



## Warming tropical Pacific increases chance of El Niño from winter

Issued on Tuesday 11 March 2014 | Product Code IDCKGEW00

The El Niño–Southern Oscillation (ENSO) remains neutral – neither El Niño nor La Niña. However, international climate models surveyed by the Bureau indicate that warming of the tropical Pacific is likely in the coming months, with most models showing temperatures approaching or exceeding El Niño thresholds during the austral winter.

Recent observations indicate that warming of the tropical Pacific is occurring. The tropical Pacific Ocean sub-surface has warmed substantially over the past few weeks, which is likely to result in a warming of the sea surface in the coming months. A recent burst of westerly winds over the far western Pacific is the strongest seen since at least 2009 – the last time an El Niño developed.

El Niño is often, but not always, associated with below-average rainfall during the second half of the year across large parts of southern and inland eastern Australia. Daytime temperatures also tend to be above average over southern Australia.

The Indian Ocean Dipole (IOD) is typically too weak to have a significant influence on the Australian climate from December to April. Current model outlooks indicate a neutral IOD through late autumn and early winter. However, the chance of a positive IOD event is elevated during El Niño.

Next update expected on 25 March 2014 | [print version](#)

## Further Details

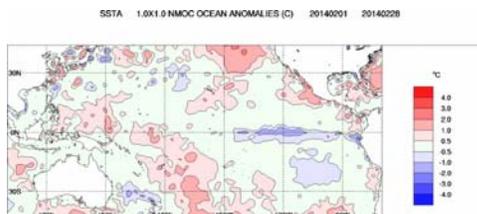
### Sea Surface Temperatures

#### Monthly sea surface temperatures:

The sea surface temperature (SST) anomaly map for February shows cooler-than-average SSTs in the eastern equatorial Pacific. Large areas of the surface waters of the western Pacific are warmer than average, extending from the area north of Indonesia and east of the Philippines to the South Pacific Convergence Zone (SPCZ) well to the east of Australia.

Index	January	February	Temperature change
NINO3	-0.2	-0.5	0.3 °C cooler
NINO3.4	-0.3	-0.3	no change
NINO4	0.0	+0.4	0.4 °C warmer

Baseline period 1961–1990.

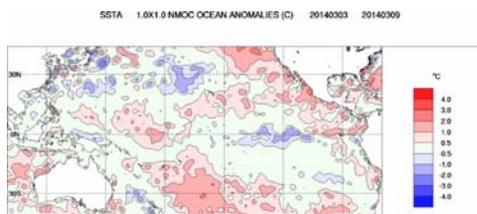


#### Weekly sea surface temperatures:

SST anomalies in the far eastern tropical Pacific have warmed compared to two weeks ago, with the appearance of warm anomalies along the equator in the far east. The anomaly map for the week ending 9 March shows cool temperature anomalies remain along part of the equator between 140°W and 100°W. Warm anomalies persist over much of the tropical Pacific west of the Date Line and around the SPCZ. Warm anomalies have developed along much of the coastline of the Americas, and now cover the far eastern equatorial Pacific. Around southern and eastern Australia surface waters remain warmer than average, as has been the case for several months.

Index	Previous	Current	Temperature change (2 weeks)
<a href="#">NINO3</a>	-0.6	-0.2	0.4 °C warmer
<a href="#">NINO3.4</a>	-0.4	-0.3	0.1 °C warmer
<a href="#">NINO4</a>	+0.4	+0.5	0.1 °C warmer

Baseline period 1961–1990.

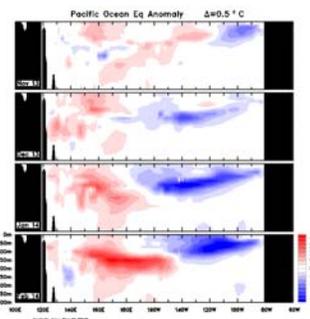


[An animation of recent SST changes](#) | [Weekly data graph](#) | [Map of NINO regions](#)

## Pacific ocean sub-surface temperatures

### Monthly sub-surface:

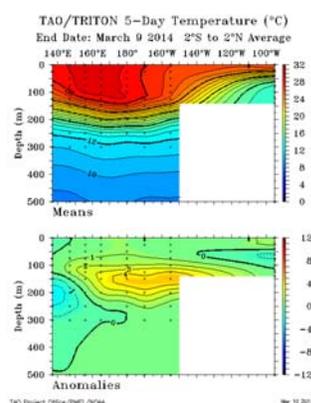
The four-month sequence of sub-surface temperature anomalies (to February) shows waters are cooler than average in the sub-surface of the equatorial Pacific east of 150°W while warmer than average west of the same point. This gradient of cool anomalies in the east and warm anomalies in the west has been similar for many months, but has strengthened significantly over the past three months. Water in an area of the eastern equatorial Pacific sub-surface between 130°W and 100°W at around 100 m depth is more than 4 °C cooler than average; warm anomalies in the western Pacific reached 3 °C at around 150 m depth between 170°W and 160°E.



