



ENSO Wrap-Up

Current state of the Pacific and Indian Ocean

Tropical Pacific continues to warm; El Niño likely in 2014

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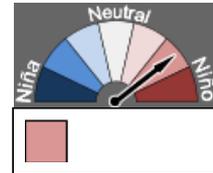
The tropical Pacific Ocean has warmed steadily in recent months, with large warm anomalies in the ocean sub-surface (5-day values up to +6 °C) and increasingly warm sea surface temperatures. Climate models surveyed by the Bureau suggest El Niño development is possible as early as July. These factors indicate that while El Niño in 2014 cannot be guaranteed, the likelihood of an event developing remains at least 70% and we are at El Niño ALERT level.

For El Niño to be established and maintained, coupling needs to occur between the tropical Pacific atmosphere and ocean, evident by further and persistent weakening of the trade winds and a consistent increase in cloudiness near the Date Line. These atmospheric characteristics of El Niño are forecast to become evident over the coming months.

El Niño impacts climate across much of the world, including below average rainfall in the western Pacific and Indonesian regions, and increased rainfall in the central and eastern Pacific. For Australia, El Niño is usually associated with below average rainfall over southern and eastern inland Australia, with about two thirds of El Niño events since 1900 resulting in major drought over large parts of the continent.

The Indian Ocean Dipole (IOD) is currently in a neutral state. Model outlooks suggest the IOD is likely to remain neutral through late autumn and early winter, with two of the five models surveyed suggesting a positive IOD may develop by early spring. Positive IOD events often coincide with El Niño and are typically associated with large parts of southern and central Australia experiencing lower rainfall than usual.

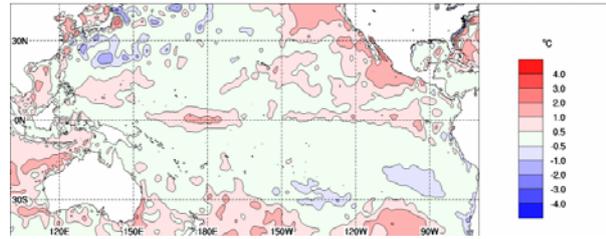
Next update expected on 20 May 2014 | [print version](#)



El Niño
ALERT

Monthly sea surface temperatures

Compared to March, the equatorial Pacific has warmed over the past month. The sea surface temperature (SST) anomaly map for April shows weak warm anomalies across most of the equatorial Pacific. The tropical Pacific has been slowly but steadily warming over the past few months, with the central Pacific warming by 0.6 °C since February.

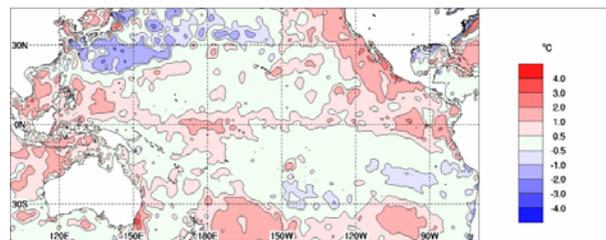


Index	March	April	Temperature change
NINO3	+0.1	+0.4	0.3 °C warmer
NINO3.4	0.0	+0.3	0.3 °C warmer
NINO4	+0.6	+0.5	0.1 °C cooler

Baseline period 1961–1990.

Weekly sea surface temperatures

The SST anomaly map for the week ending 4 May 2014 shows positive SST anomalies are now present across the whole equatorial band in the Pacific, reflecting a gradual warming of the tropical Pacific over the past few months. This warming is consistent with an emerging El Niño.



Waters surrounding Australia are generally warmer than average, with waters to the south of Australia having cooled over the past week from an extended period of cold southerly winds.

