

NERP

Torres Strait / GBR environmental conditions report:

Recent status and predictions

11 April 2014

By Ana Redondo-Rodriguez & Marites Magno-Canto

Contact: a.rodriguez@uq.edu.au

UQ-GPEM Biophysical Oceanography Group

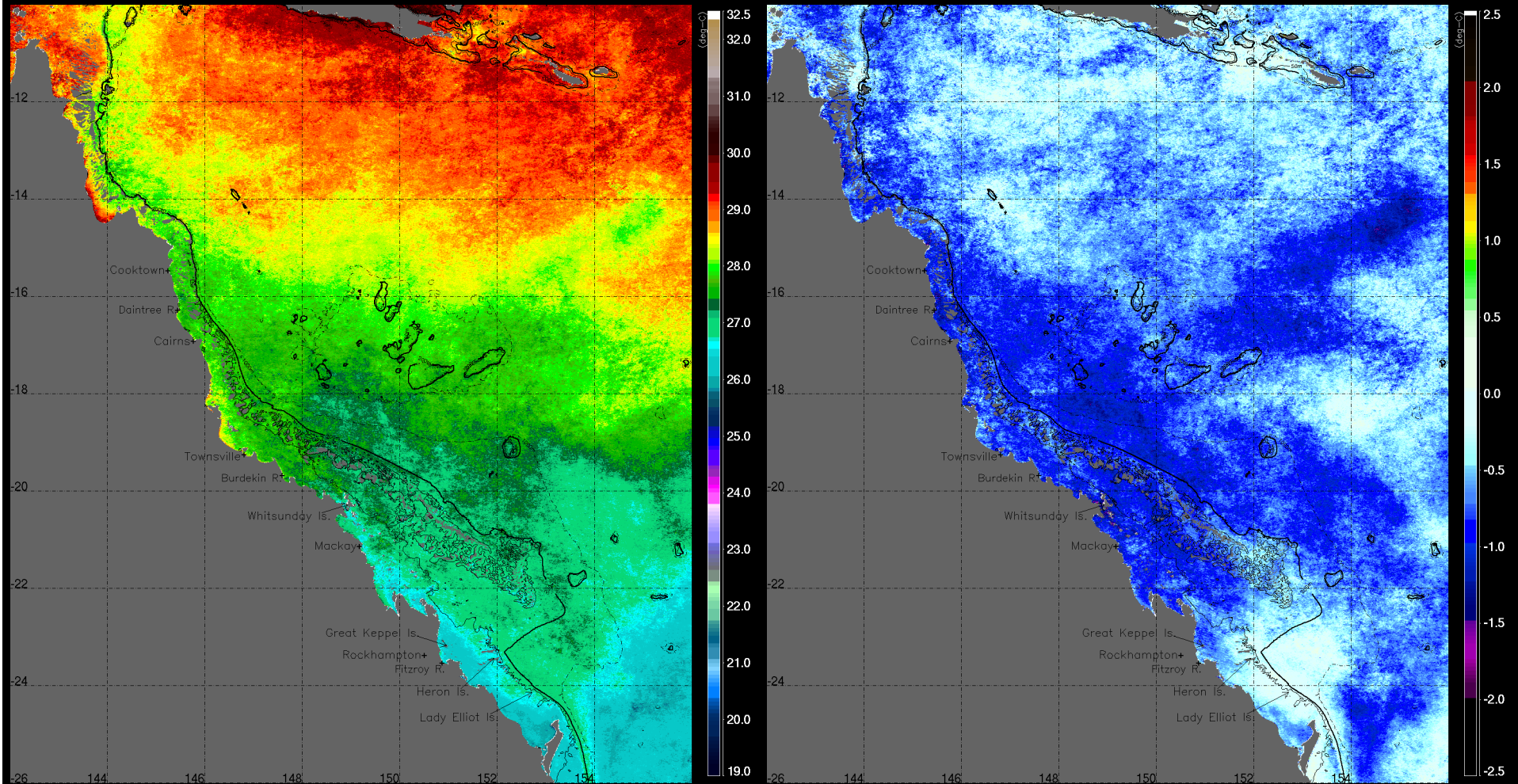
Outline

- Overview
- Recent SST and in situ Temperature evolution
- GBR SST forecast (POAMA)
- Coral Bleaching Outlook (NOAA:CRW)
- Surface conditions in the tropical Pacific
- ENSO evolution and predictions

Overview

- Negative SST anomalies were widespread over the Torres Strait and GBR areas during March 2014.
- *In situ* data show that water temperatures stayed well below the long-term mean for the entire month for most of the stations.
- POAMA forecast mostly neutral conditions for the upcoming months, with slightly higher anomalies for the southernmost areas of the GBR. Accordingly, all the NOAA Coral Reef Watch outlooks show no bleaching alerts for the GBR and Torres Strait areas.
- **Progression of a kelvin Wave:** In the equatorial Pacific the pattern of positive SST anomalies continued to be displaced eastwards during March compared to previous months. This coincides with the eastward progression of a Kelvin wave, which is related with increased oceanic heat content and may be associated with the development of an El Niño event.
- ENSO neutral conditions continued in the Pacific during March and expected to persist in the upcoming months. However, there is an increased chance (>50%) that El Nino will develop during the austral winter season.