### Weekly sub-surface:

The sub-surface temperature map for the 5 days ending 9 March shows a large area of warm anomalies in the sub-surface of the equatorial Pacific, reaching more than 4 °C above average around 150 m depth in the central Pacific.

The [animation of sub-surface temperature change over recent weeks](#) shows this pool of warmer-than-average water developing and progressing across the Pacific. Such downwelling Kelvin wave events can be driven by westerly winds over the western tropical Pacific. If this pool of warmer-than-average sub-surface water rises to the surface in the eastern tropical Pacific this may lead to surface warming and the formation of an El Niño.

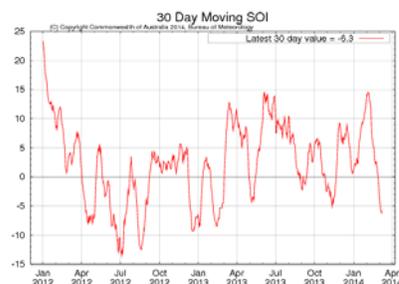


[Animation of recent sub-surface changes](#) | [Archive of sub-surface temperature charts](#)

### Southern Oscillation Index:

The Southern Oscillation Index (SOI) has continued to drop over the past two weeks, having dropped steadily over the past month from a peak of about +14. The latest approximate 30-day SOI value to 9 March is -6.3.

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.

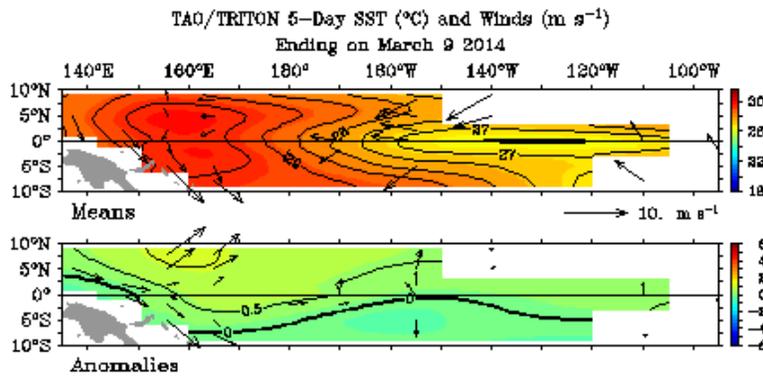


[Monthly graph](#) | [SOI table](#) | [SOI text](#)

### Trade winds:

Strong westerly wind anomalies are present over the western tropical Pacific while trade winds are near-average along the equator in the central and eastern tropical Pacific (see anomaly map for the 5 days ending 23 February). This is the second strong westerly wind burst this year, with the first occurring between 19 and 30 January.

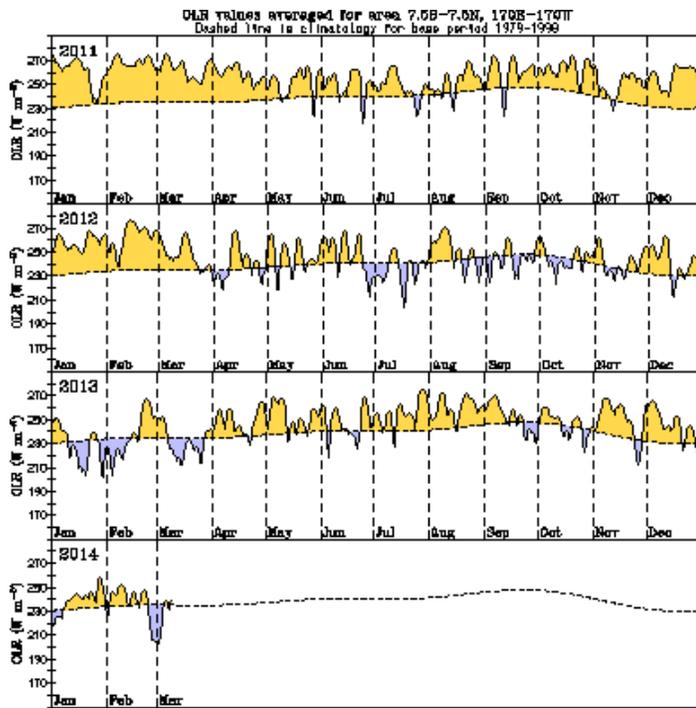
During La Niña events, there is a sustained strengthening of the trade winds across much of the tropical Pacific, while during El Niño events there is a sustained weakening of the trade winds.



**Cloudiness near the Date Line:**

Cloudiness near the Date Line was briefly above average around the end of February and start of March, but has since returned to near-average values.

