

NERP

Torres Strait / GBR environmental conditions report:

Recent status and predictions

09 May 2013

By Ana Redondo-Rodriguez
work supervised by Dr. Scarla Weeks
Contact: a.rodriguez@uq.edu.au

UQ-GPEM Biophysical Oceanography Group

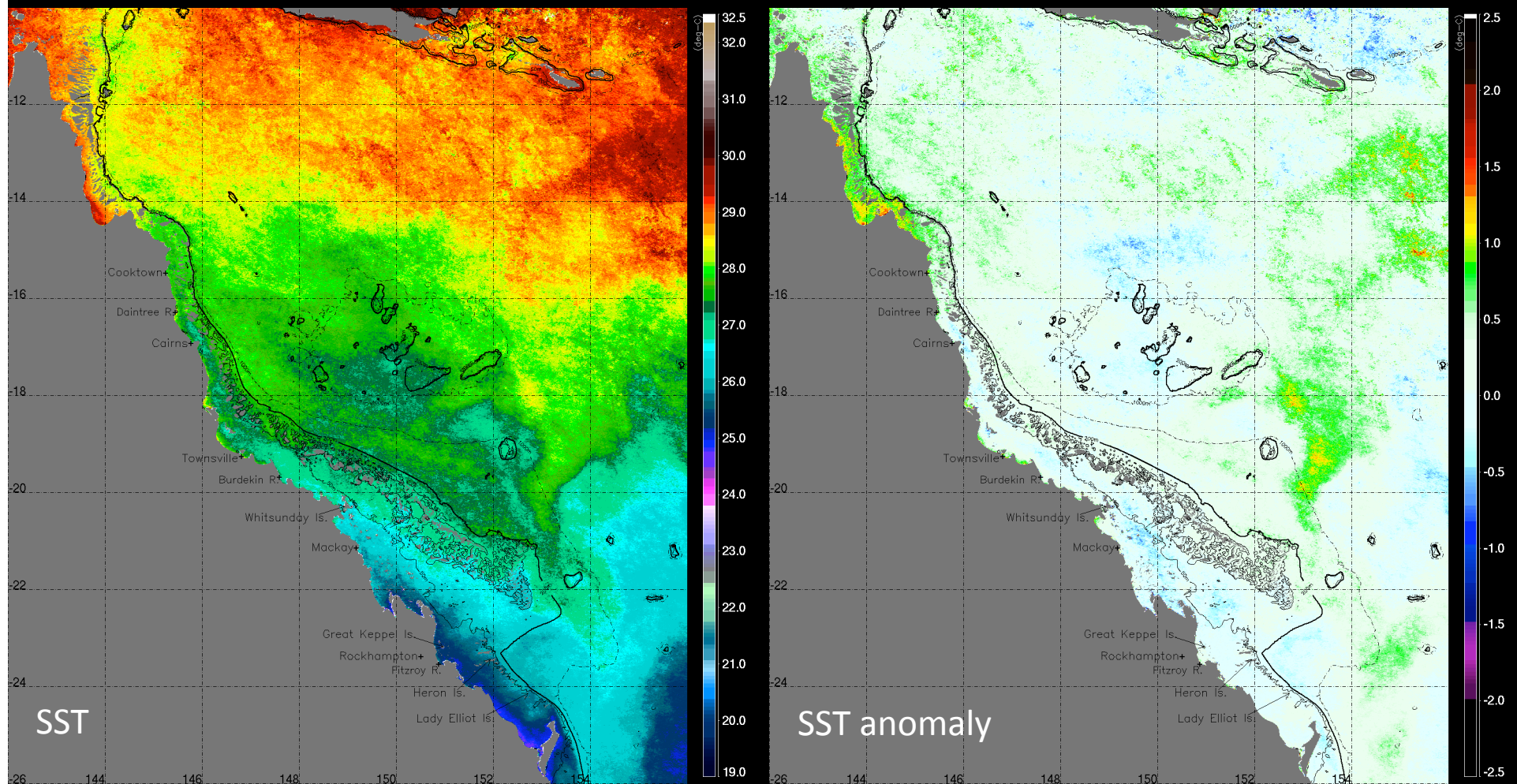
Outline

- 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

- Average SST prevalent over the southern GBR during April while above mean temperatures were experienced in the Torres Strait and far N-GBR areas
- Forecast of close to average SST along the GBR and Torres Strait for the upcoming months.
- The NOAA Coral Reef Watch shows no bleaching alerts for the GBR and Torres Strait for the winter months.
- ENSO-neutral conditions continued in the Pacific during April, and are expected to persist in the upcoming months.