MODIS sea surface temperature (day+night) March 2014



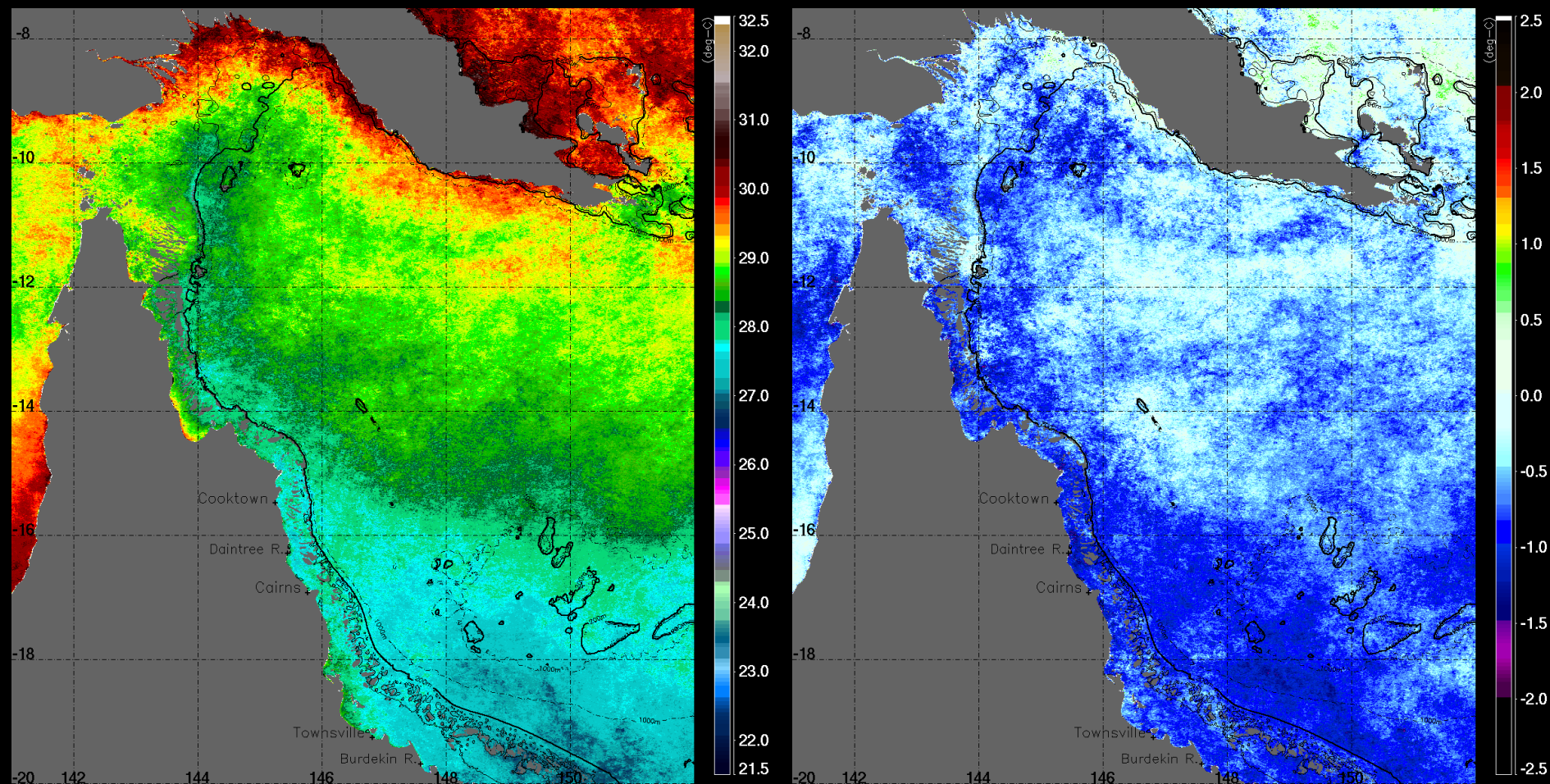
Note:

- As per previous month, MODIS data showed negative SST anomalies widespread along the length of the GBR and Torres Strait regions during March.

Torres Strait / far northern GBR

MODIS sea surface temperature (day+night)

March 2014



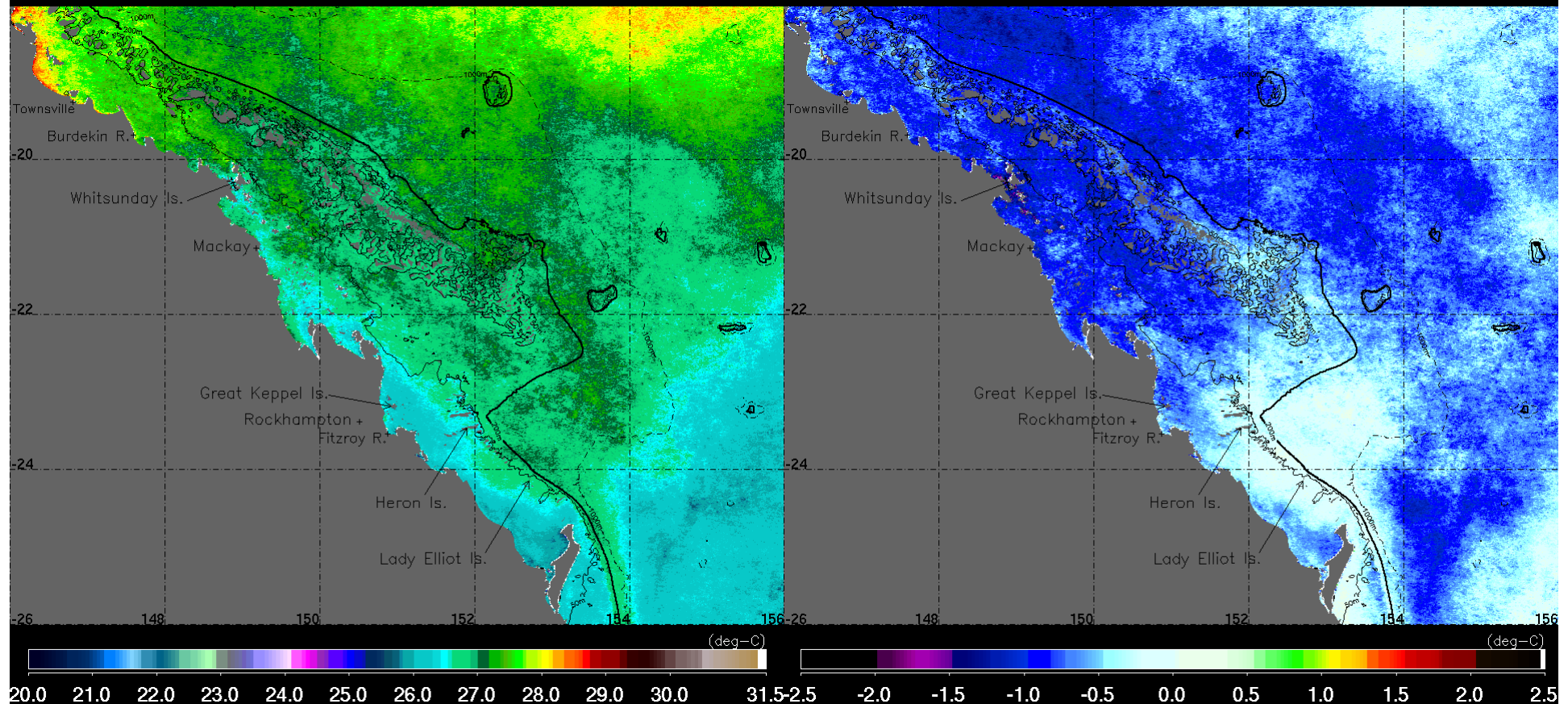
Note:

