NERP

Torres Strait / GBR environmental conditions report:

Recent status and predictions

10 December 2013

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UQ-GPEM Biophysical Oceanography Group

Outline

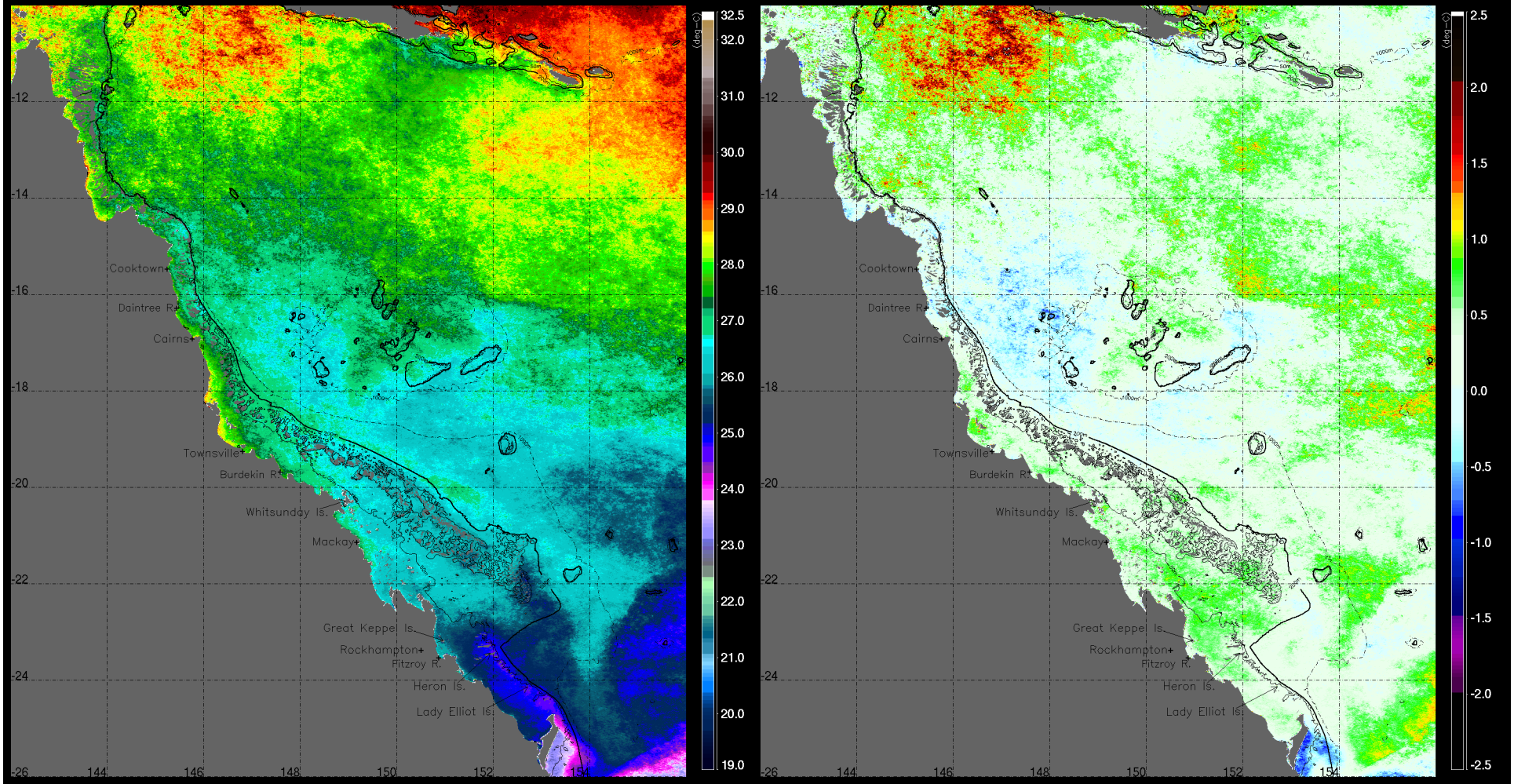
- Overview
- Recent SST and in situ Temperature evolution
- Monthly means and anomalies of MODIS Chlorophyll-a concentrations and 10% Photic Depth
- GBR SST forecast (POAMA)
- Coral Bleaching Outlook (NOAA:CRW)
- Surface conditions in the tropical Pacific
- ENSO evolution and predictions

Overview

- Mostly neutral SST conditions over the Torres Strait and N-GBR areas during November, while slightly positive SST anomalies remain along most of the S-GBR
- MODIS chlorophyll-*a* concentrations and 10% Photic Depth products still showing intrusions of oceanic waters onto the shelf
- In situ data showed water temperatures below average during the first half of the month that increased above the long-term mean during the second half.
- POAMA forecast mostly average SST for summer. In addition, the CFS-based NOAA Coral Reef Watch bleaching thermal outlook shows no alerts/"warning" levels, while the LIM-based outlook has increased the level from "Warning" to "Alert Level 1" over the Torres Strait and N-GBR areas.
- ENSO-neutral conditions continued in the Pacific during November and are expected to persist tin the upcoming months.

MODIS sea surface temperature (day+night)

