



## ENSO Wrap-Up

### A regular commentary on the El Niño-Southern Oscillation

Product Code: IDCKGEWW00

**CURRENT STATUS** as at 23<sup>rd</sup> December 2009

Next update expected by 6<sup>th</sup> January 2010 (two weeks after this update).

#### Summary: Warming continues in the Pacific Ocean

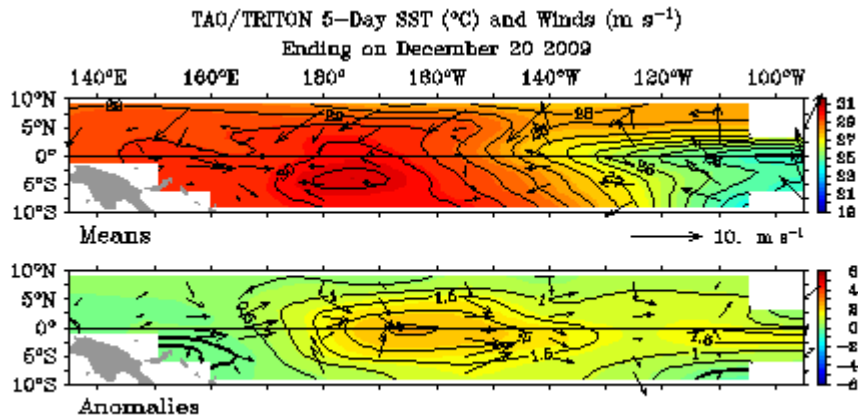
Pacific Ocean temperatures remain at levels typical of a mature El Niño. Over the past fortnight, Trade winds have remained weak over the central tropical Pacific, resulting in further warming of the underlying ocean. As a result, central Pacific Ocean surface temperatures are now at their warmest level since the El Niño of 1997-98, exceeding temperatures observed in both the 2002-03 and 2006-07 events. During the past week, small regions which are more than 3°C above their average temperature, have emerged along the equator.

Leading climate models continue to suggest tropical ocean temperatures are approaching their peak, and will remain above El Niño thresholds through the southern summer before starting to cool.

Over the past fortnight, the Southern Oscillation Index has fallen slightly, and remains at levels typical of an El Niño event. Similarly, cloudiness and rainfall near the equator remains enhanced, while eastern Australian rainfall remains low; all typical of a mature El Niño event. However, the influence of El Niño events on Australian rainfall typically declines by mid to late summer.

The Indian Ocean Dipole (IOD) has a reduced impact upon Australia over the summer months.

See [IOD forecasts](#), [DMI values](#).

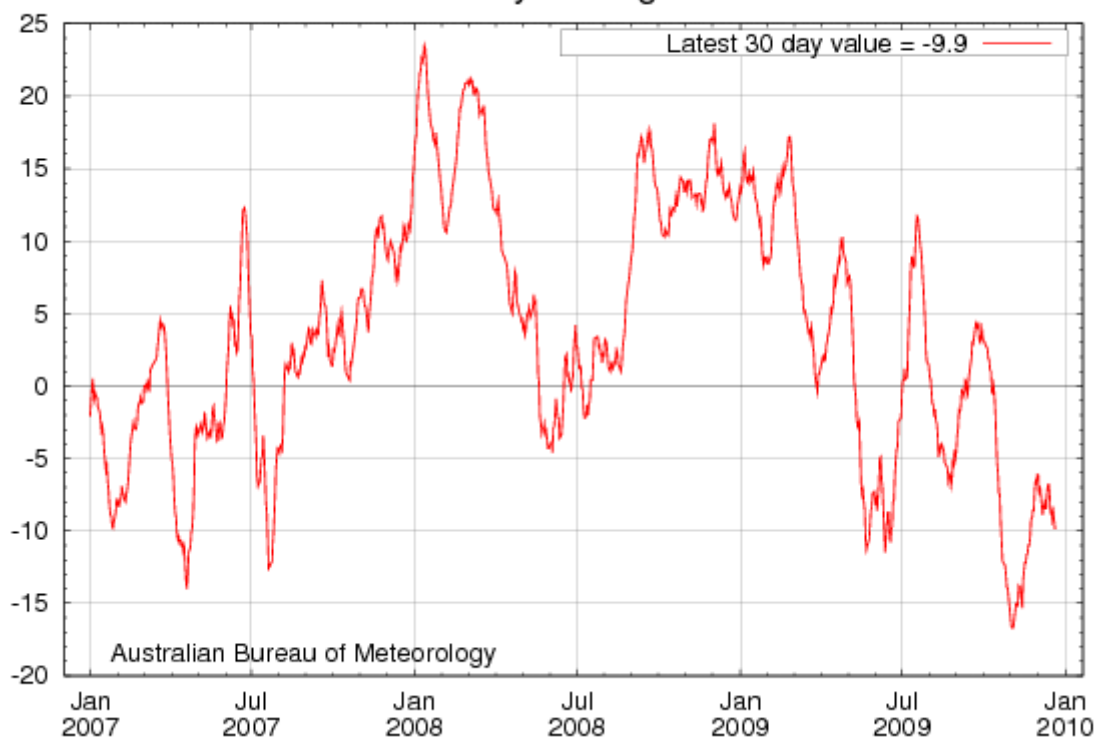


From the [NOAA/PMEL/TAO website](#).