- Sea surface temperatures for the Torres Strait and N-GBR areas were mostly below the long-term mean during March.

Southern GBR

MODIS sea surface temperature (day+night)

March 2014

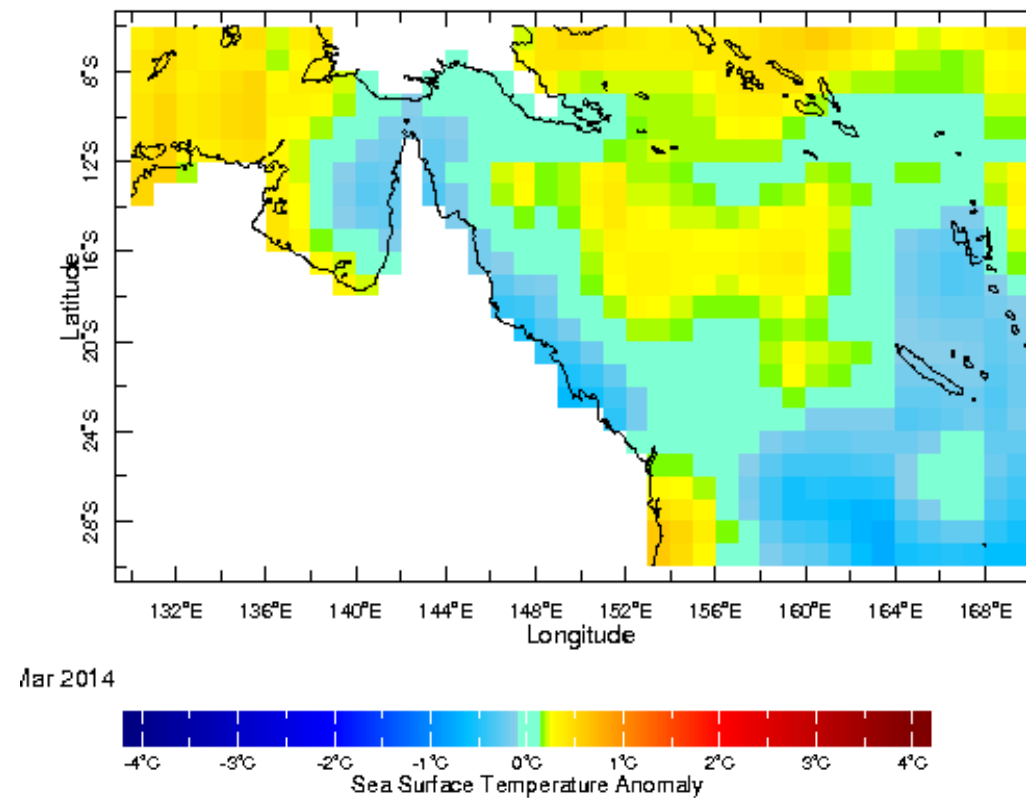


Note:

- Widespread negative SST anomalies along the S-GBR, with the exception of the Capricorn-Bunker Reefs, where temperatures remained close to average.

Sea Surface Temperature Anomaly

from NOAA NCEP EMC CMB GLOBAL Reyn_SmithOlv2



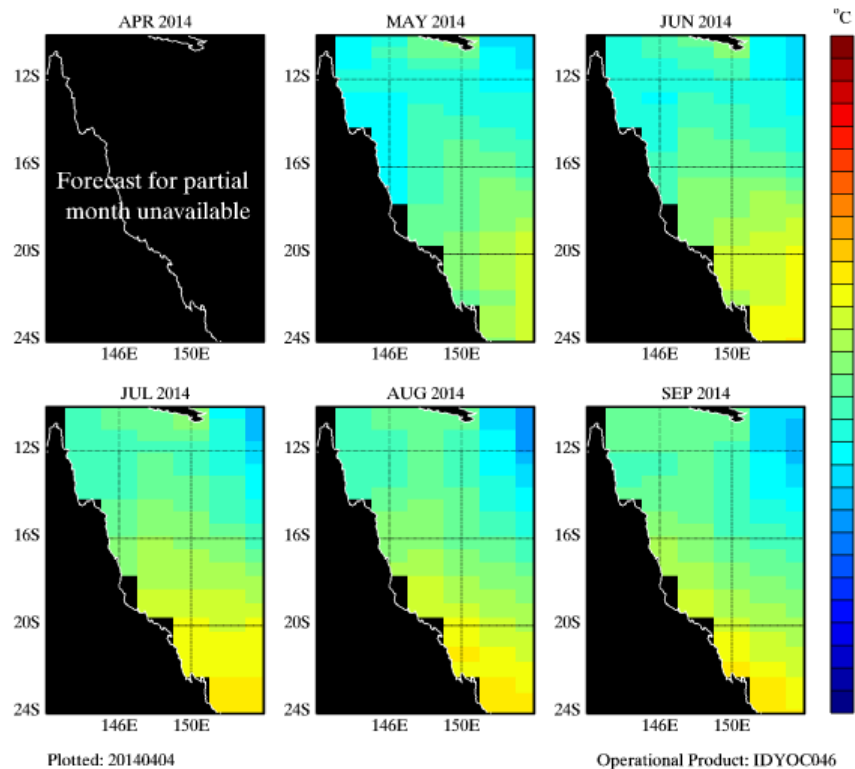
Note:

- In agreement with MODIS data, the Reynolds SST anomalies showed negative SST anomalies along the length of GBR and Torres Strait regions during March.