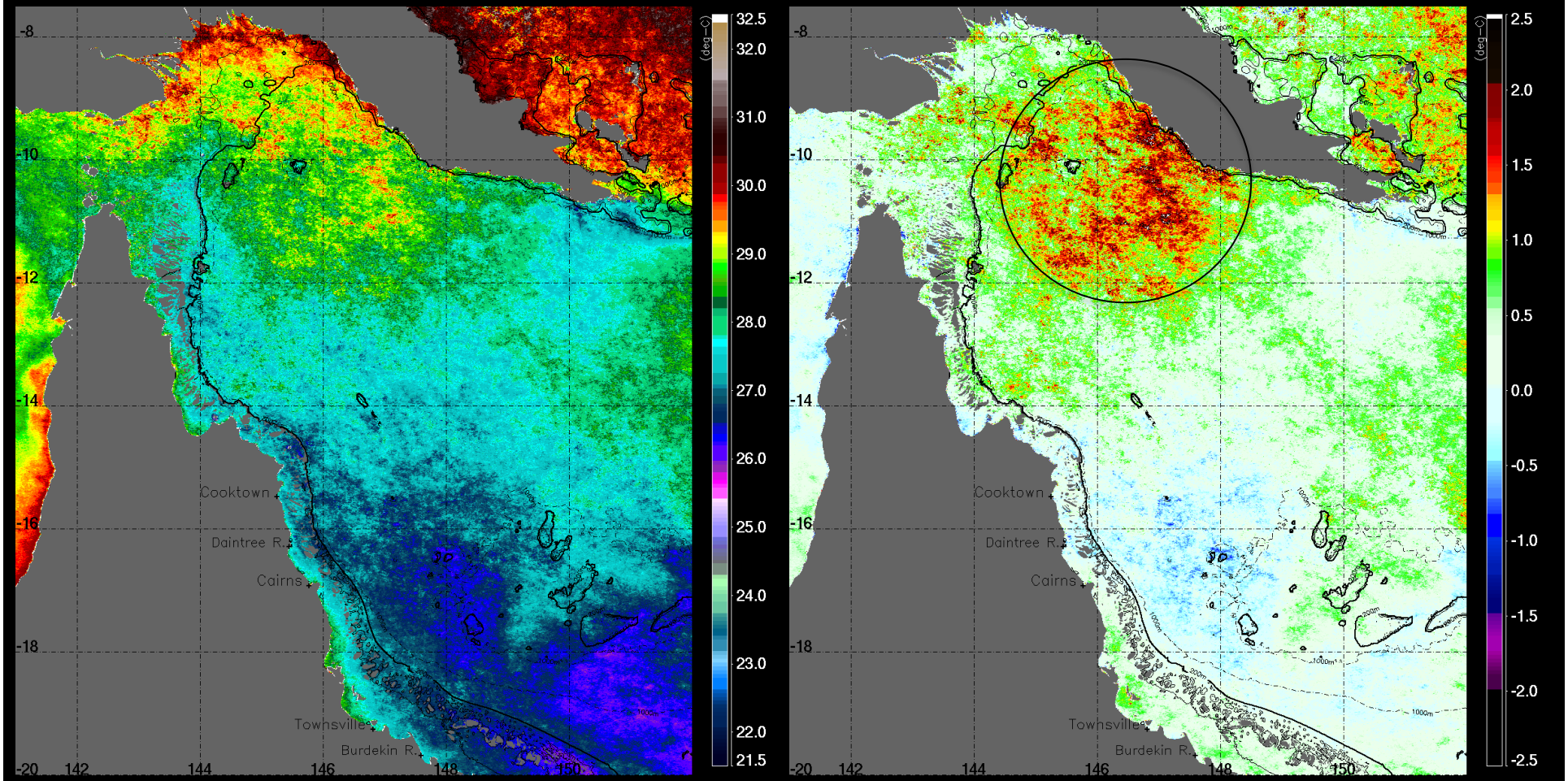
November 2013



Note:

- MODIS SST showed mostly neutral conditions that continued over the Torres Strait and N-GBR areas during November. Positive SST anomalies dissipated on the inner reefs south of ~17°S, showing only slightly positive SST anomalies .
- Due to extensive cloud contamination during November, the SST conditions may not be representative of the whole month - caution should be applied when interpreting the anomalies.

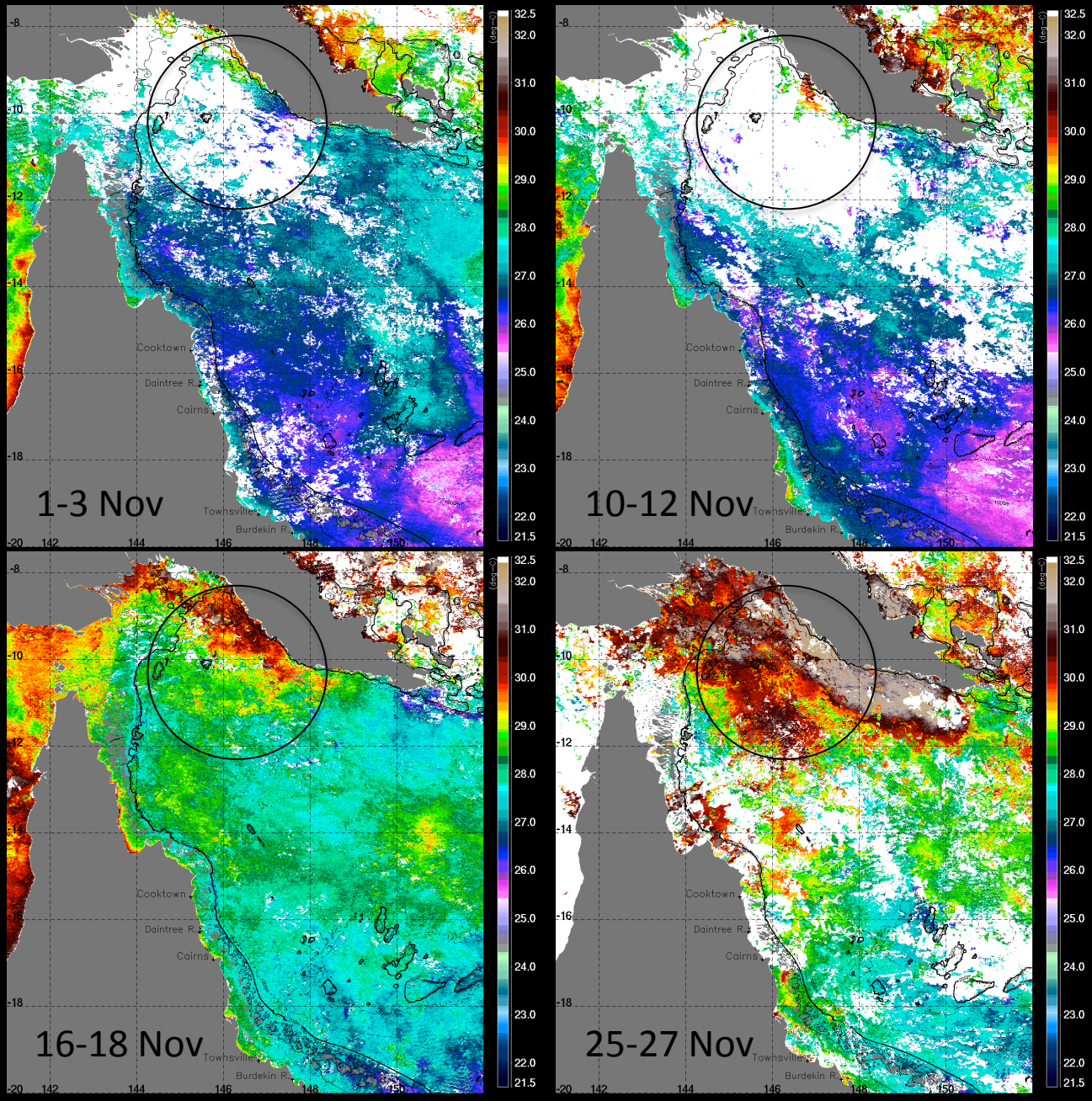
Torres Strait / far northern GBR
MODIS sea surface temperature (day+night)
November 2013



Note:

- Mostly average anomalies along the N-GBR and Torres Strait areas.
- The high positive anomalies area (circled) mostly represent data from a few days at the end of the month, where SST was unusually high (see following slide)

MODIS sea surface temperature (3-day means)