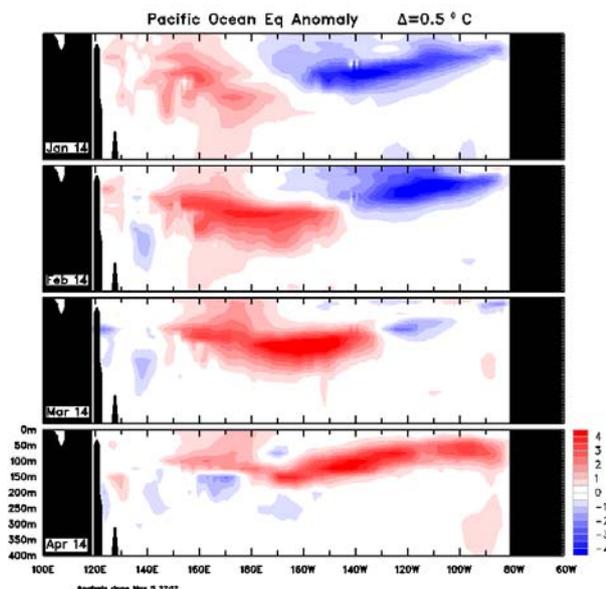
Index	Previous	Current	Temperature change (2 weeks)
NINO3	+0.4	+0.6	0.2 °C warmer
NINO3.4	+0.3	+0.4	0.1 °C warmer
NINO4	+0.4	+0.7	0.3 °C warmer

Baseline period 1961–1990.

See also: [Animation of recent SST changes](#) [Weekly index values](#) [Map of NINO regions](#)

Monthly sub-surface temperatures

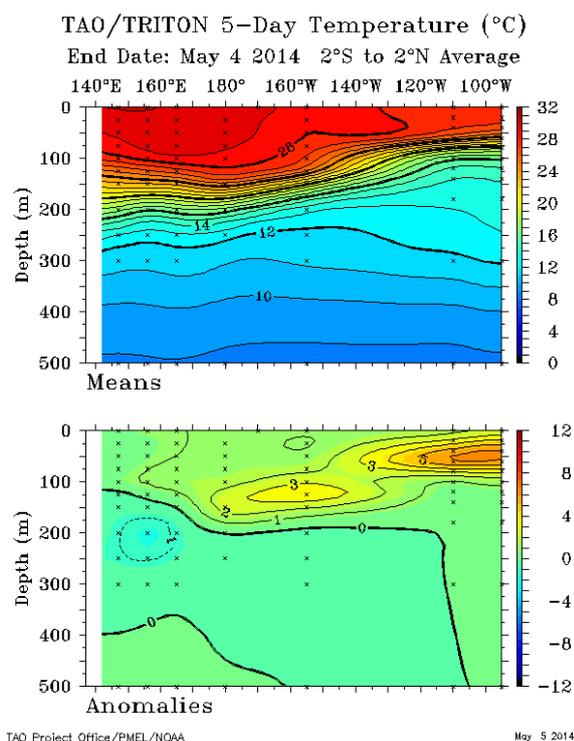
The plot to the right shows the sub-surface temperature anomalies for the four months ending April 2014. The sequence over the last four months shows the development and eastward propagation of warmer than average water (known as a downwelling Kelvin wave event), which has now reached the eastern Pacific sub-surface.



Weekly sub-surface temperatures

The sub-surface temperature map for the 5 days ending 4 May 2014 shows water in the sub-surface of the equatorial Pacific is generally warmer than average. Waters in the central Pacific sub-surface are more than 3 °C warmer than average around 100 m deep, and more than 5 °C warmer than average around 50 m deep in the far east Pacific.

The [animation of sub-surface temperature changes](#) shows the progression of the warmer waters across the Pacific (which is known as a Kelvin wave). Downwelling Kelvin wave events are the result of westerly wind anomalies over the western tropical Pacific. This pool of warmer-than-average sub-surface water is expected to cause a further warming at the surface of the tropical central and eastern Pacific, which is likely to contribute to the formation of an El Niño during winter.



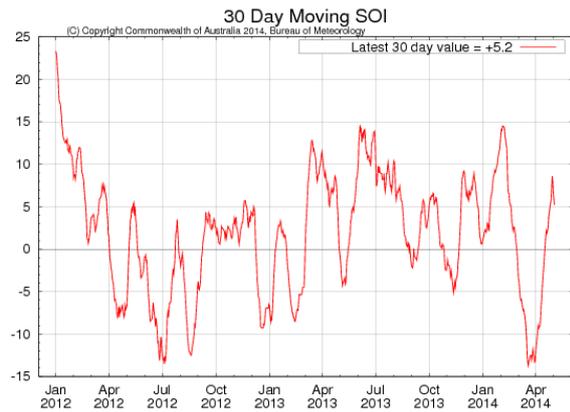
See also: [Animation of recent sub-surface temperature changes](#)

[Archive of sub-surface temperature charts](#)

Southern Oscillation Index

The Southern Oscillation Index (SOI) currently remains neutral. The latest approximate 30-day SOI value to 4 May 2014 is +5.2.

