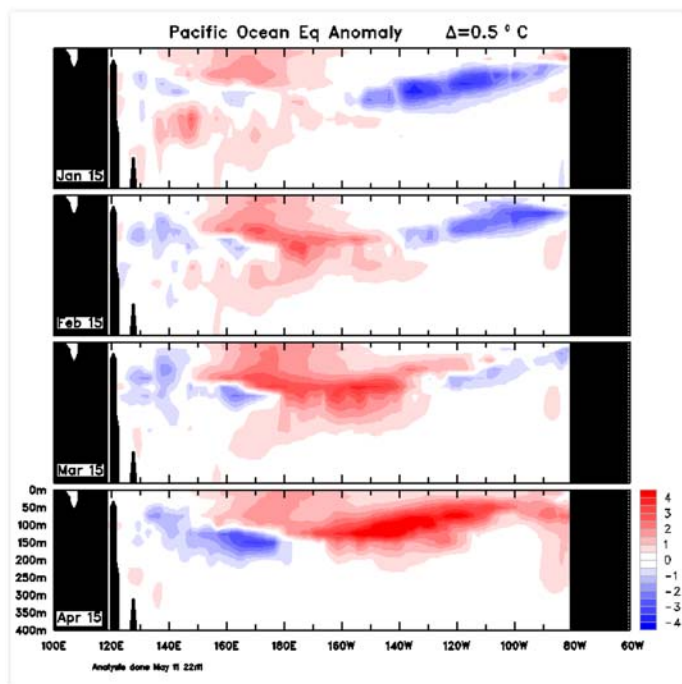
Further increases in surface temperature anomalies in the eastern Pacific are expected to result as these warm anomalies continue to rise towards the surface of the ocean.



Monthly sub-surface temperatures

The four-month sequence of sub-surface temperature anomalies (to April) shows the eastward progression of warm anomalies over the past 3 to 4 months (also known as a downwelling Kelvin wave). The eastward migration of strengthening warm anomalies, and their gradual rise towards the surface, can be seen in the monthly sequence from January. Compared to March, warm anomalies increased in the central to eastern equatorial Pacific sub-surface and migrated eastward.

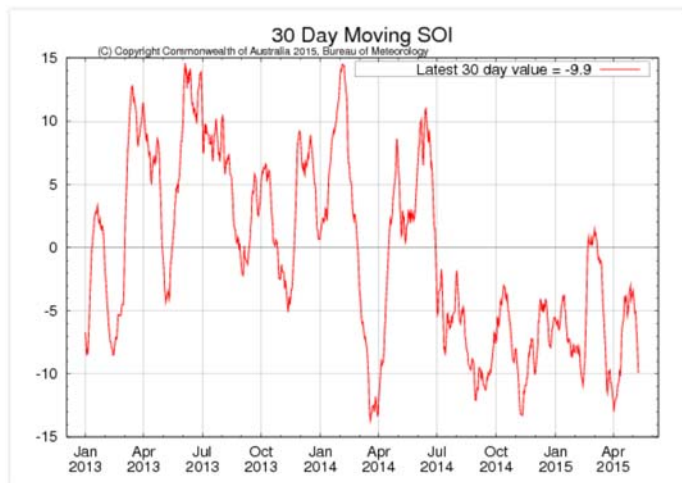
For April, warm anomalies were present in the top 150 m of the equatorial Pacific sub-surface between about 150°E and the South American coast. Anomalies in small parts of the central equatorial Pacific reached more than +4 °C. A small area of cool anomalies was present in the sub-surface of the western equatorial Pacific.



Southern Oscillation Index

The Southern Oscillation Index (SOI) has dropped over the past two weeks, with values again surpassing El Niño thresholds. The latest 30-day SOI value to 10 May is -9.9 . The SOI has been generally negative since early in the southern hemisphere spring of 2014, but despite brief periods exceeding El Niño thresholds, the SOI has yet to exceed El Niño thresholds for a sustained period. During the southern tropical wet season (now ended), large fluctuations in the SOI are common due to transient weather systems.

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.