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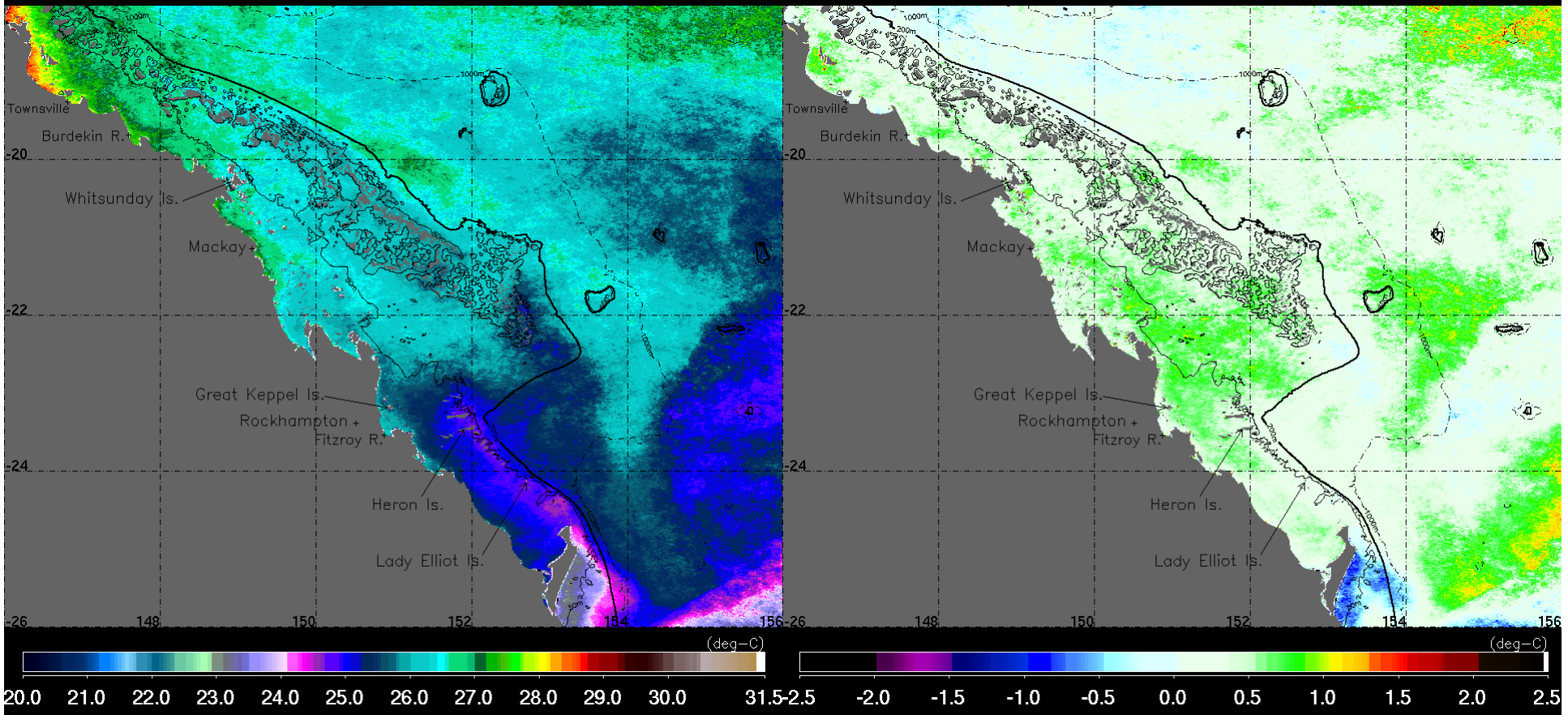
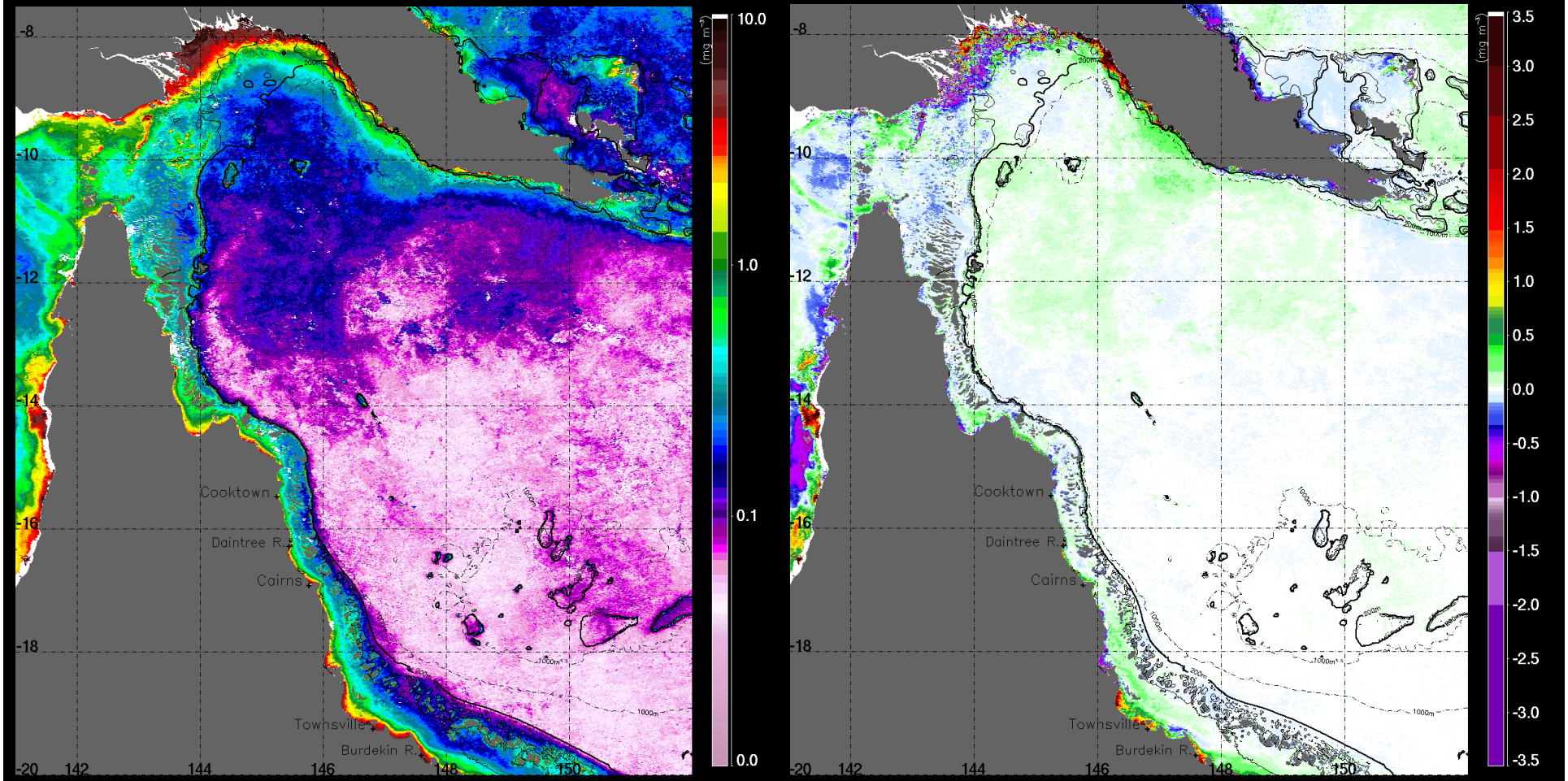
Southern GBR
MODIS sea surface temperature (day+night)
November 2013



Note:

- Capricorn Bunker group of reefs bathed by cooler waters
- Slightly positive SST anomalies remain along the remainder of S-GBR during November.

Torres Strait / far northern GBR
MODIS chlorophyll-*a* concentration
November 2013



Note:

- Mostly neutral chlorophyll-a concentration conditions over the Torres Strait and far N-GBR areas during November. Positive anomalies more marked on the inner reefs south of ~18°S.
- Due to extensive cloud contamination during November, conditions may not be representative of the whole month - caution should be applied when interpreting the anomalies.