Sustained positive values of the SOI above +8 may indicate a La Niña event, while sustained negative values below -8 may indicate an El Niño event. Values of between about +8 and -8 generally indicate neutral conditions.

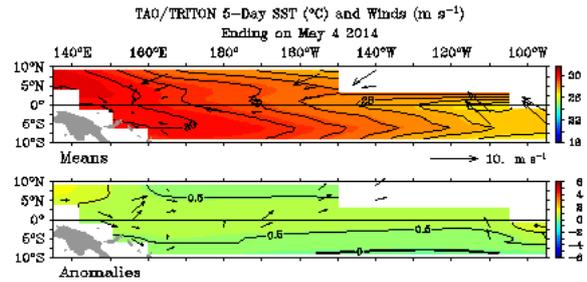


See also: [Monthly SOI graph](#) [Table of monthly SOI values](#) [30-day SOI values](#)

Trade winds

Westerly wind anomalies are present over the western equatorial Pacific, while trade winds are near-average along the equator in the central to eastern tropical Pacific (see anomaly map for the 5 days ending 4 May 2014).

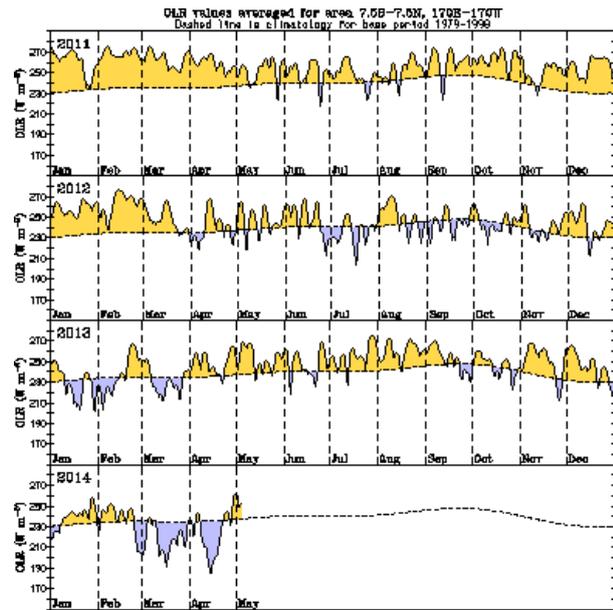
During La Niña events, there is a sustained strengthening of the trade winds across much of the tropical Pacific, while during El Niño events there is a sustained weakening of the trade winds.



Cloudiness near the Date Line

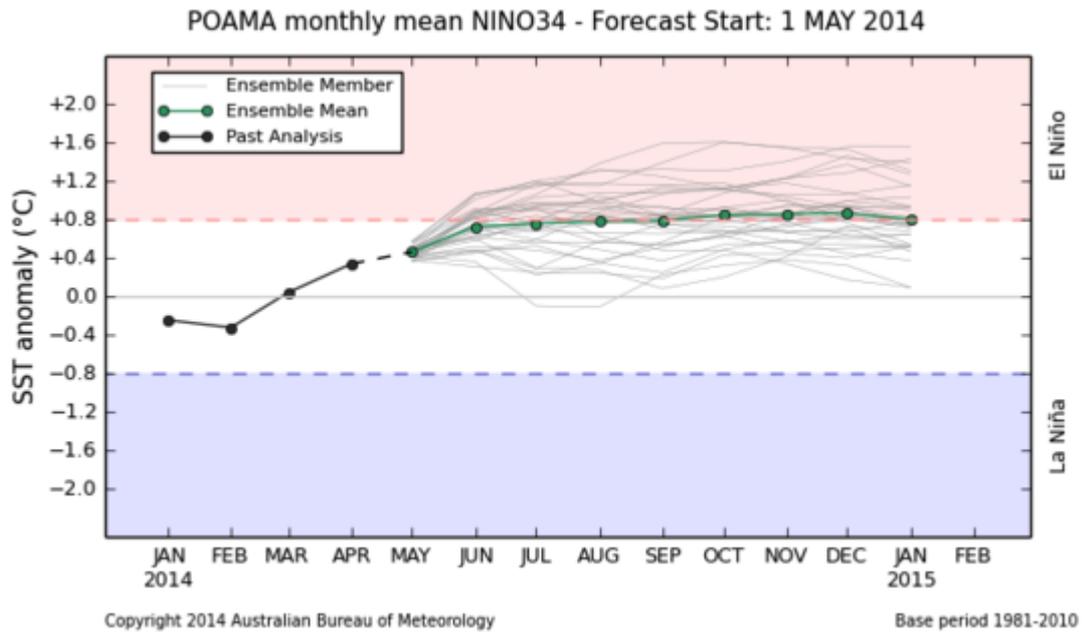
Cloudiness near the Date Line has fluctuated recently, and is currently close to the long-term average.