Sea surface temperature anomaly forecast (POAMA-2)

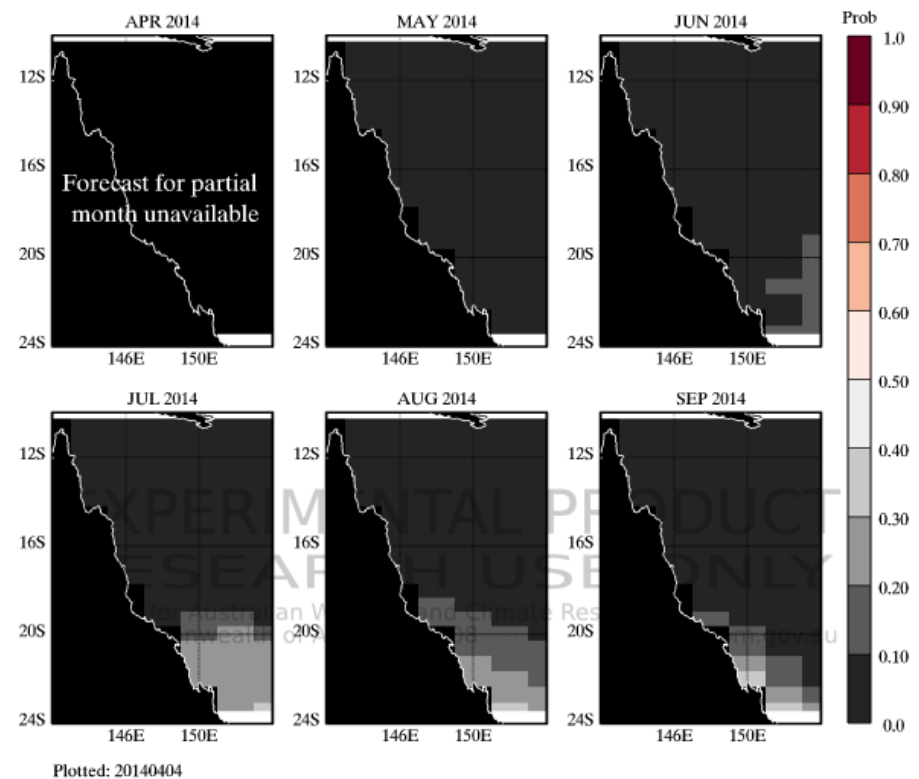
POAMA SST anomaly forecast for the next 6 months (operational)

M2.4abc Monthly SSTA: GBR 20140403 [Lead=0-5 months, Nens=33]



Probabilities of SST anomalies greater than 0.6°C for the next 6 months (Experimental)

POAMA M2.4abc Probability SSTA $\geq 0.6^\circ\text{C}$: 20140403 [Lead=0-5 Nens=33]



Note:

- POAMA forecast mostly neutral conditions for the upcoming months, with slightly higher anomalies in the southernmost areas of the GBR. Null or very low probability of SST anomalies exceeding 0.6°C.

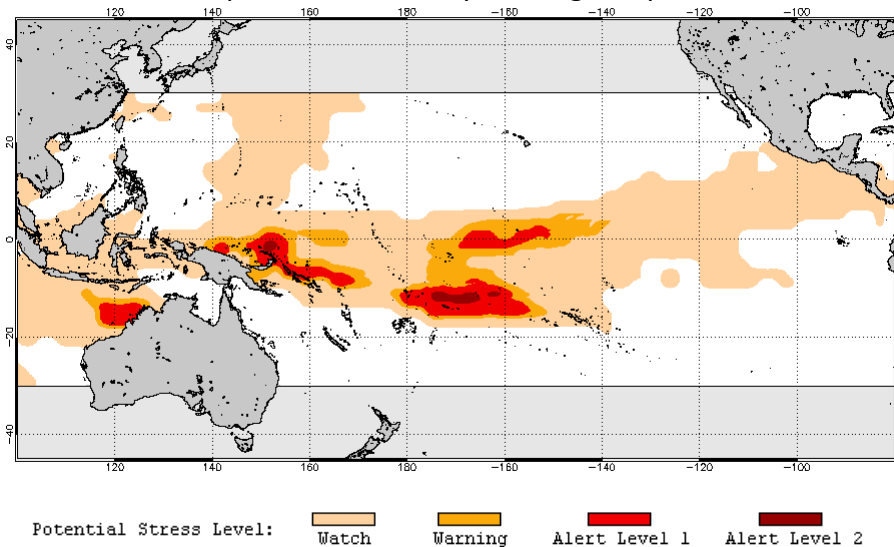
NOAA Coral Reef Watch

Seasonal coral bleaching thermal stress outlook

April to July 2014

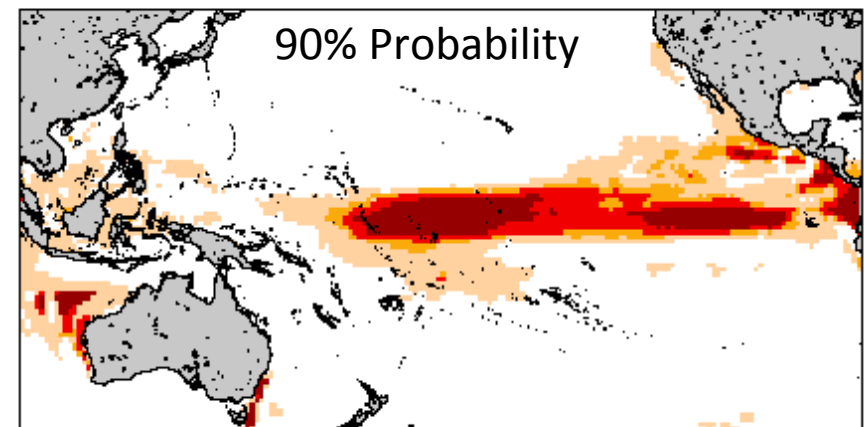
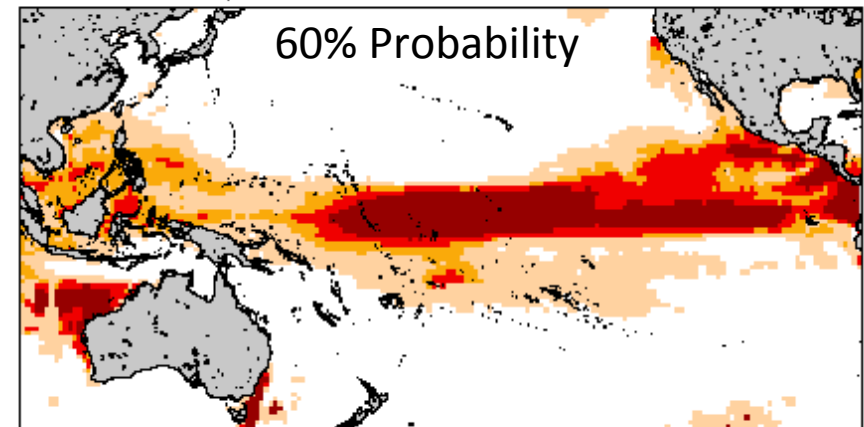
LIM-based