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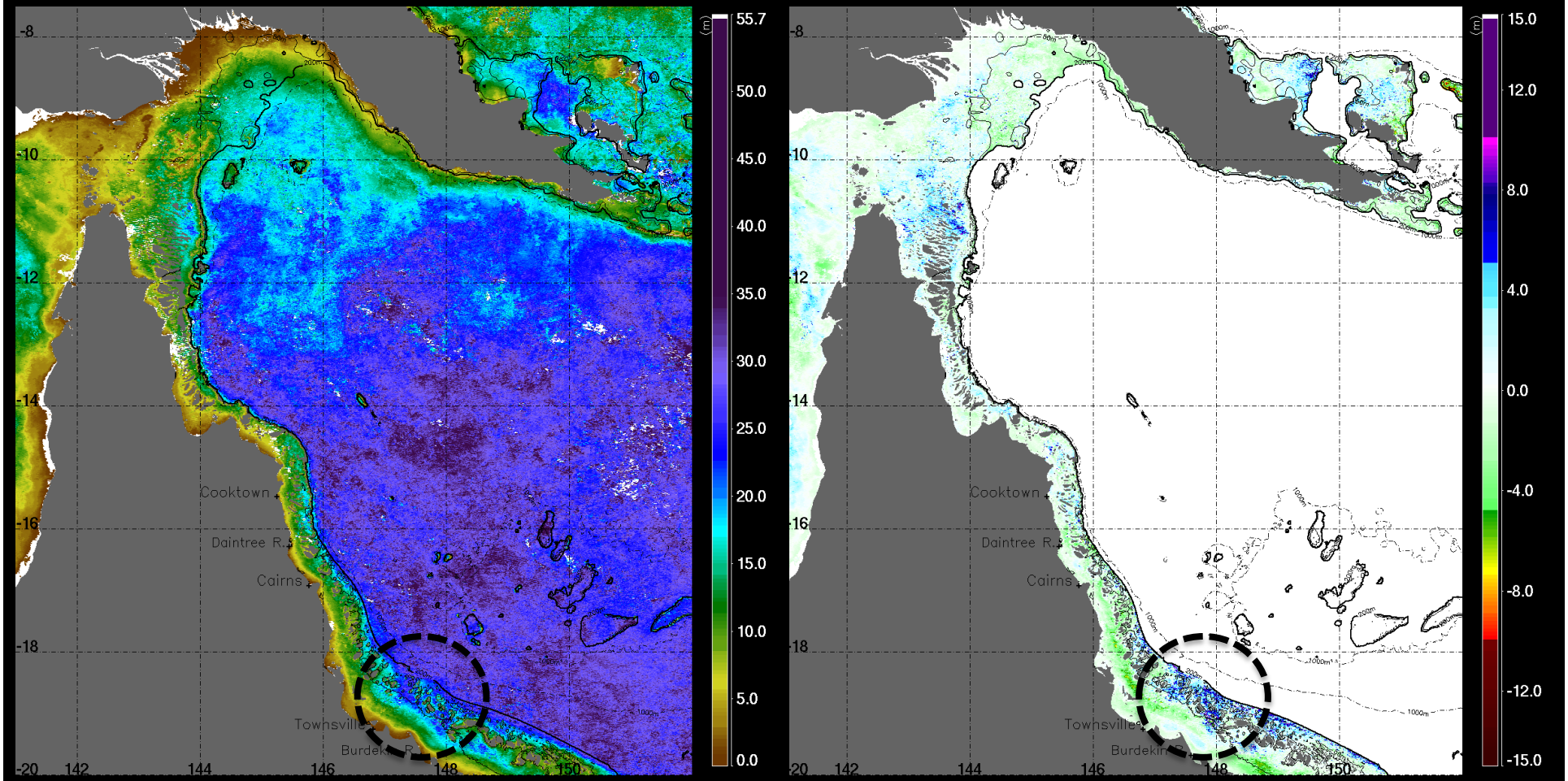
Torres Strait / far northern GBR
MODIS 10% photic depth
November 2013



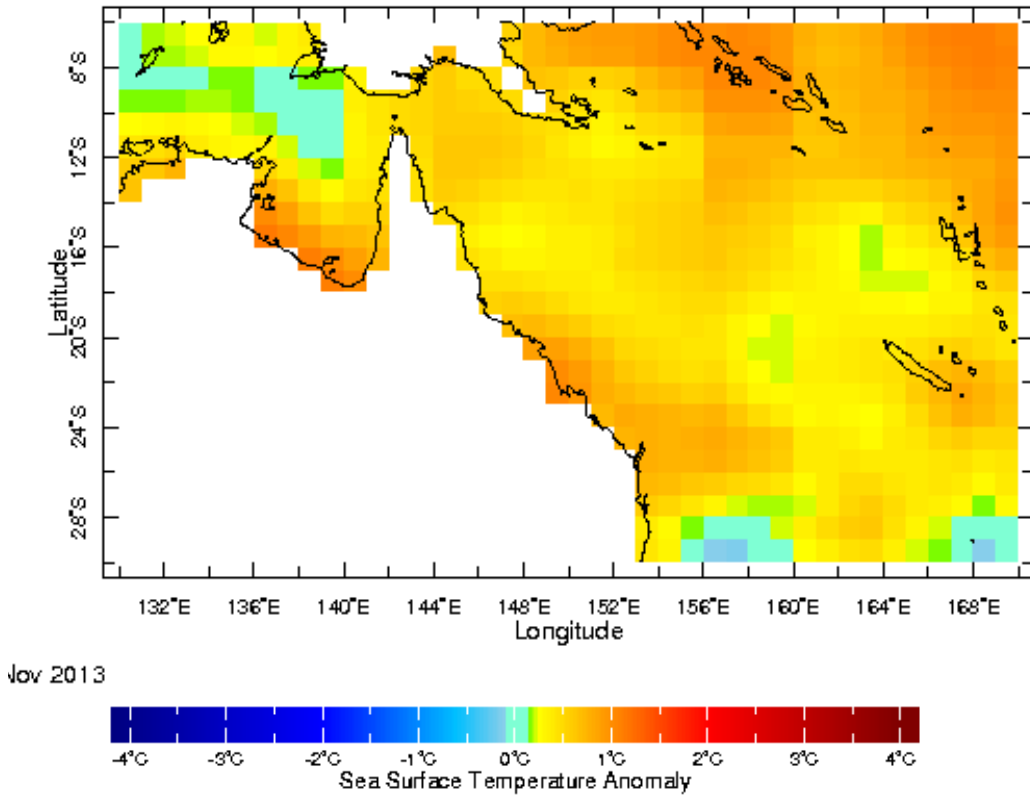
Note:

- MODIS photic depth still showing areas of positive anomalies (increased water quality) during November, related to intrusions of oceanic waters onto the shelf through the Myrmidon and Palm Passages. These are less marked than previous month.

Sea Surface Temperature Anomaly

from NOAA NCEP EMC CMB GLOBAL Reyn_SmithOIv2

NOVEMBER 2013



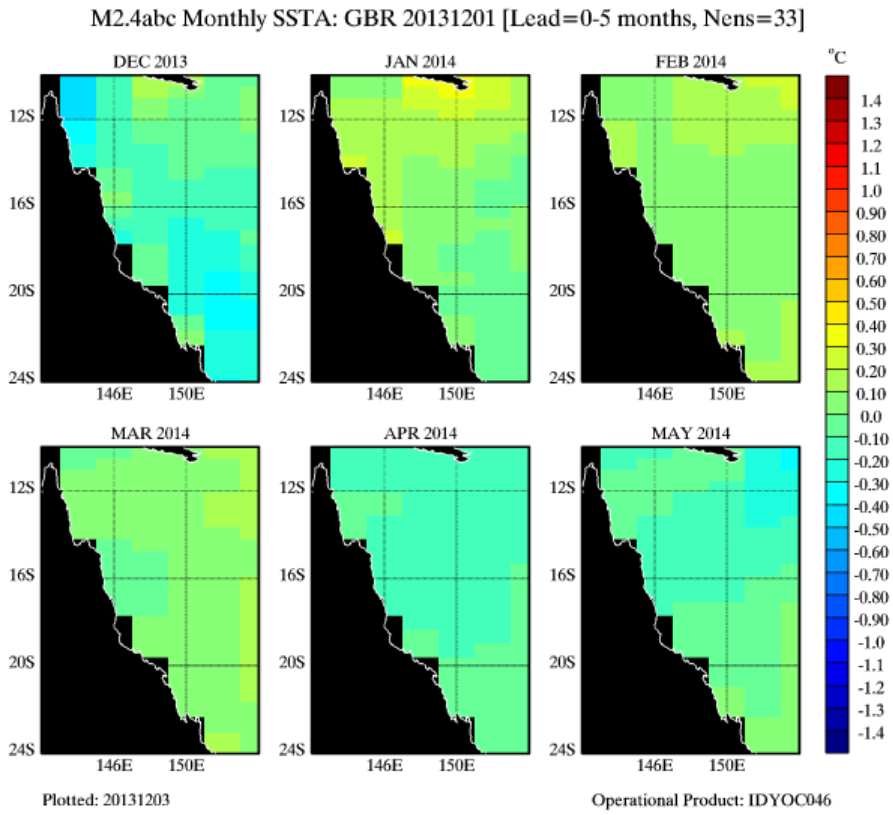
Note:

- The Reynolds SST anomaly data for November showed positive (but low) SST anomalies along the GBR that intensified southwards.