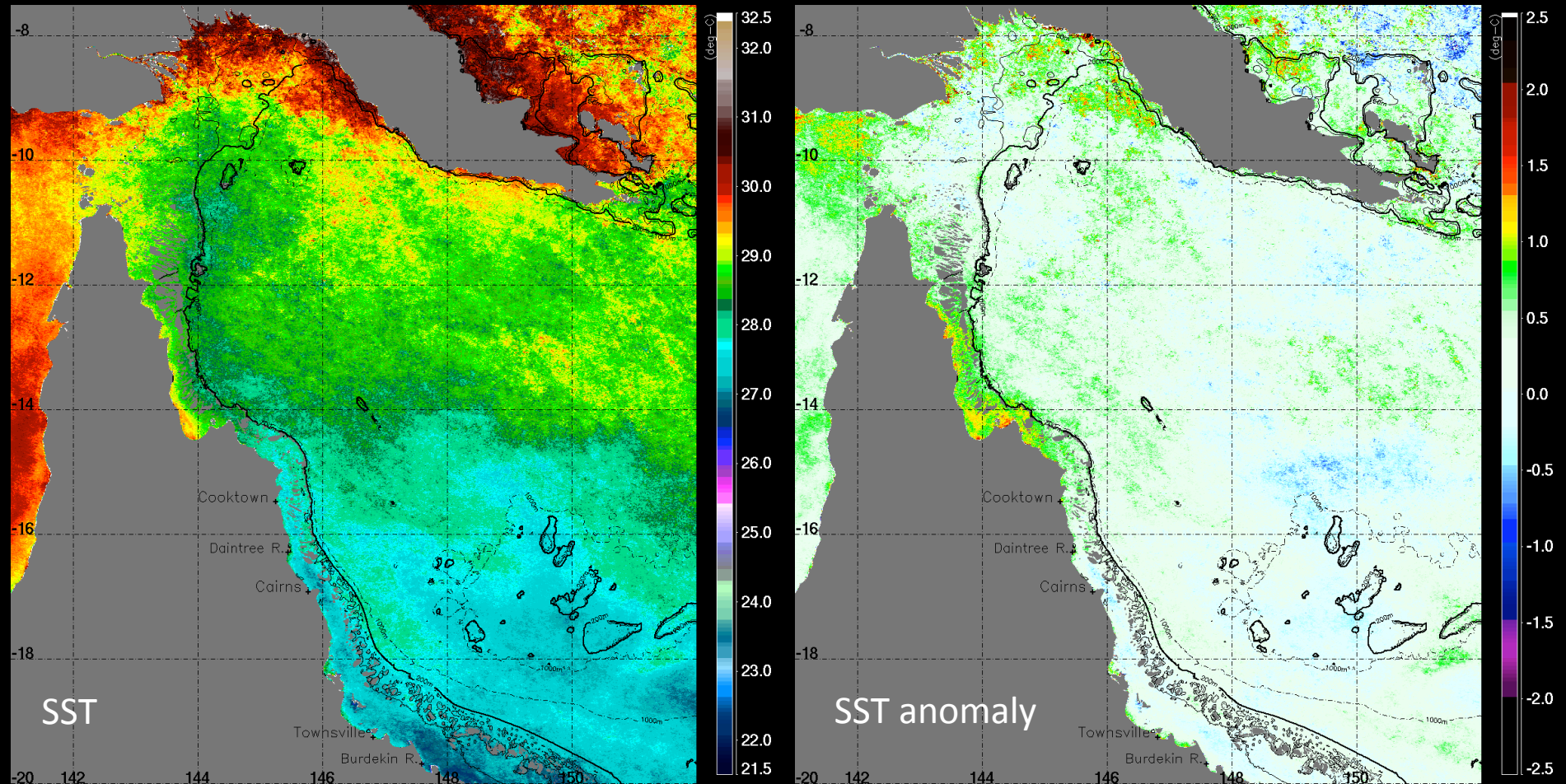
Modis SST (day+night): April 2013



Note:

- The strong negative anomalies shown during March dissipated during April, leaving mostly neutral conditions along the length of the GBR, with the exception of the far N-GBR, which experienced positive SST anomalies.