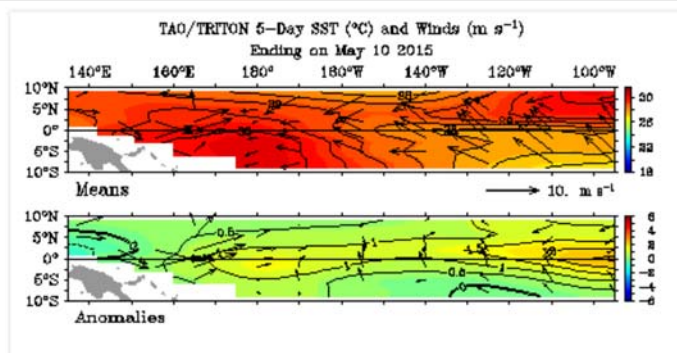


Trade winds

Trade winds over the western tropical Pacific for the 5 days ending 10 May were reversed (i.e. westerly—see map). Trade winds have been consistently weaker than average, and on occasion reversed in direction, since the start of 2015. This has caused warming of the sub-surface of the tropical Pacific Ocean. Tropical storm *Dolphin* in the northern hemisphere has recently strengthened westerly winds in the western tropical Pacific.

Bursts of westerly winds over the equatorial Pacific can induce warming of the ocean below by driving downwelling Kelvin waves, which travel eastward as a 'pulse' of warmer-than-average water and warm the surface and sub-surface of the ocean.

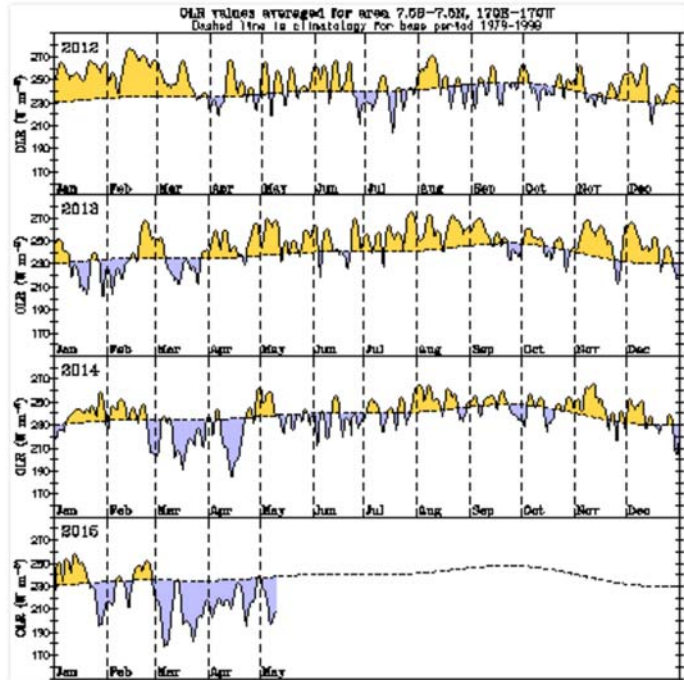
During La Niña there is a sustained strengthening of the trade winds across much of the tropical Pacific, while during El Niño there is a sustained weakening of the trade winds.



Cloudiness near the Date Line

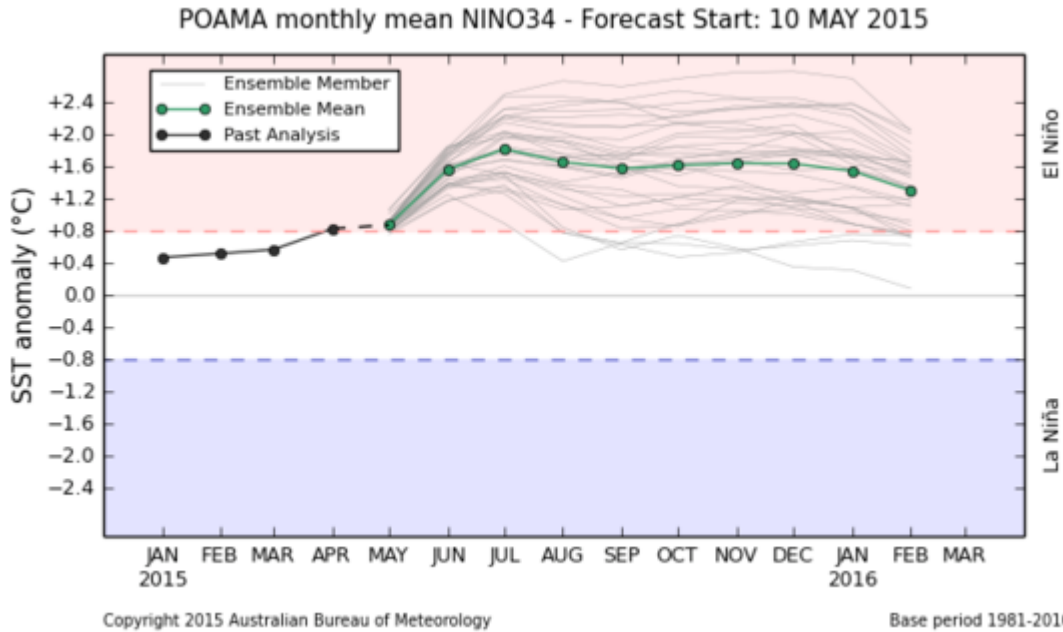
Cloudiness near the Date Line has been above average for the past two weeks. Cloudiness has been above average since the start of March.