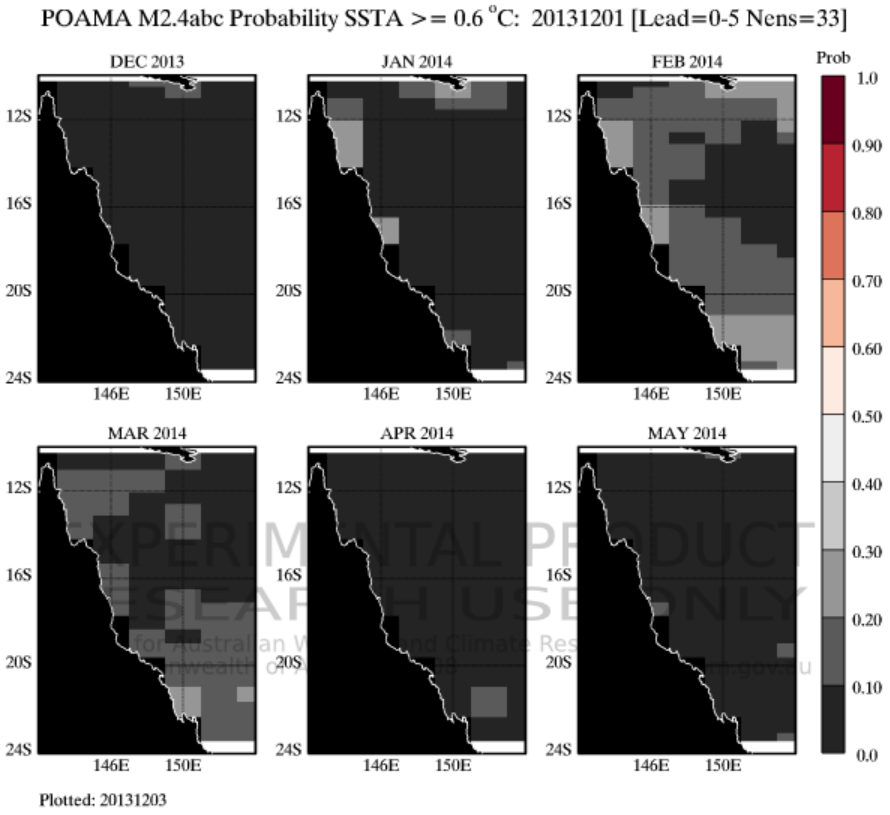
http://iridl.ldeo.columbia.edu/SOURCES/.NOAA/.NCEP/.EMC/.CMB/.GLOBAL/.Reyn_SmithOIv2/

Sea surface temperature anomaly forecast (POAMA-2)

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



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



Note:

- As per previous months, POAMA forecast mostly average temperatures for summer, with very low probabilities of SST anomalies exceeding 0.6°C.