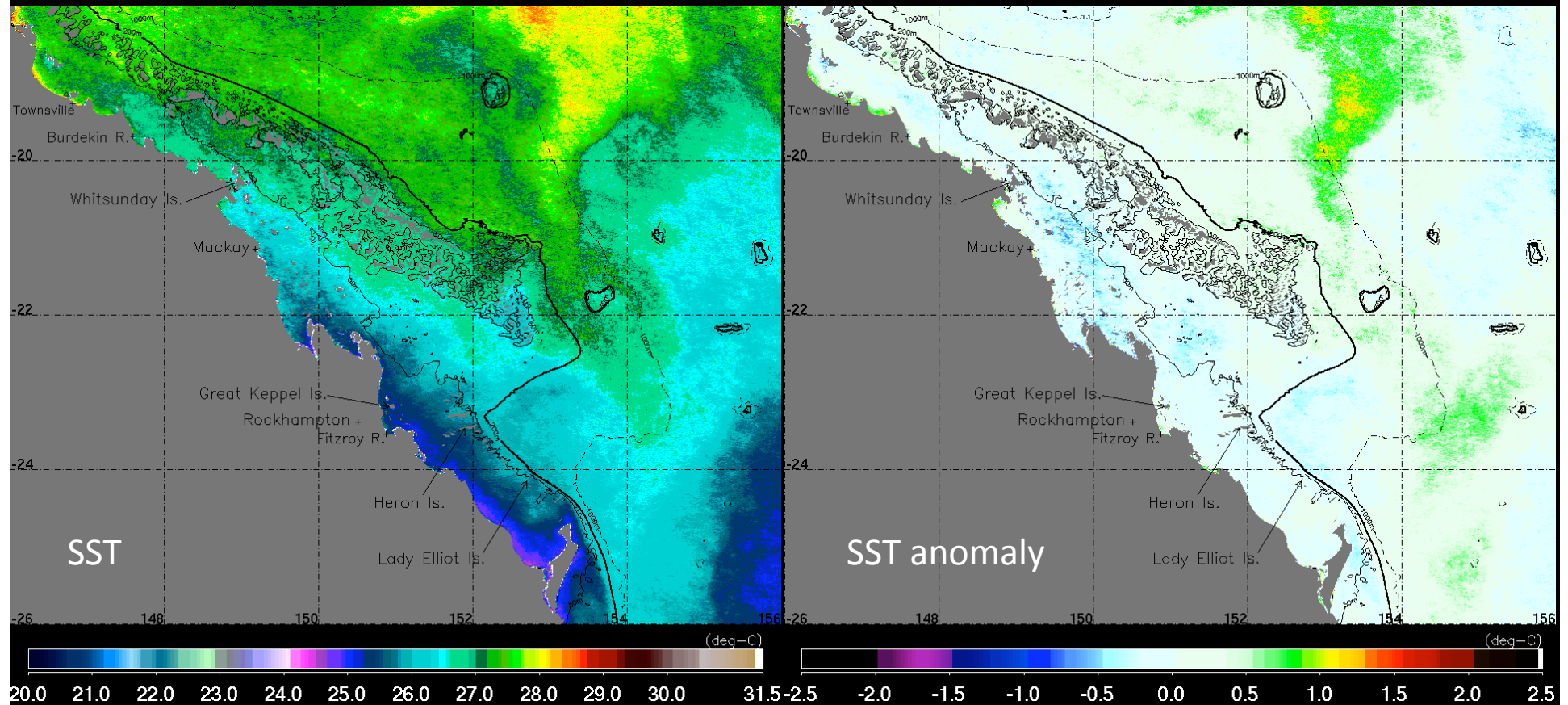
Torres Strait / far northern GBR MODIS SST: April 2013



Note:

- Neutral conditions apparent on the N-GBR south of ~15S during April, and positive SST anomalies north of 15S.
- Neutral/moderate positive anomalies are shown in the Torres Strait area.