Cloudiness along the equator, near the Date Line, is an important indicator of ENSO conditions, 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 through the southern winter and at least well into spring. The average value of NINO3.4 expected by the end of the southern winter is about +1.5 °C; however, it is too early to determine with confidence how strong this potential El Niño could be.

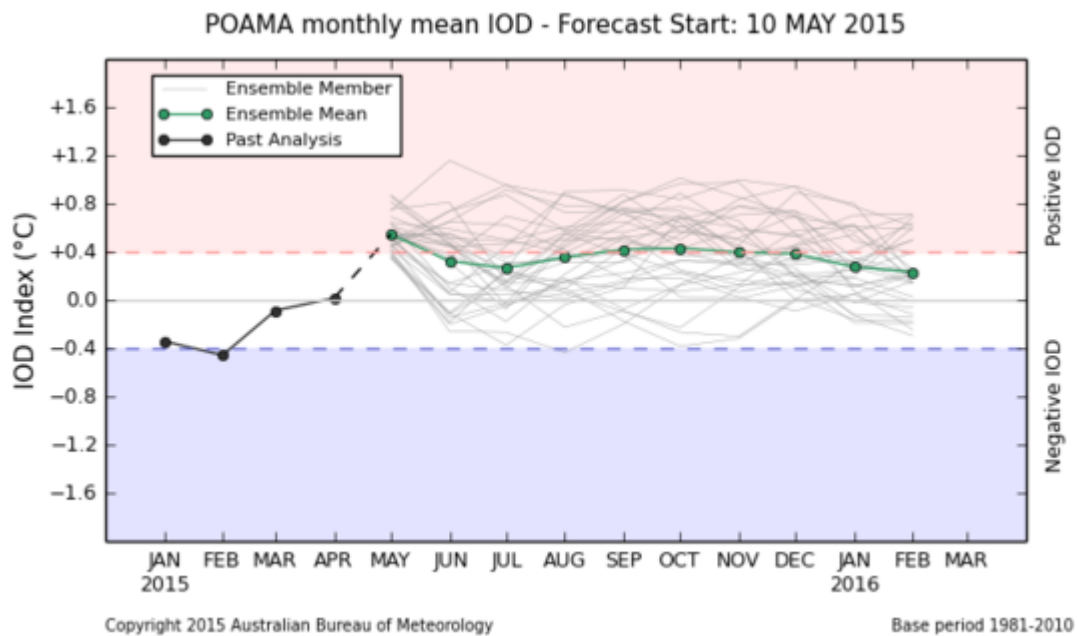


Indian Ocean Dipole

The latest weekly value of the Indian Ocean Dipole (IOD) index to 10 May is +0.15 °C.

On average, climate models surveyed in the [model outlooks](#) favour a continuation of a neutral phase of the IOD throughout winter. However, some models favour values near threshold levels during the austral spring. Positive IOD events are more likely to occur during El Niño, therefore conditions will be monitored closely.

Temperatures in the Indian Ocean more broadly are warmer than average over much of the basin, with largest positive anomalies in the mid-latitudes of the southern hemisphere. These very warm temperatures are currently having a significant impact upon Australia's climate, increasing the odds of a wetter period in most dynamical climate models surveyed.



See also: [IOD forecasts](#)

This page was created at **13:13 on Tuesday 12 May 2015 (AEST)**

© [Copyright](#) Commonwealth of Australia 2015, Bureau of Meteorology (ABN 92 637 533 532) | [Disclaimer](#) | [Privacy](#) | [Accessibility](#)