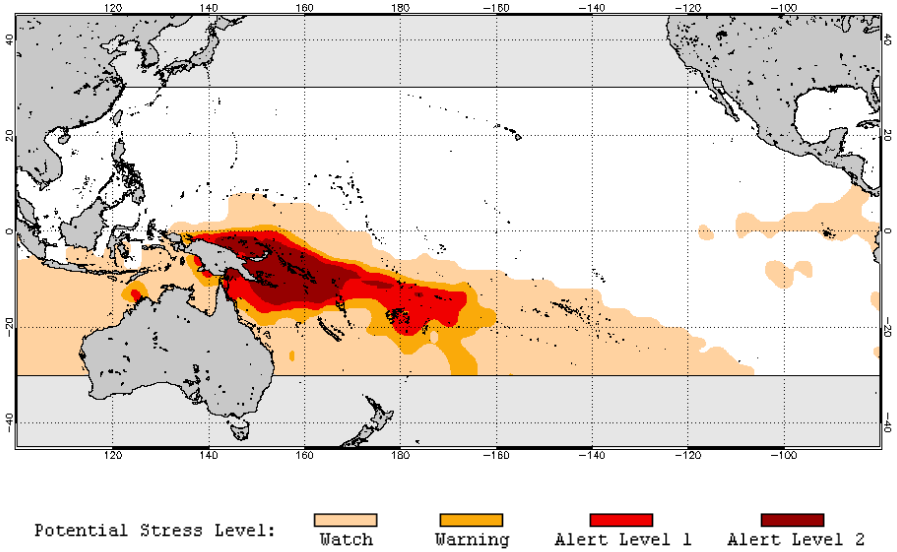
NOAA Coral Reef Watch

Seasonal coral bleaching thermal stress outlook

December 2013 to March 2014

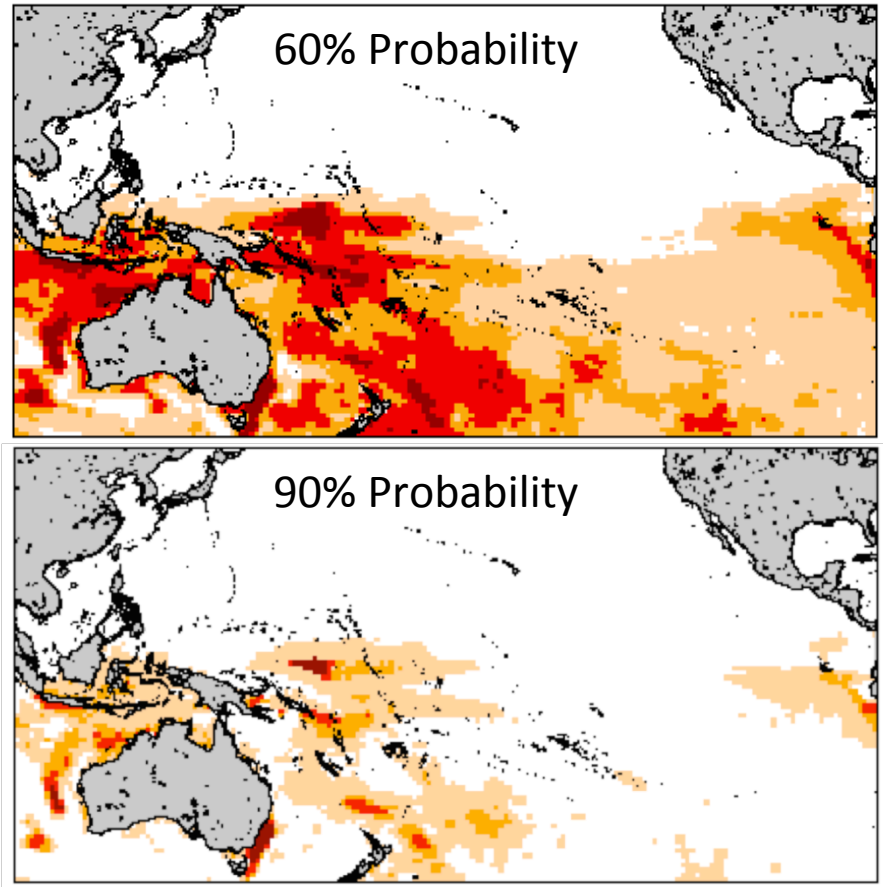
LIM-based

Version 2, experimental, weekly 2x2 degree spatial resolution



CFS-based

Version 2, experimental, weekly 1x1 degree spatial resolution

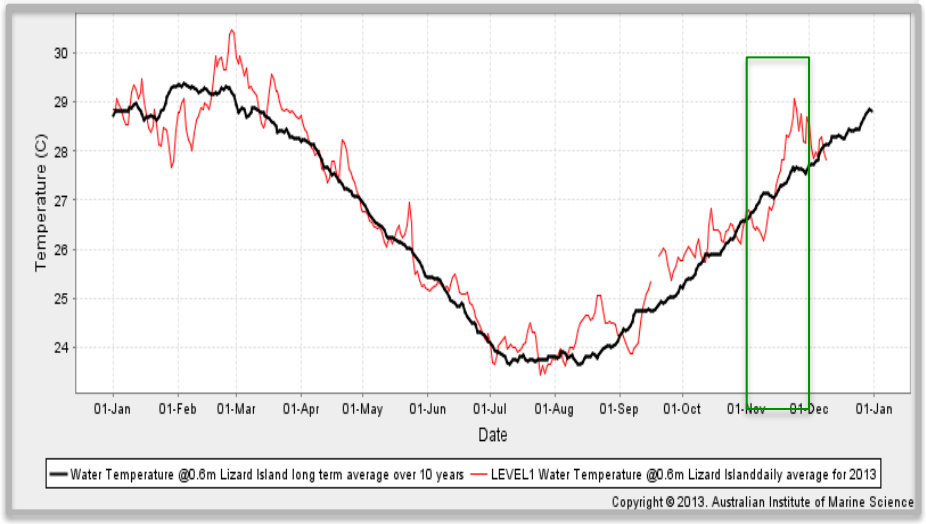


Note:
[These outlooks are based on SST predictions from: CRW's experimental statistical Linear Inverse Model (LIM-based – left panel) and the NCEP climate forecast system (CFS-based; right panels) systems]

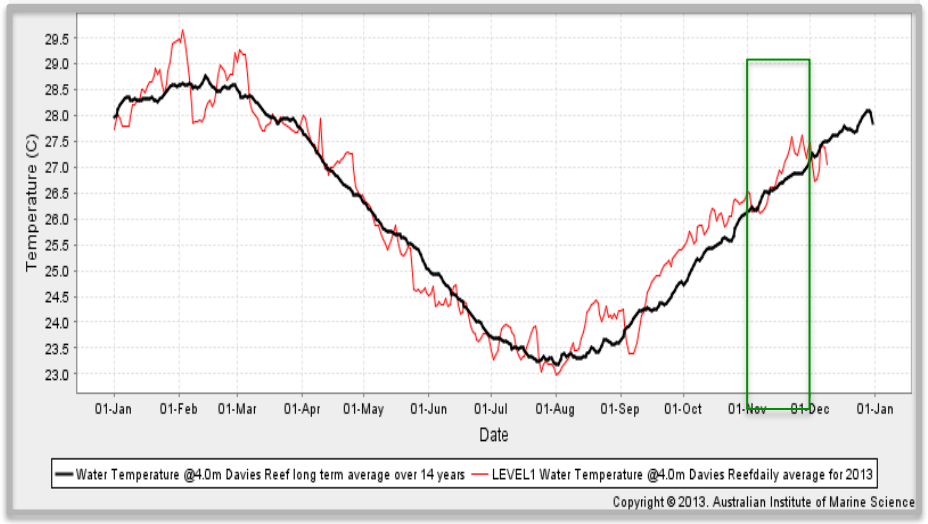
- The LIM-based NOAA CRW bleaching thermal outlook increased the level - from "warning" to "Alert Level 1" - over the Torres Strait and Northern GBR areas.
- The CFS-based outlook showed no bleaching alerts (at probabilities of 90%; bottom right) to "warning" (at probabilities of 60%; top right) over the GBR and Torres Strait areas.

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

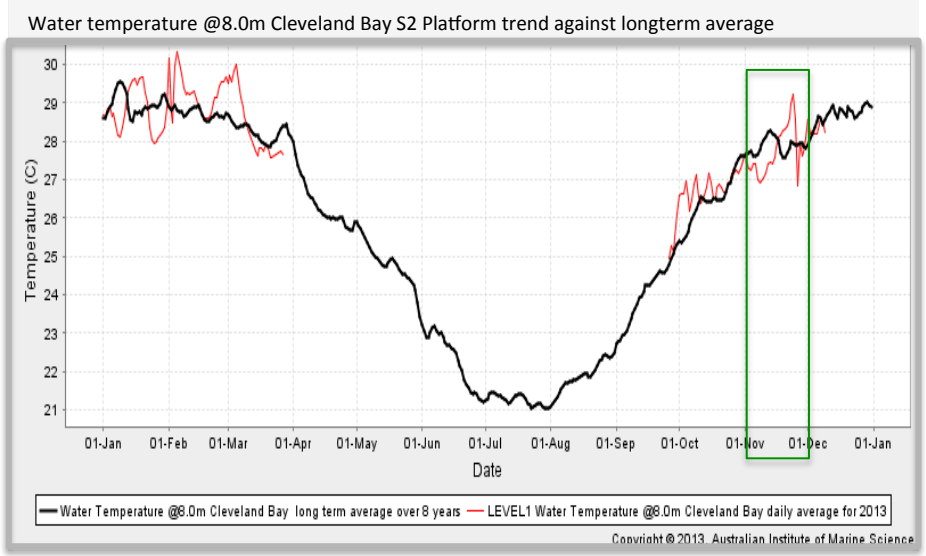
Water temperature @0.6m Lizard Island sensor float trend against longterm average



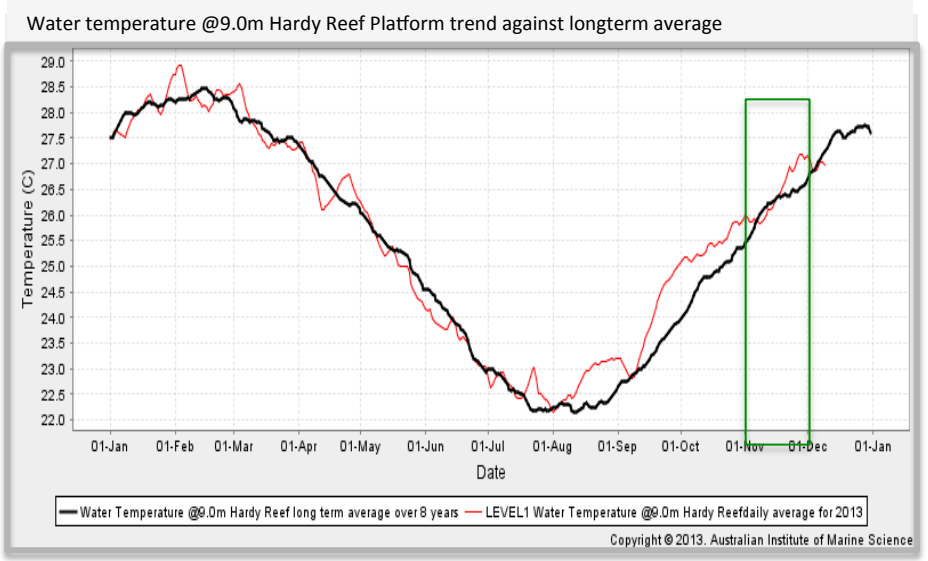
Water temperature @4.0m Davies Reef Platform trend against longterm average



