

25-03-2014

## Increased chance of El Niño from winter

While the tropical Pacific Ocean remains El Niño–Southern Oscillation (ENSO) neutral, the chance of an El Niño occurring in 2014 has increased further. The latest climate model survey by the Bureau shows that the tropical Pacific is very likely to warm in the coming months, with most models showing sea surface temperatures reaching El Niño thresholds during the southern hemisphere winter.

Observations indicate that the tropical Pacific Ocean is currently warming. Following two strong westerly wind bursts since the start of the year, waters below the surface of the tropical Pacific have warmed significantly over the past two months. This has led to some warming at the surface, with further warming expected in the coming weeks. The Southern Oscillation Index (SOI) has dropped to  $-13$  — the lowest 30-day value since March 2010 — but would need to remain firmly negative for several weeks to indicate the atmosphere and ocean are reinforcing each other.

El Niño is often, but not always, associated with below-average rainfall across large parts of southern and inland eastern Australia during the second half of the year. 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.

### Further Details

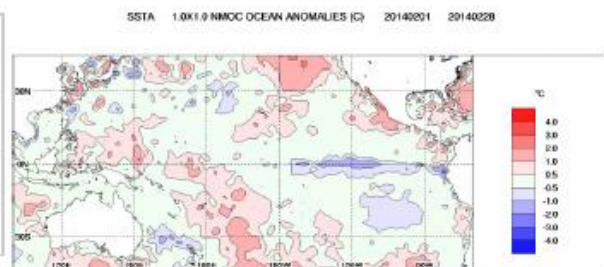
#### Sea Surface Temperatures

##### 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

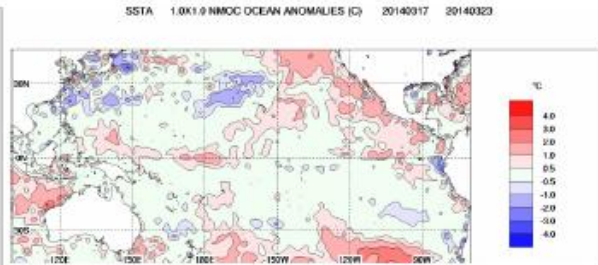
Baseline period 1961–1990.



**Weekly sea surface temperatures:**

SST anomalies in the far eastern tropical Pacific have continued to warm over the past two weeks. The anomaly map for the week ending 23 March shows warm temperature anomalies along the equator west of the Date Line and in much of the far eastern equatorial Pacific, with waters in the central Pacific at near average temperatures. Warm anomalies have weakened around the SPCZ while strengthening around northwestern Australia.

Index	Previous	Current	Temperature change (2 weeks)
<a href="#">NINO3</a>	-0.2	+0.2	0.4 °C warmer
<a href="#">NINO3.4</a>	-0.3	+0.1	0.4 °C warmer
<a href="#">NINO4</a>	+0.5	+0.5	no change

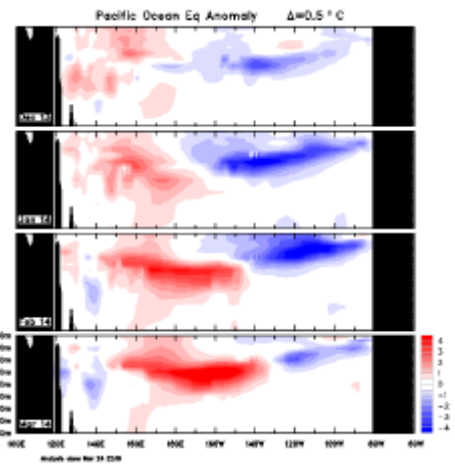


Baseline period 1961–1990.

**Pacific ocean sub-surface temperatures**

**Monthly sub-surface:**

The four-month sequence of sub-surface temperature anomalies (to March) shows waters are slightly cooler than average in the sub-surface of the equatorial Pacific east of 130°W while strongly warmer average west of the same point. The pool of warm water in the western Pacific sub-surface has been strengthening over recent months, and has started to progress eastward in the central Pacific, eroding the cooler waters in the east. Water around and east of the Date Line in the equatorial sub-surface between around 100 m and m depth are more than 4 °C warmer than average.