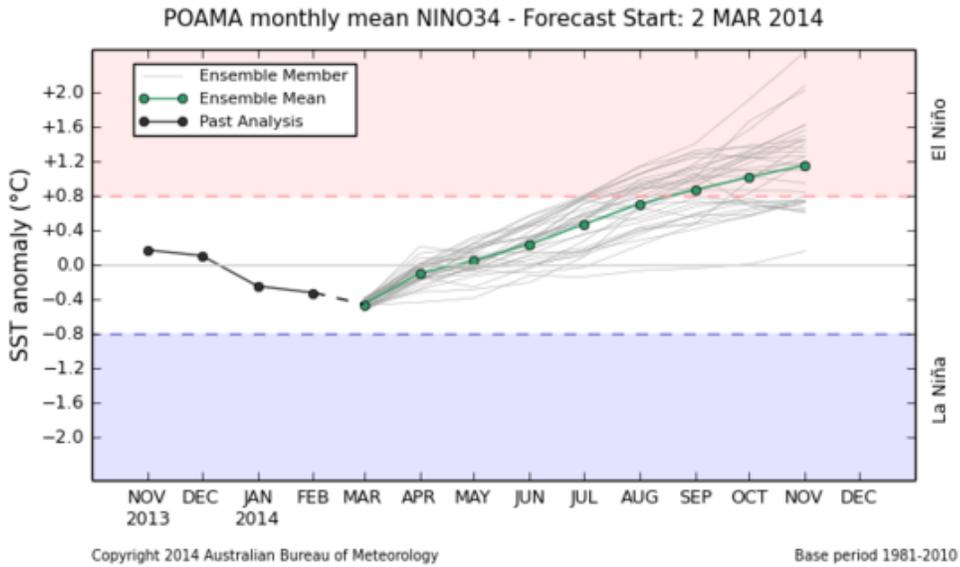
Cloudiness along the equator, near the Date Line, is an important indicator of ENSO conditions, as it typically increases (negative Outgoing Long-wave Radiation (OLR) anomalies) near and to the east of the Date Line during an El Niño event and decreases (positive OLR anomalies) during a La Niña event.



**Climate Models:**

The majority of international [climate models](#) surveyed by the Bureau indicate that SSTs in the equatorial Pacific Ocean are likely to slowly warm, although remaining in the ENSO-neutral range until at least the end of autumn. Some models suggest this warming may approach or exceed El Niño thresholds during winter.

The predictability of El Niño or La Niña conditions for the period extending through and beyond autumn is lower than for forecasts made at other times of the year (this known as “the autumn predictability barrier”). Long-range model outlooks should be used cautiously at this time.

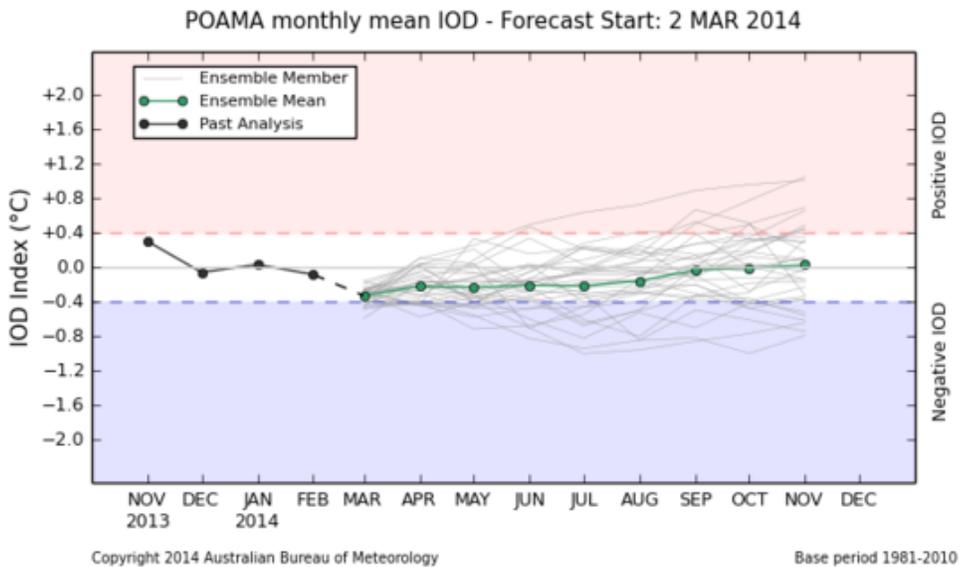


[NINO3.4 timeseries](#) [NINO3.4 values](#) [Map of NINO regions](#) [NINO3.4 forecasts \(POAMA\)](#)

**Indian Ocean Dipole:**

The Indian Ocean Dipole (IOD) remains neutral, with the latest weekly index value (9 March)  $-0.3$  °C.

The IOD is typically not an active influence on Australian climate during summer and early autumn. During this time of year, establishment of negative or positive IOD patterns is largely inhibited by the development and position of the monsoon trough in the southern hemisphere.



[IOD timeseries](#) [DMI values](#) [Map of IOD regions](#) [IOD forecasts \(POAMA\)](#)

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