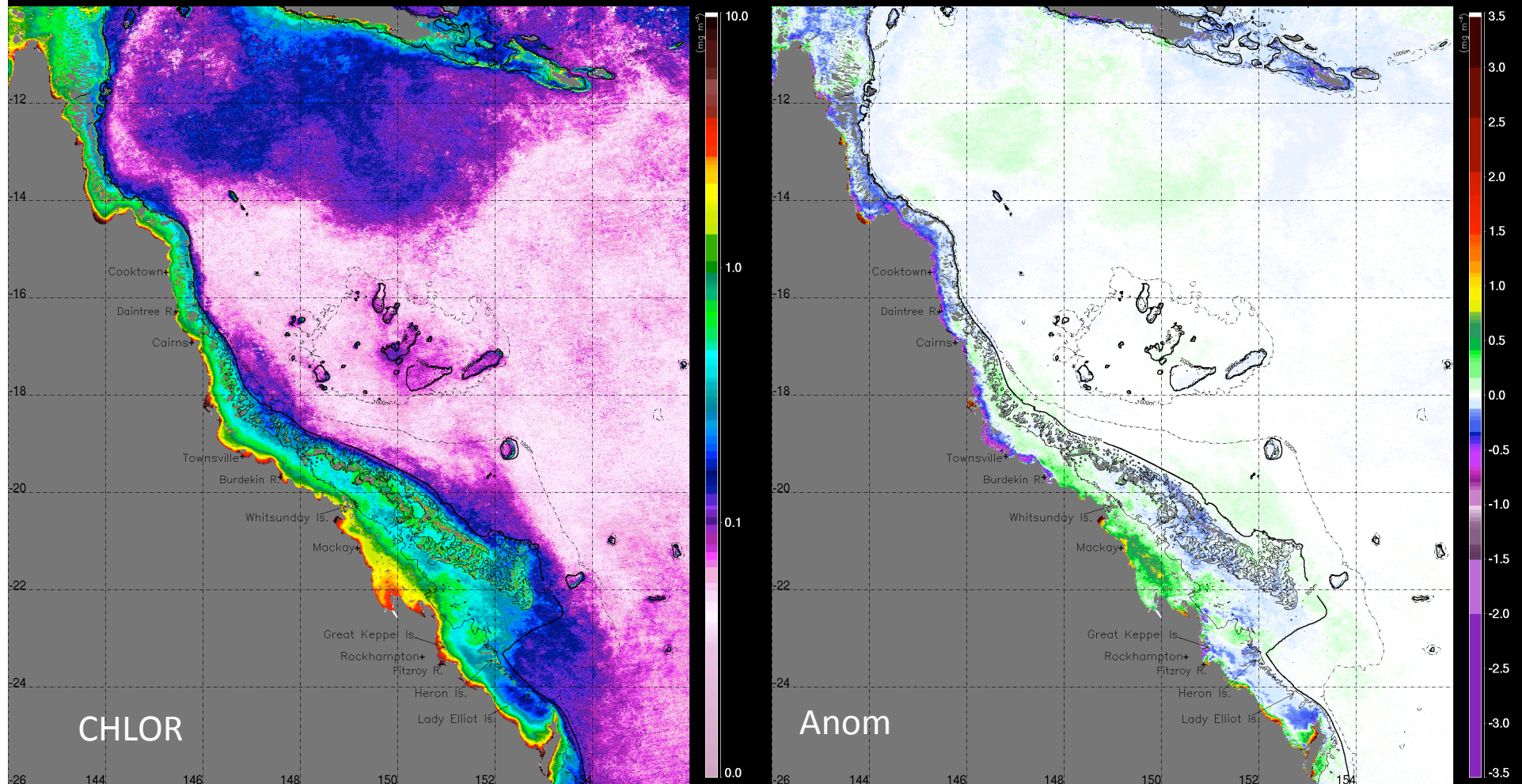
Southern GBR MODIS SST: April 2013



Note:

- Average SST conditions prevalent over the S-GBR during April, leading to neutral SST anomalies.