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

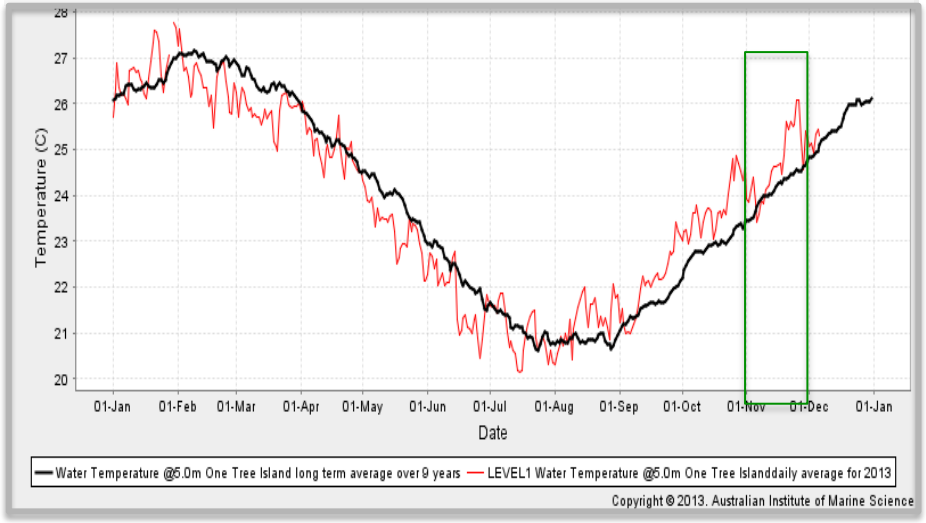


Water temperature @9.0m Hardy Reef Platform trend against longterm average

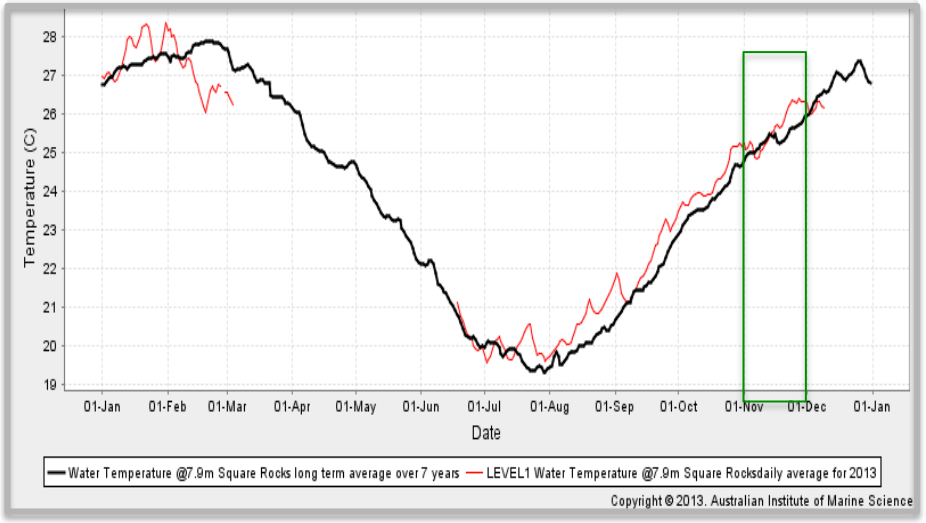


Water temperatures from IMOS Sensor Network (FAIMMS) (AIMS operated)

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



Water temperature @7.9m Square Rocks Plattform trend against longterm average

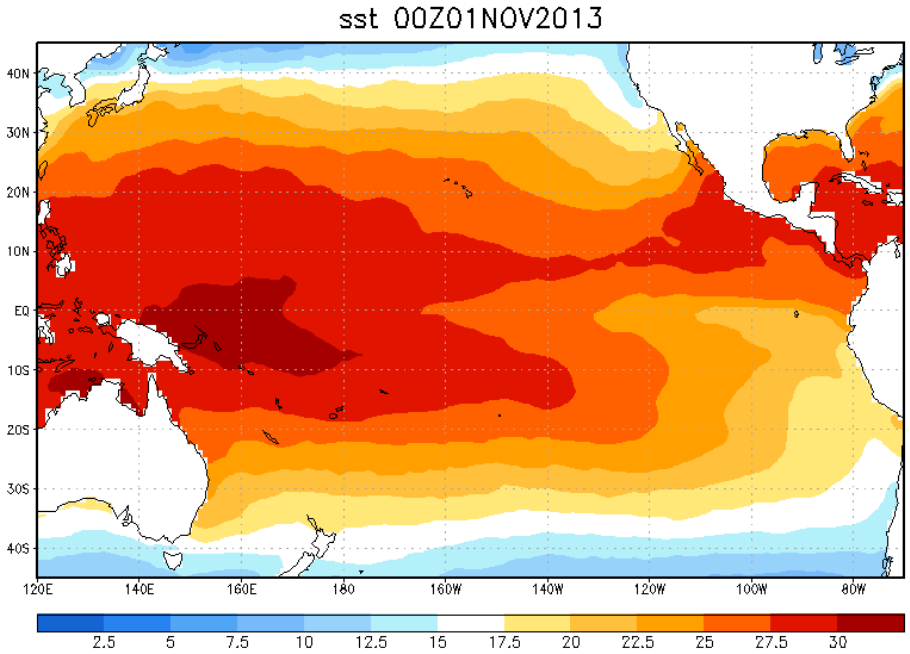


Note:

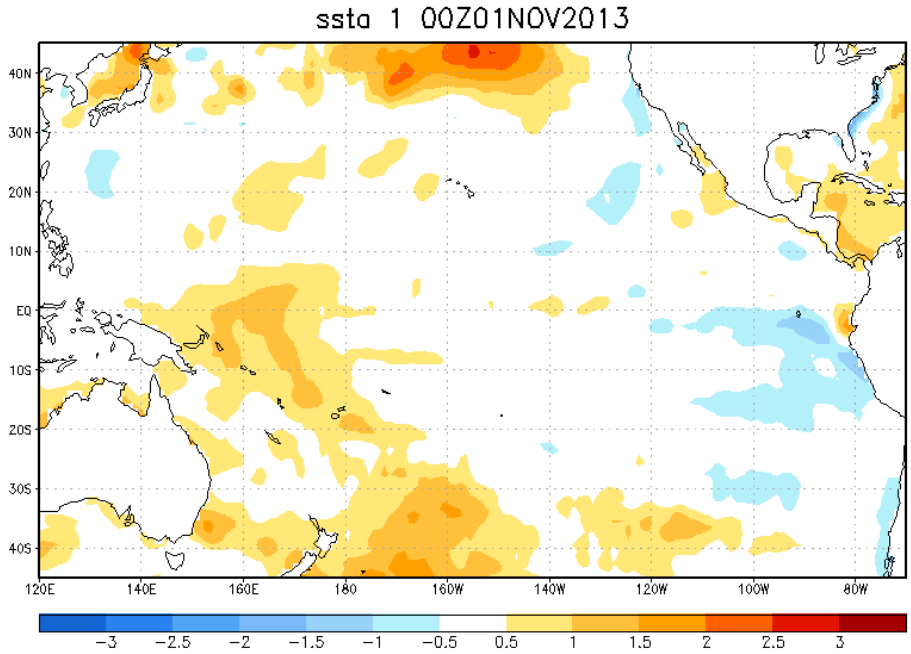
- In situ data showed mostly average/below average water temperatures during the first half of the November that increased above the long term mean during the second half of the month.