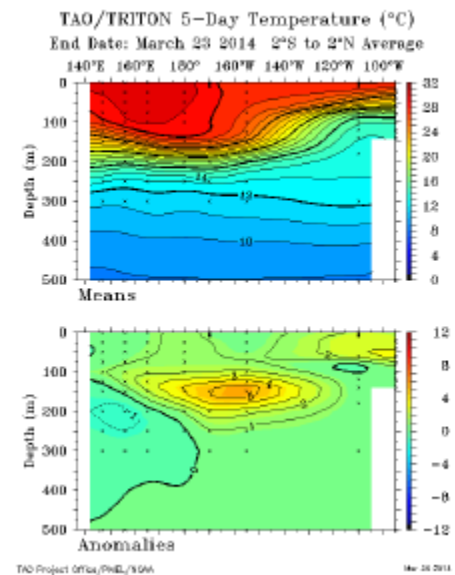


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**Weekly sub-surface:**

The sub-surface temperature map for the 5 days ending 23 March shows a large area of warm anomalies in the sub-surface of the equatorial Pacific. This pool of warmer-than- average water reached more than 5 °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 be driven by westerly winds over the western tropical Pacific. If this 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.

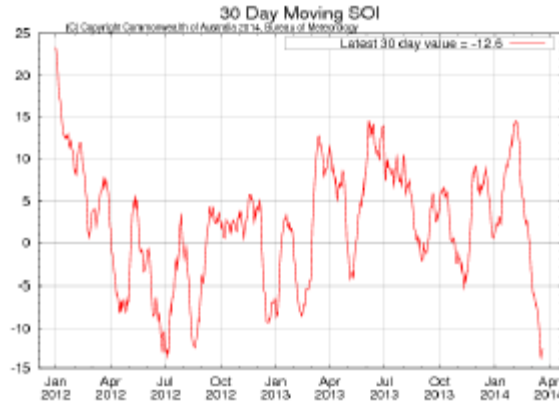


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**Southern Oscillation Index:**

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 23 March is -12.6. Recent values are the lowest since March 2010, during the last El Niño.

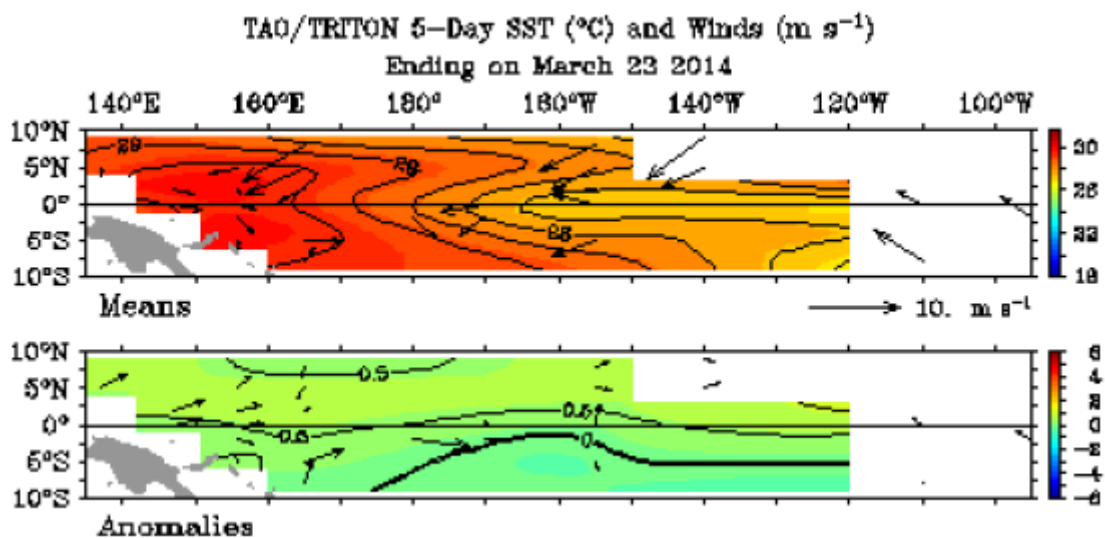
Sustained positive values of the SOI above +8 may indicate a La Niña event, while sustained negative values below -8 may indicate an El Niño event. Values of between about +8 and -8 generally indicate neutral conditions.



**Trade winds:**

Westerly wind anomalies are present over the western tropical Pacific while trade winds are near-average along the equator in the eastern tropical Pacific (see anomaly map for the 5 days ending 23 March). A reversal of the trade winds (i.e. winds becoming westerly in the equatorial region) in the western Pacific has extended east to the Date Line; this is the first time this has occurred since the 2009–10 El Niño.