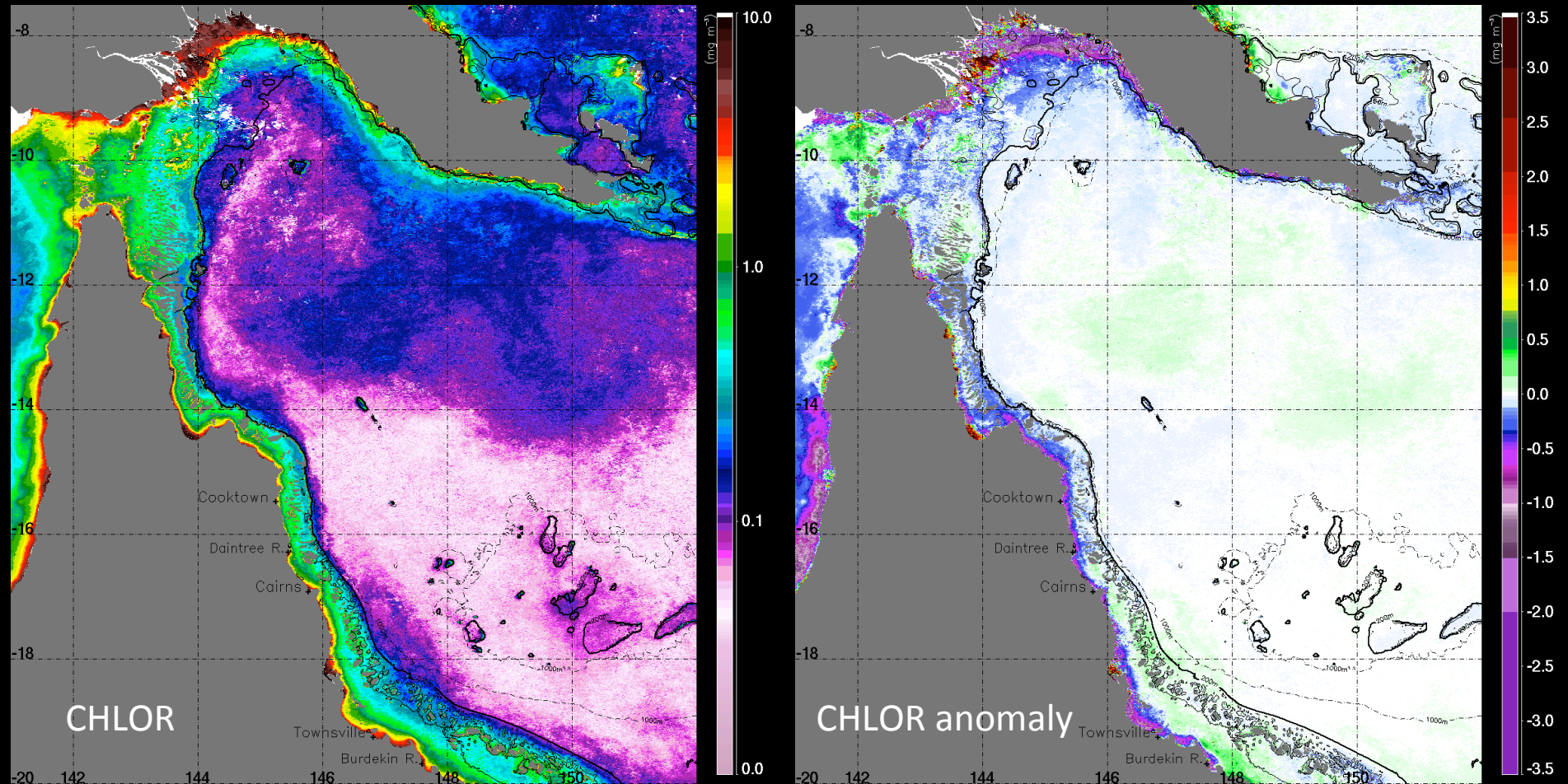
MODIS Chlorophyll-*a* concentration: April 2013



Note:

- Although high Chlorophyll-*a* signal on the inner reefs south of ~20S was still visible during April, the anomalies present during March dissipated, and only slightly positive anomalies remained on the Southern GBR.
- Similarly, the negative anomalies that were previously present north of Townsville also dissipated considerably during April.