NOAA optimum interpolation sea surface temperature

OISST November 2013



OISST anomaly November 2013



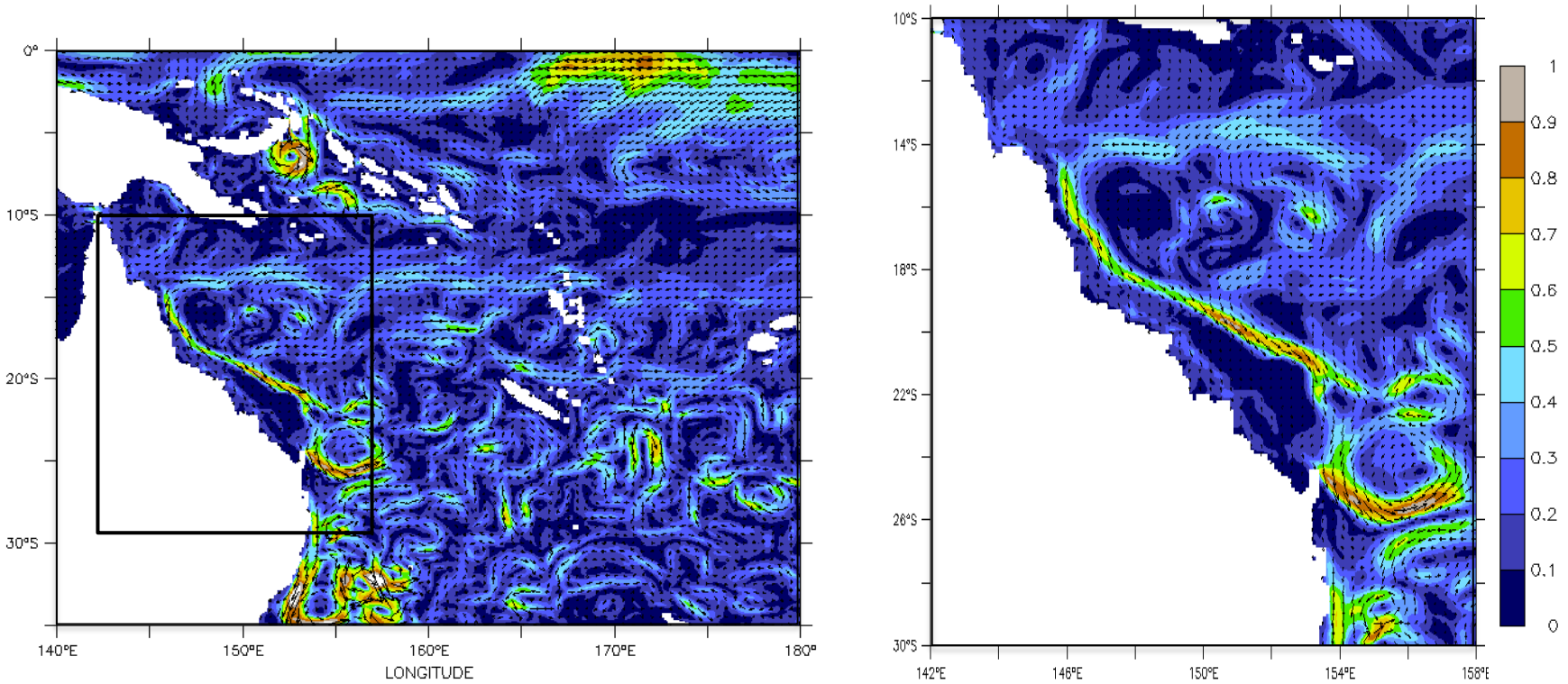
Note:

- Positive but low SST anomalies continued in the western equatorial Pacific while negative but also low SST anomalies persisted in the eastern Equatorial Pacific, consistent with the SST anomaly pattern prevalent over the last months.

http://www.emc.ncep.noaa.gov/research/cmb/sst_analysis/

OceanMAPS 15m Depth-Average Currents
November 2013

OceanMAPS Ocean Modeling, Analysis and Prediction System was developed at CSIRO Marine and Atmospheric Research and the Bureau of Meteorology and it is part of the **Bluelink** project.

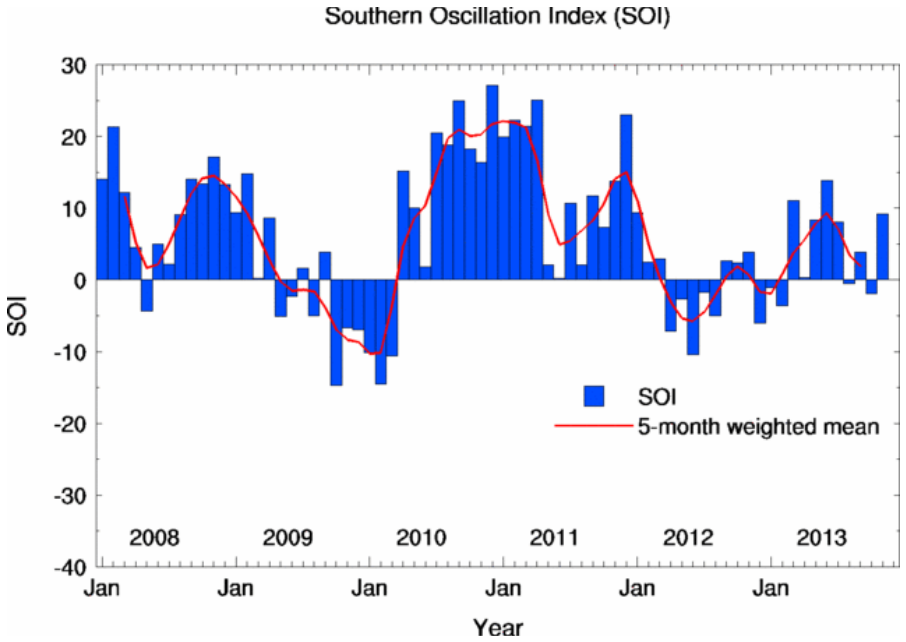


Behind Real Time analysis
15 m Depth-Averaged Currents (m/s).

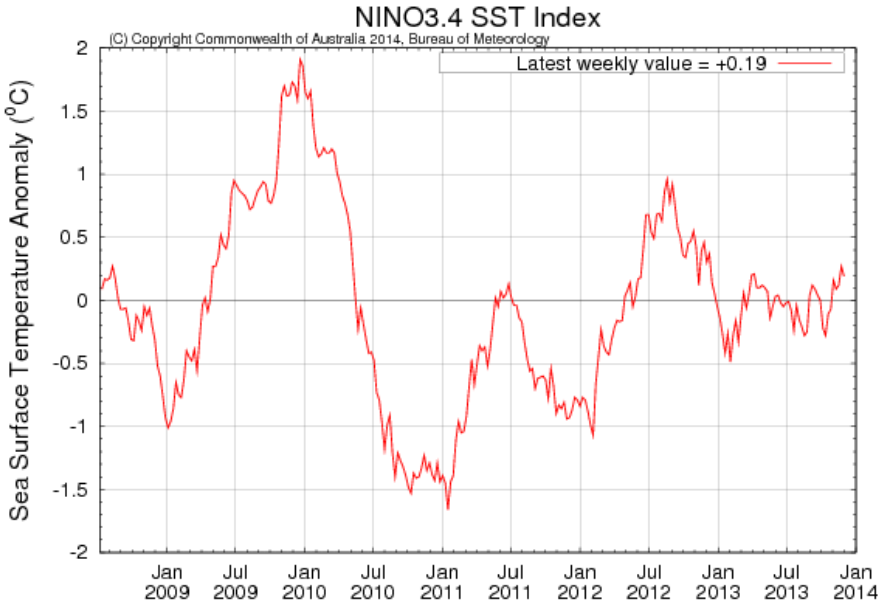
Note:

- During November, most of the South Equatorial Current turned southwards as it encountered the GBR, leading to a stronger East Australian Current (EAC). The EAC then separated at Fraser Island turning eastwards and feeding a large anticyclone eddy.

ENSO Index



Negative SOI = El Niño



Positive Nino 3.4 index= El Niño

Note:

- ENSO neutral conditions continued during November and are expected to persist for the upcoming months.