Version 2, experimental, weekly 2x2 degree spatial resolution



CFS-based

Version 2, experimental, weekly 1x1 degree spatial resolution



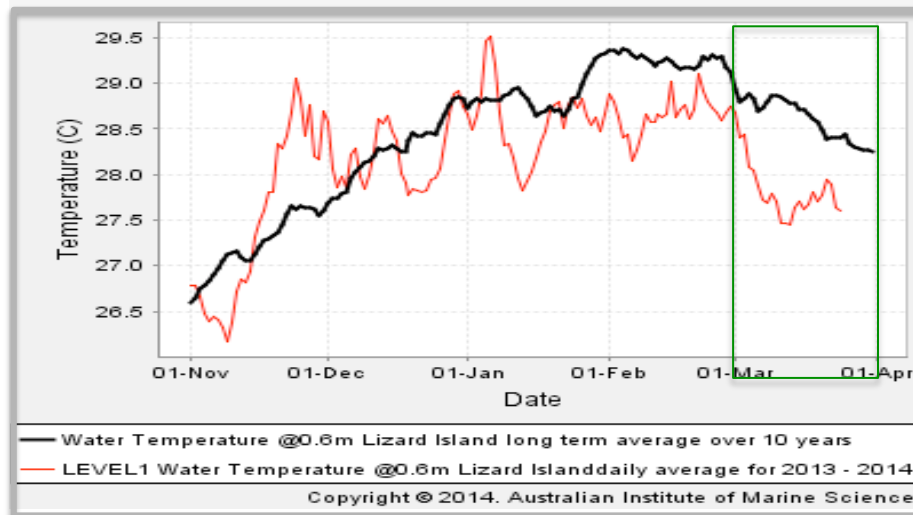
Note:

[These outlooks are based on SST predictions from: CRW's experimental statistical Linear Inverse Model (LIM-based – left panel) and the NCEP climate forecast system (CFS-based; right panels) systems]

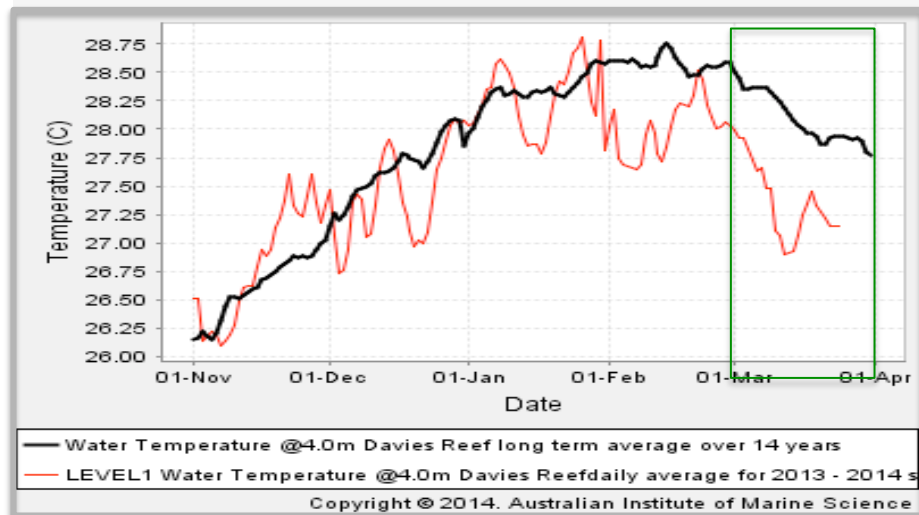
- None of the outputs from NOAA Coral Reef Watch, including the LIM-based Outlook, depict any potential stress levels for the upcoming months over the Torres Strait and GBR areas.

Water temperatures from IMOS Sensor Network (FAIMMS) (AIMS operated)

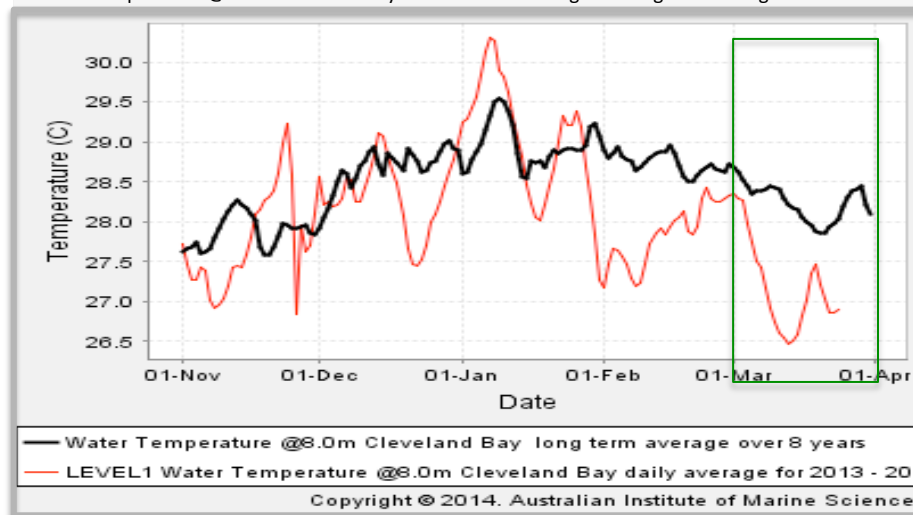
Water temperature @0.6m Lizard Island sensor float trend against longterm average