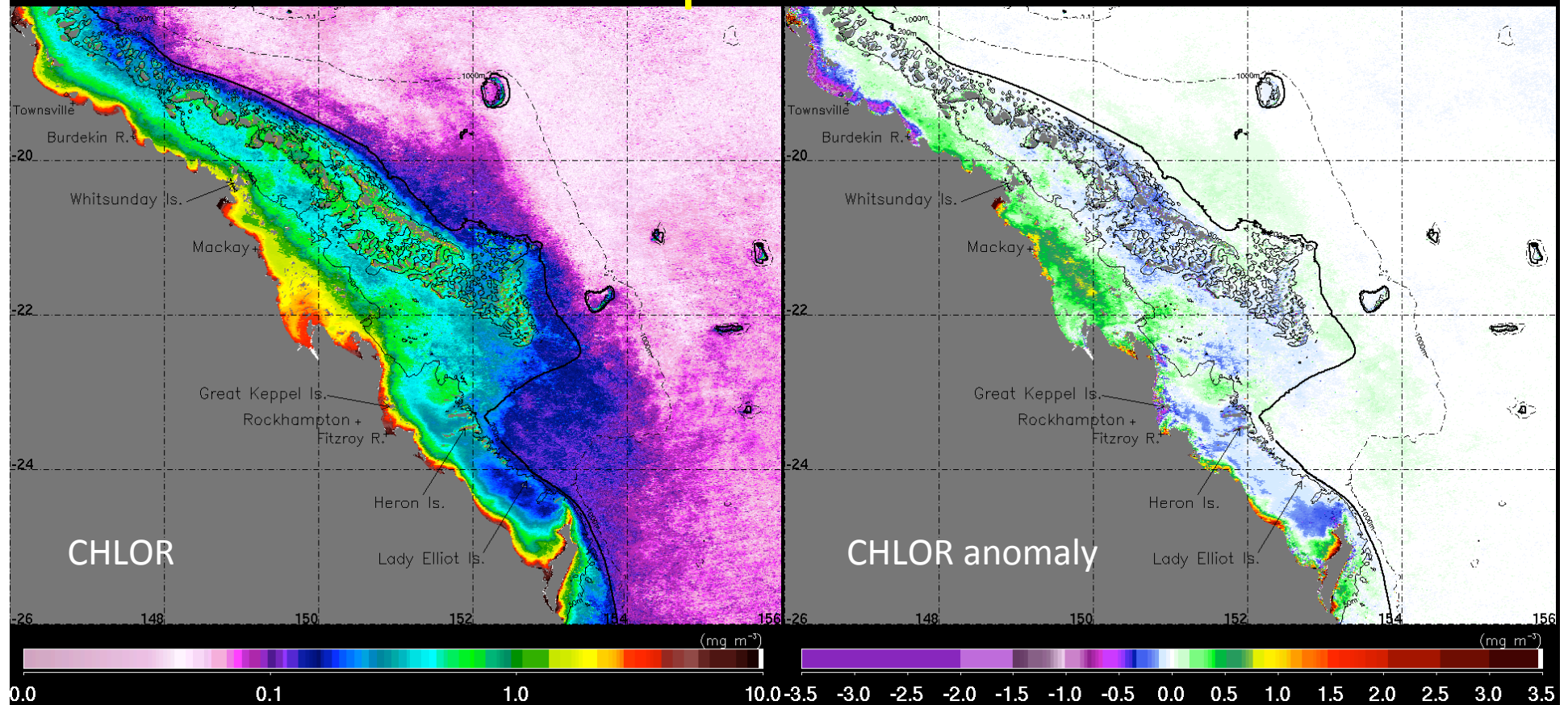
Torres Strait / far northern GBR Chlorophyll-*a* concentration April 2013



Note:

- Chlorophyll image showing a clear signal of the Gulf of Papua gyre.
- Chlorophyll image for the Torres Strait/far-northern GBR represents only a limited number of days in April due to cloud contamination, especially north of 16S, hence caution should be applied when interpreting the anomalies.