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 an El Niño event and decreases (positive OLR anomalies) during a La Niña event.



Model outlooks

All international [climate models](#) surveyed by the Bureau indicate that SSTs in the equatorial Pacific Ocean are likely to continue to warm into winter. All models indicate that El Niño thresholds are likely to be exceeded by the southern hemisphere spring.

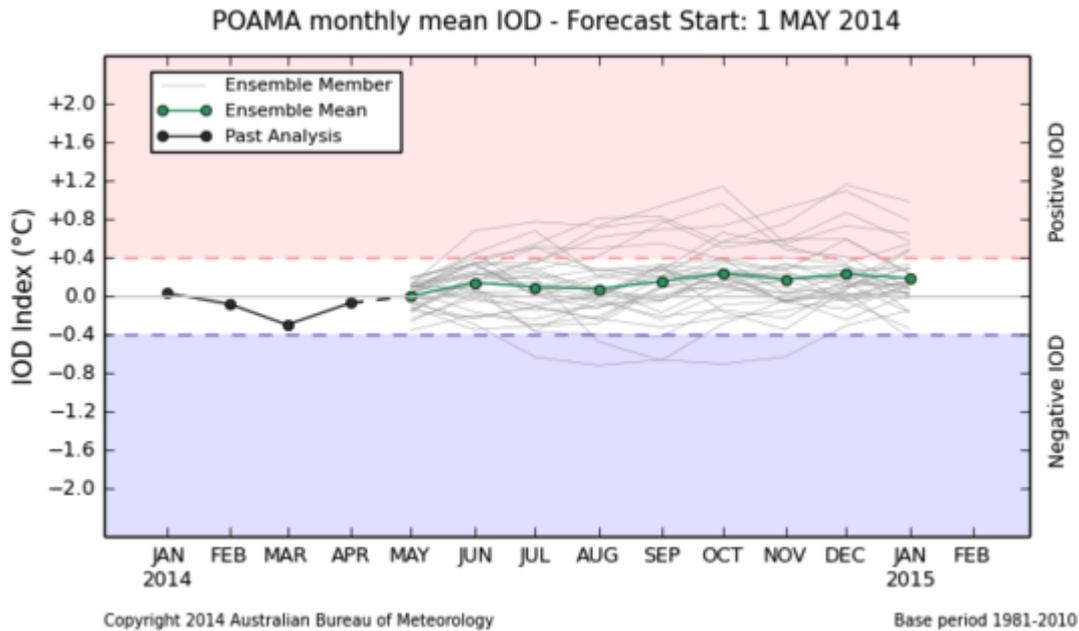


See also: [Climate model summary](#)

Indian Ocean Dipole

The Indian Ocean Dipole (IOD) remains neutral, with the latest weekly index value (4 May) at 0.0 °C.

Climate models surveyed in the [model outlooks](#) favour neutral IOD values over the coming months. However, the development of an El Niño would increase the chance of a positive IOD event – two models indicate this is a possibility by early spring. Positive IOD events often coincide with El Niño and are typically associated with lower than average winter and spring rainfall over parts of southern and central Australia.



See also: [POAMA model](#) [IOD time series](#) [Map of IOD regions](#) [IOD forecasts](#)

[Weekly IOD values](#)