#### In Brief

- The tropical Pacific Ocean sea surface remains significantly warmer than the long-term average in central and eastern areas.
- The sub-surface water of the tropical Pacific remains warmer than the long-term average.
- The latest approximate 30-day SOI value is -10; the monthly value for November was -7. The SOI has remained relatively stable throughout December.
- Trade winds are weaker than normal across the Pacific.
- Cloudiness near the date-line has increased over the past fortnight.
- All of the above are consistent with a moderately strong El Niño, which most leading international computer models surveyed by the Bureau predict will persist through the southern hemisphere summer, but decline thereafter.

## 30 Day Moving SOI



This graph is updated automatically each day. [Download data.](#)

### Details

Sea surface temperatures (SSTs) across the tropical Pacific Ocean remained above normal for the month of November. The SST anomaly map for November is available [here](#); the map shows warm anomalies in excess of +1 °C covering most of the tropical Pacific east of 160 °E, with anomalies exceeding +2°C in parts of the central Pacific. The map also shows near-normal SSTs covering most of the western Pacific and northern waters around Australia. The monthly NINO indices for November were +1.3°C, +1.7°C and +1.5°C for NINO3, NINO3.4 and NINO4 respectively. Each of the NINO regions warmed when compared with October values; NINO3 by approximately 0.4°C, NINO3.4 by 0.6°C and NINO4 by 0.2°C.

In terms of [weekly data](#), the most recent NINO indices are +1.6°C, +1.9°C and +1.5°C for NINO3, NINO3.4 and NINO4 respectively for the week ending 20 December. When compared with two weeks ago all indices have risen; NINO3 by +0.1°C and NINO3.4 and NINO4 by +0.2°C. NINO3.4 is now at its highest level since the 1997-98 El Niño. The [7-day SST anomaly map](#) shows warm anomalies in excess of +1 °C covering most of the tropical Pacific east of the dateline. In some areas, particularly between 170°W and 140°W, ocean temperatures are more than +2°C above normal, with a few small patches having anomalies in excess of +3°C. When compared with anomalies observed two weeks ago, the central Pacific sea surface has warmed slightly. An animation of [recent SST changes](#) is available.

A four-month sequence of sub-surface Pacific Ocean equatorial temperature anomaly is available [here](#). The sequence shows the rapid warming of the sub-surface through October and November, with anomalies greater than +4°C present in the eastern Pacific, between 110°W and 140°W. However, weak negative anomalies propagating eastwards during December are displacing the warm anomalies along the thermocline, particularly in the central Pacific. A recent map for the [5 days ending 20 December](#) shows a weak renewal of warming in the central Pacific associated with weaker than normal Trade winds. When compared with two weeks ago, the western Pacific sub-surface has cooled slightly between 140°E and 170°E, with negative anomalies up to -2°C on a weekly scale. An animation of [recent sub-surface changes](#) is available.

An [archive of past SST and sub-surface temperature charts](#) is available.

Trade winds have been weaker than normal across much of the equatorial Pacific during December, with a strong westerly wind burst in the western Pacific. The [TAO/TRITON map](#) (small image above), for the five days ending 20 December, shows westerly wind anomalies dominating the central equatorial Pacific. This has renewed surface warming east of the dateline.

The SOI has been relatively stable throughout December after increasing through November. The current 30-day SOI value (21 December) is -10. The monthly value for November was -7, and October was -15. The SOI remains at values typical of an El Niño event ([SOI graph](#), [SOI table](#)).

[Cloudiness near the date-line](#) over the equatorial Pacific is another important indicator of ENSO conditions. Cloudiness near the dateline has been mostly above average since July, consistent with a developing El Niño. Negative OLR anomalies have increased during December reaching levels last seen in January 2007.

Most international [computer models](#) are predicting that El Niño conditions will persist throughout the southern hemisphere summer. Five of six international models surveyed by the Bureau of Meteorology forecast SSTs to remain above threshold levels into early 2010. A majority of computer models are predicting that Pacific Ocean SSTs will start to cool by March next year, which is the typical timing for the decay of El Niño events. Recent forecasts from the [POAMA model](#), run daily at the Bureau of Meteorology, show a continuation of warming with SSTs remaining above El Niño thresholds into 2010, peaking over the summer months.

THE NEXT UPDATE OF THE DETAILED SECTION ABOVE IS EXPECTED BY 6 JANUARY 2010

[Archive of previous ENSO Wrap-Ups](#)

### Other Useful Links

The links below can be used to keep track of important developments across the Pacific Basin.

The [Weekly Tropical Climate Note](#) issued by the Darwin office of the Bureau of Meteorology discusses the main features of the tropical atmosphere and ocean, including the **intra-seasonal oscillation or 30-60 day wave** which is thought to sometimes impact on the development of El Niño events.

The [Bureau of Meteorology Research Centre](#) (BMRC) has recently developed maps of **Out-going Longwave Radiation (OLR)**, a useful El Niño monitoring tool. Negative anomalies show areas which, in general, have been cloudier (and potentially wetter) than normal.

The [TAO / TRITON](#) data display page is excellent for creating your own plots of numerous variables that are relevant to El Niño.

*Note however that information coming from other countries is likely to describe timing and impacts relevant to those countries, which will not be the same as those in Australia.*