Southern GBR Chlorophyll-*a* concentration: April 2013

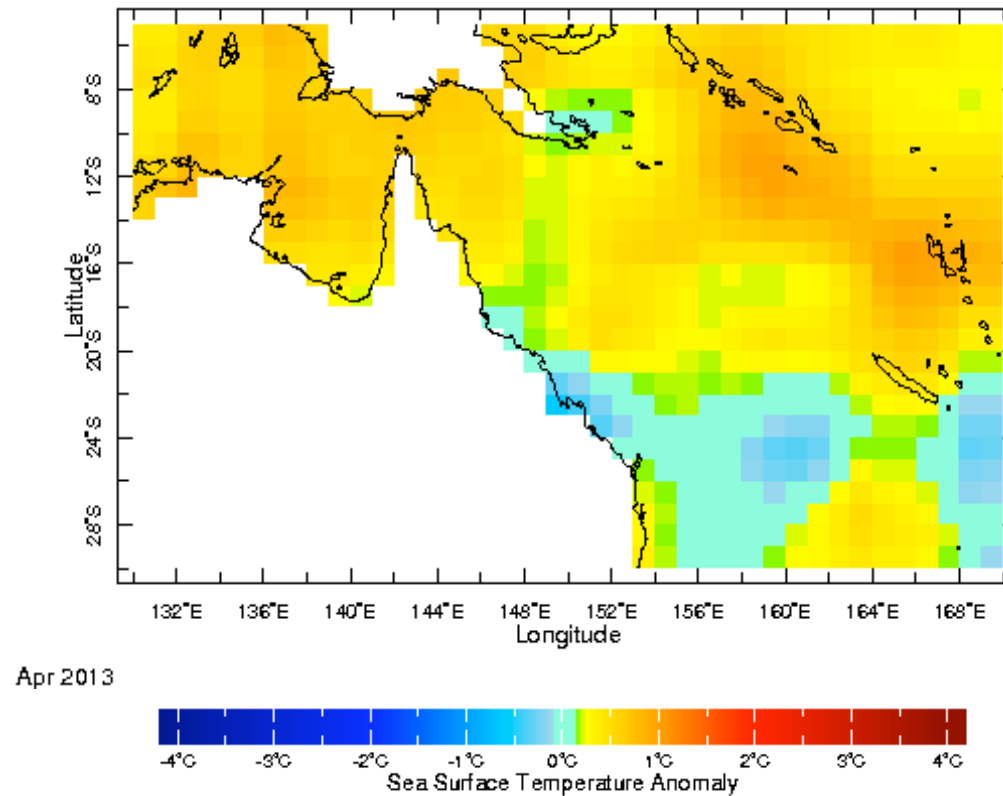


Note:

- The high chlorophyll-*a* concentrations that were present inshore during March due to intense river discharge, dissipated during April, especially around the Fitzroy River, leading to mostly average conditions on the area.
- Marginally positive anomalies remain south of Mackay.

NOAA NCEP EMC CMB GLOBAL Reyn_SmithOlv2 monthly SSTA: Sea Surface Temperature Anomaly data