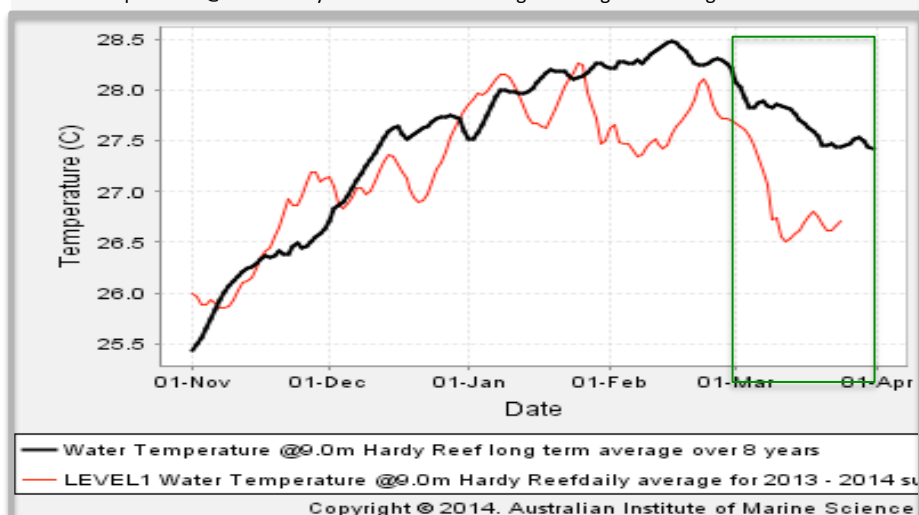
Water temperature @4.0m Davies Reef Platform trend against longterm average



Water temperature @8.0m Cleveland Bay S2 Platform trend against longterm average

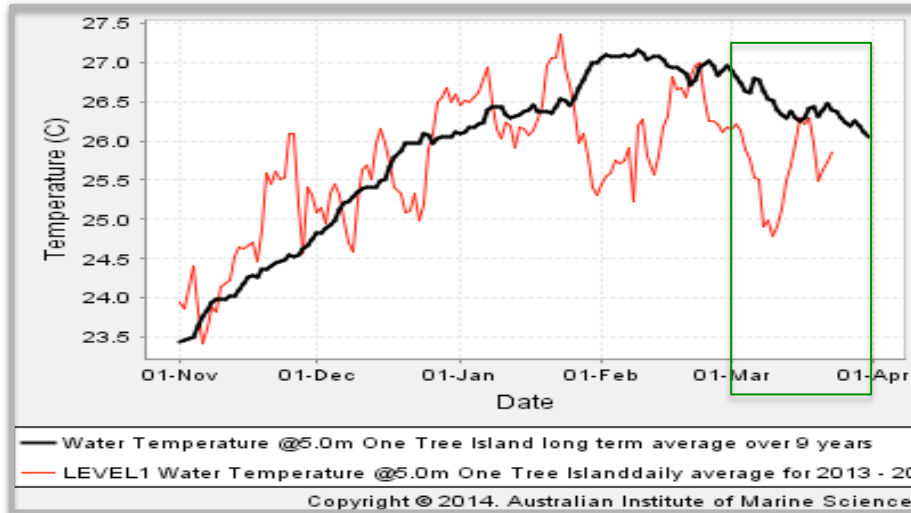


Water temperature @9.0m Hardy Reef Platform trend against longterm average

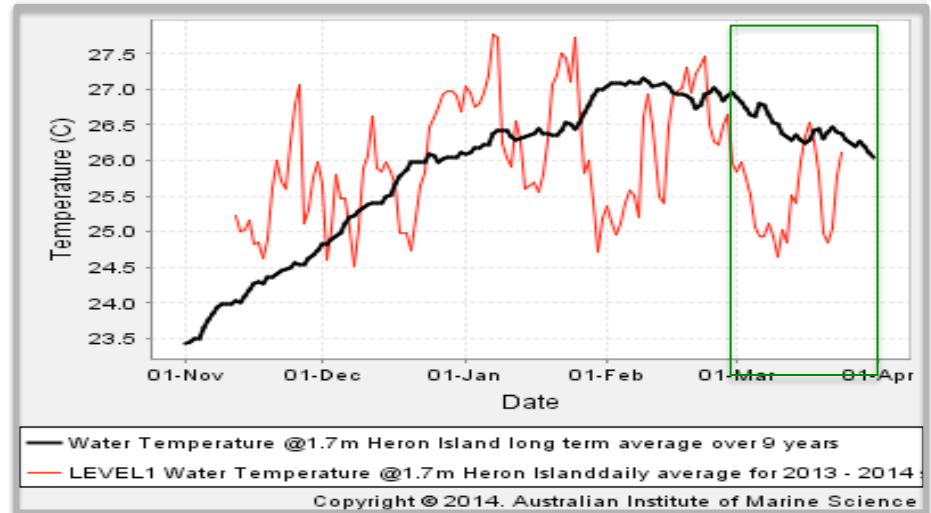


Water temperatures from IMOS Sensor Network (FAIMMS) (AIMS operated)

Water temperature @5.0m One Tree Island Relay Pole 3 trend against longterm average