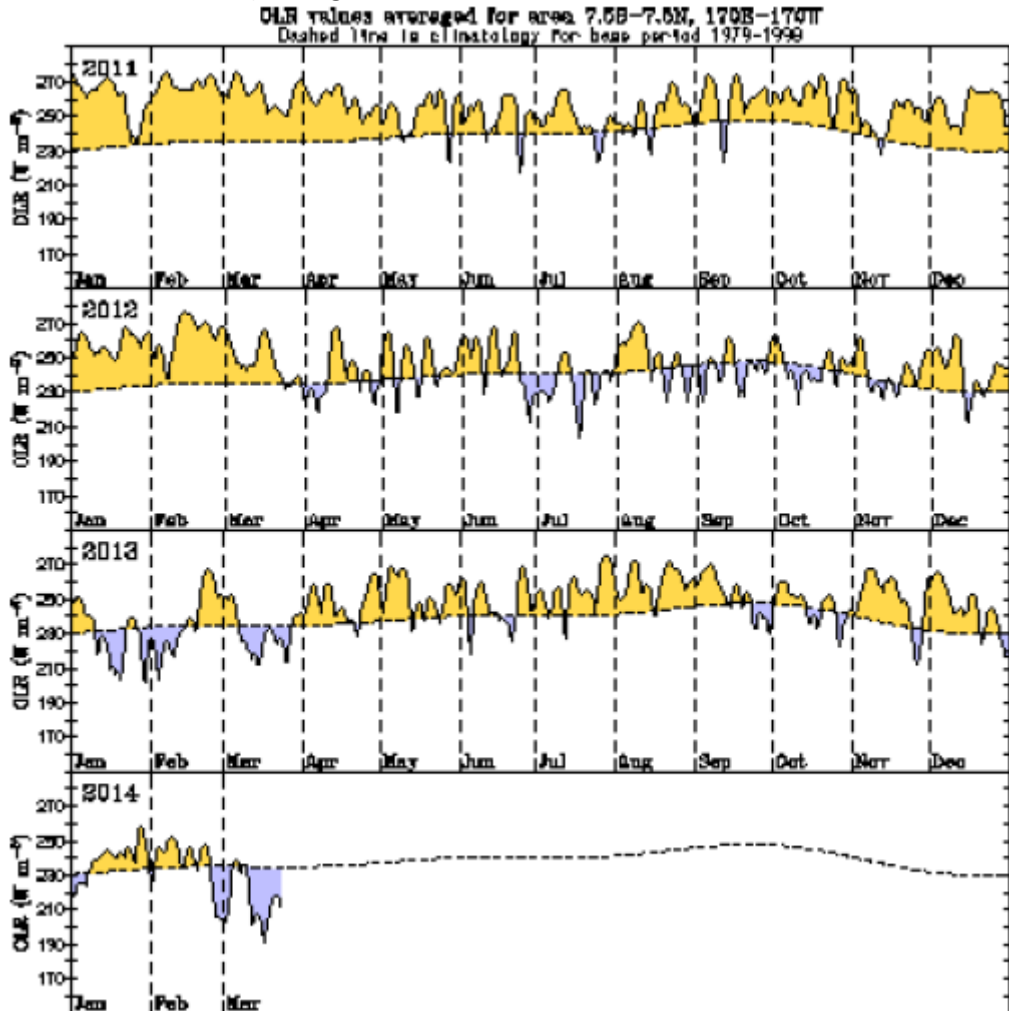
During La Niña events, there is a sustained strengthening of the trade winds across much of the tropical Pacific, while during El Niño events there is a sustained weakening of the trade winds.



## Cloudiness near the Date Line:

Cloudiness near the Date Line has generally been above average from late February.

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.