Water temperature @1.7m Heron Island Relay Pole 1 trend against longterm average

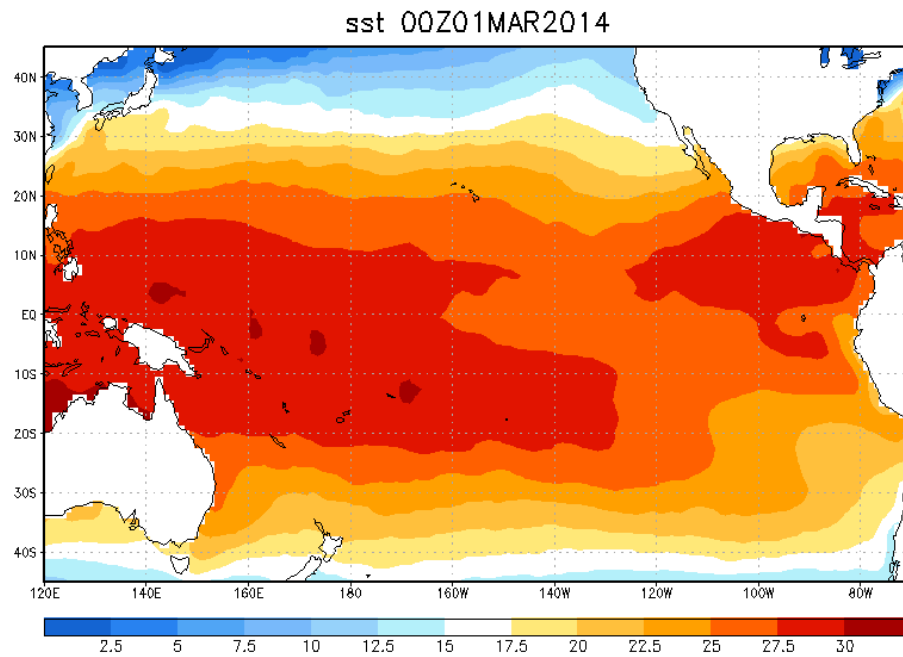


Note:

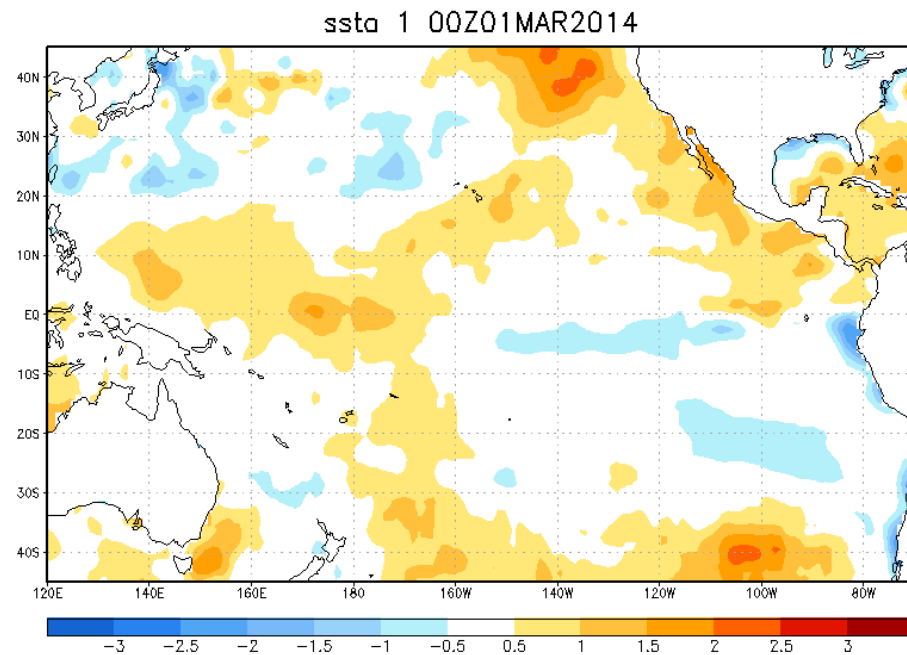
- Consistent with the SST data, most reefs presented *in situ* sea water temperatures well below their long-term mean during March.
- One Tree Island and Heron Island (two figures above) showed temperatures below the long term mean during the first half of the month (data not available for the last week of March).

NOAA optimum interpolation sea surface temperature

OISST MARCH 2014



OISST anomaly MARCH 2014

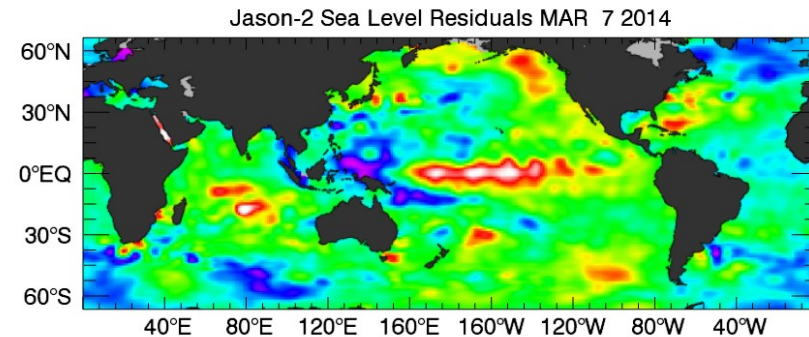
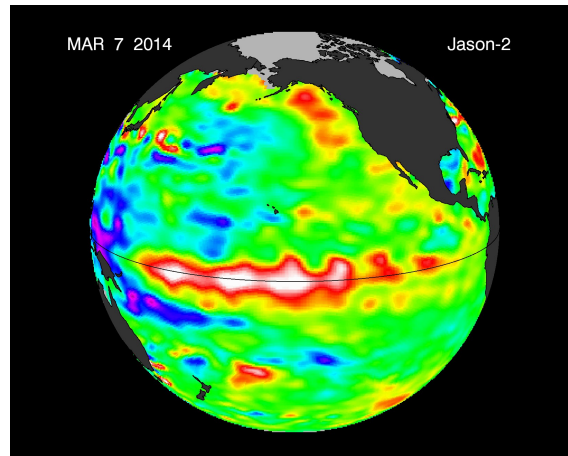


Note:

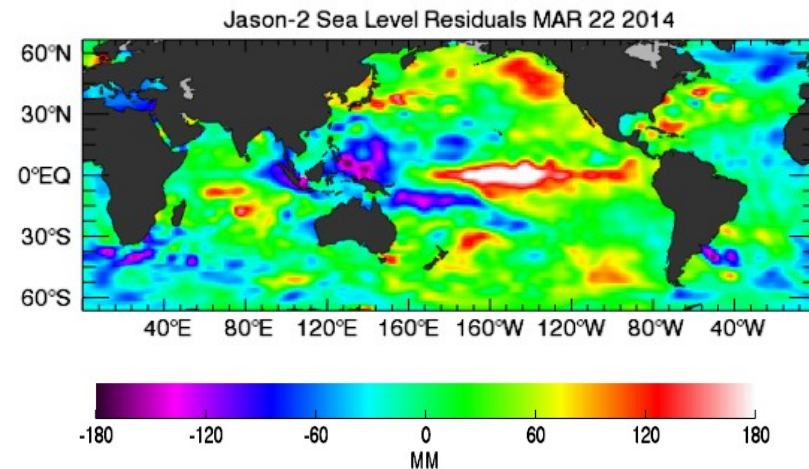
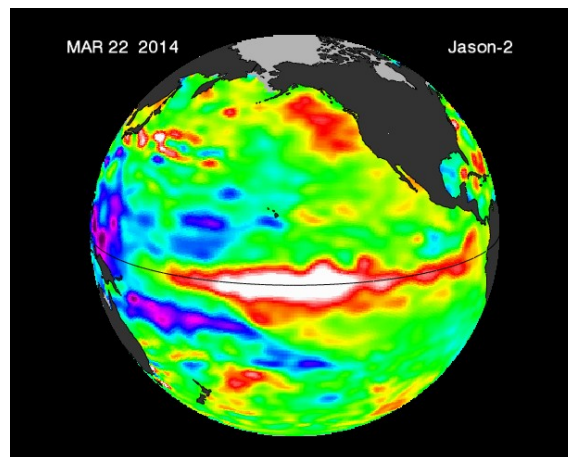
- The pattern of positive SST anomalies was displaced eastwards during March, while the eastern and central Pacific presented near average conditions. This pattern is consistent with the progression of the Kelvin Wave (see next slide).

Sea surface height anomalies from Ocean Surface topography: Jason-2 (NASA/French)

7th March
2014



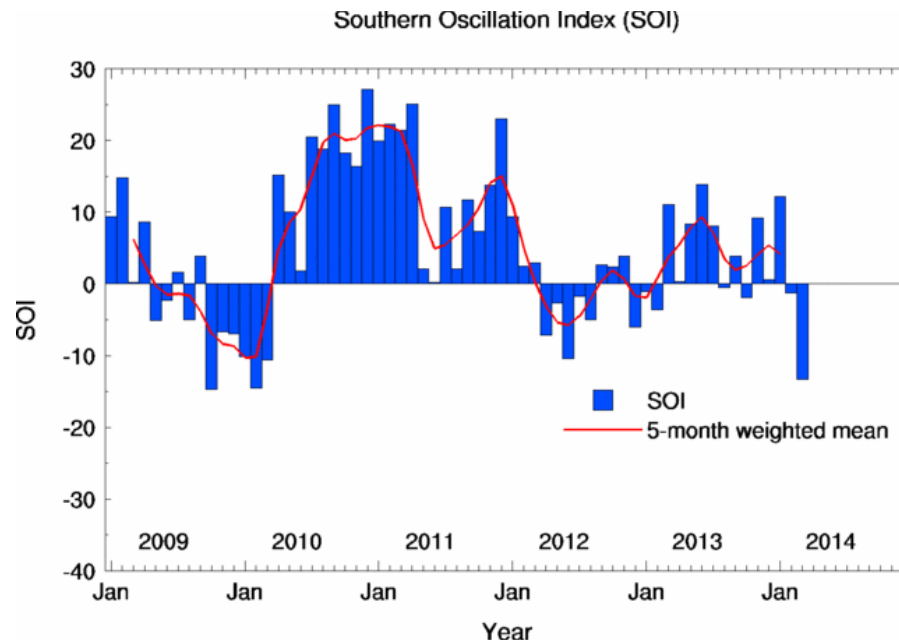
22nd March
2014



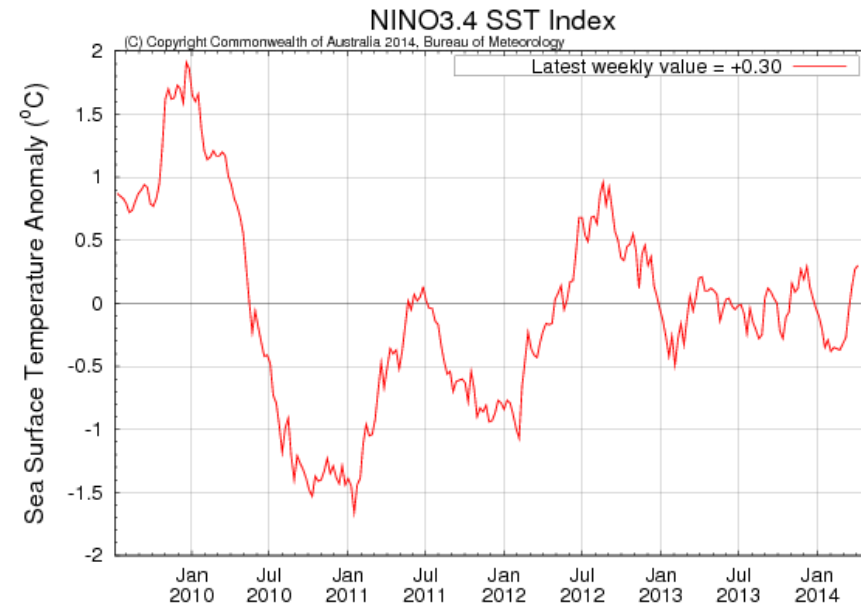
Note:

- The sea-level height data shows the eastward progression of the strong Kelvin Wave that was initiated during January. The Kelvin wave is related with increased oceanic heat content and warmer than normal subsurface temperatures (red area).

ENSO Index



Negative SOI = El Niño



Positive Nino 3.4 index= El Niño

Note:

- ENSO neutral conditions continued during March 2014 and are expected to continue for the upcoming months, however the chances that an El Niño event will develop during the austral autumn or winter have increased to more than 50%.