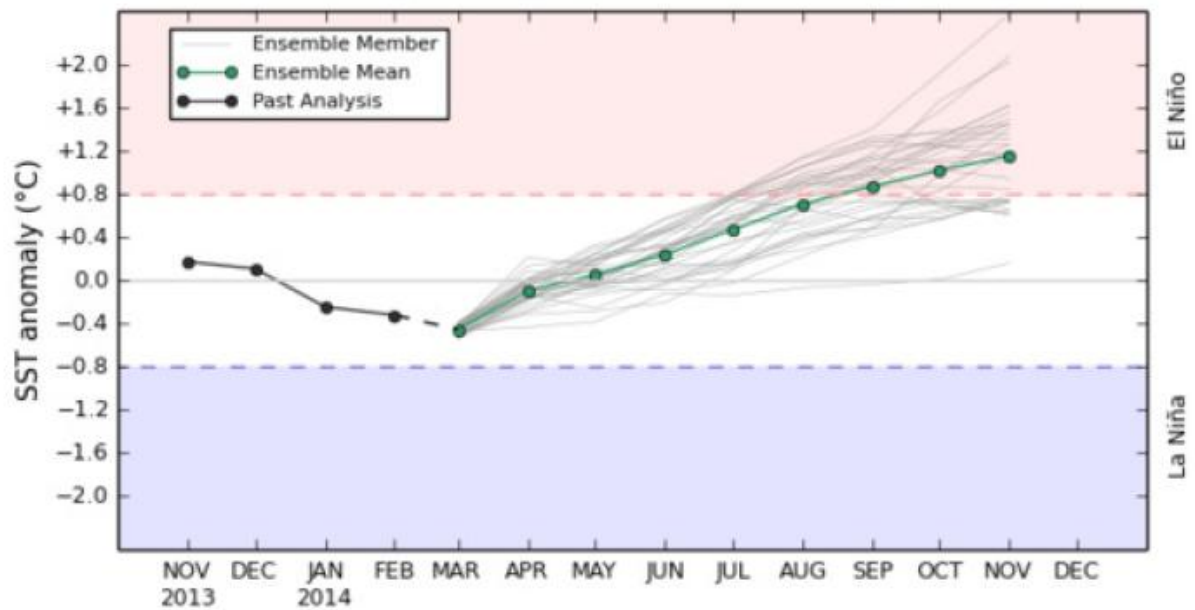


## Climate Models:

All international climate models surveyed by the Bureau indicate that SSTs in the equatorial Pacific Ocean are likely to continue to warm during autumn and winter. All models but one indicate that El Niño thresholds will be reached or exceeded during the southern hemisphere 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.

POAMA monthly mean NINO34 - Forecast Start: 2 MAR 2014



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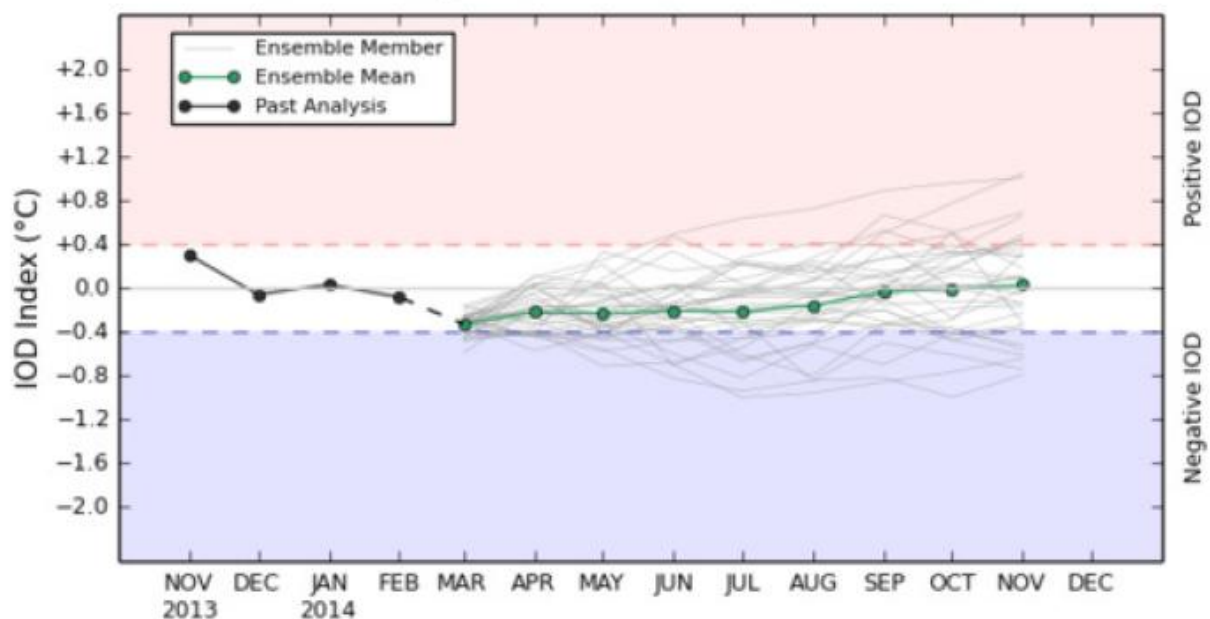
Base period 1981-2010

### Indian Ocean Dipole:

The Indian Ocean Dipole (IOD) remains neutral, with the latest weekly index value (23 March)  $-0.5$  °C.

Climate models surveyed in the model outlooks continue to favour neutral IOD values over the coming months. The IOD is not typically an active influence on Australian climate during early autumn, but the evolution of an El Niño would increase the change of a positive IOD event.

POAMA monthly mean IOD - Forecast Start: 2 MAR 2014



[http://www.bom.gov.au/climate/enso/archive/ensowrap\\_20140325.pdf](http://www.bom.gov.au/climate/enso/archive/ensowrap_20140325.pdf)