April 2013



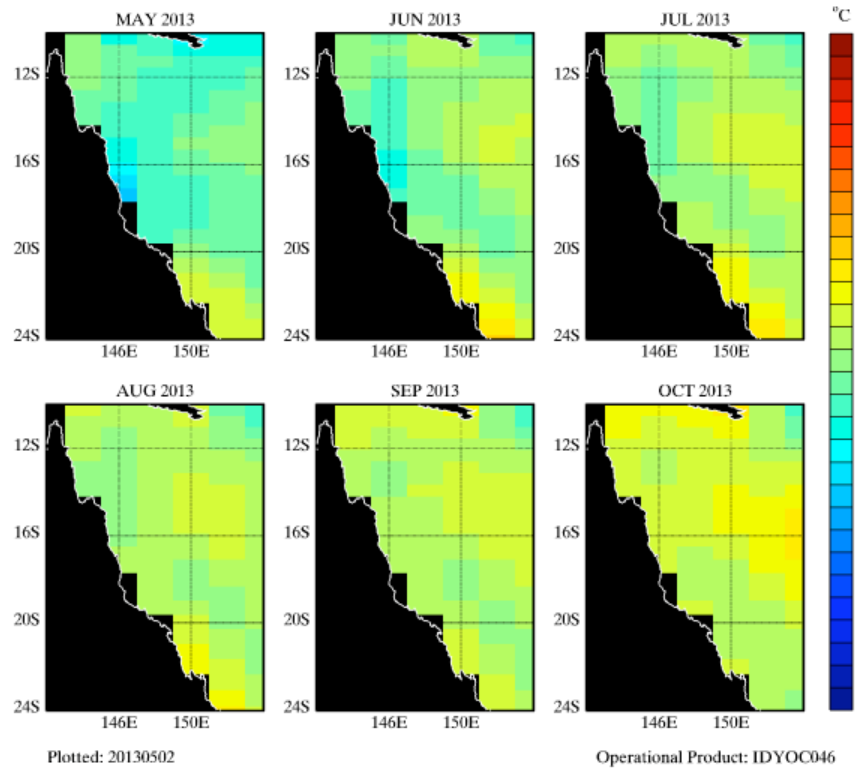
Note:

- Reynolds SST anomaly data show a pattern of higher than average temperatures for the Torres Strait and Northern GBR, and neutral conditions elsewhere in the GBR.

Great Barrier Reef SST Anomaly Forecast (POAMA-2)

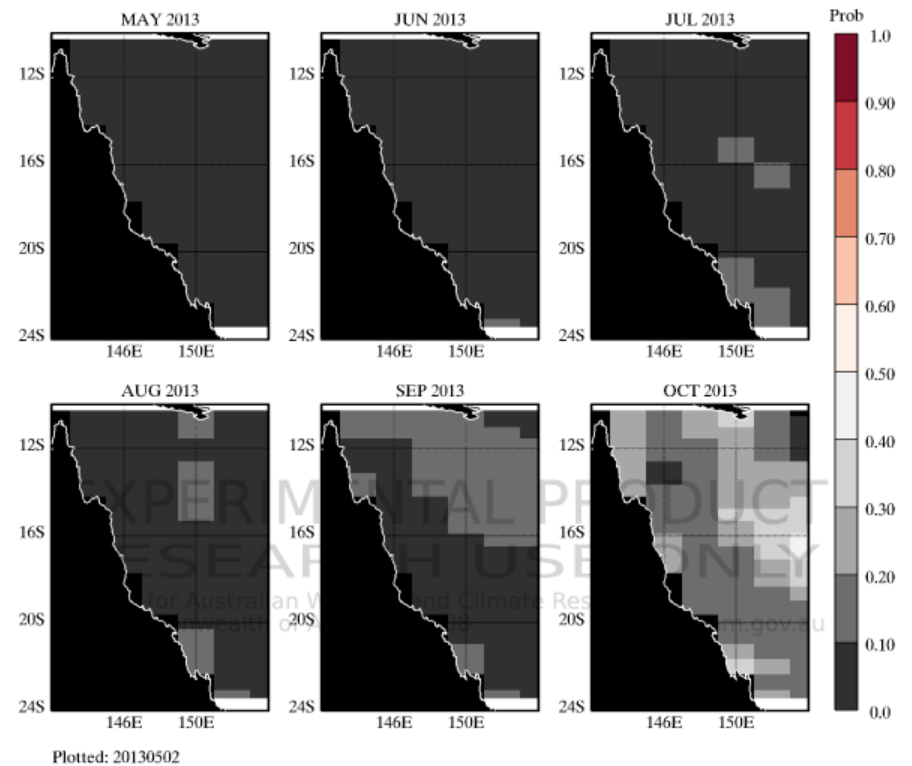
POAMA SST anomaly forecast for the next 6 months
(Operational)

P2.4abc Monthly SSTA: GBR 20130501 [Lead=0-5 months, Nens=30]



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

POAMA 2.4abc Probability SSTA $\geq 0.6^\circ\text{C}$: 20130501 [Lead=0-5 months, Nens=30]



Note:

- POAMA continues to forecast temperatures close to or below average for the upcoming months, with very low probabilities of temperature anomalies exceeding 0.6°C.

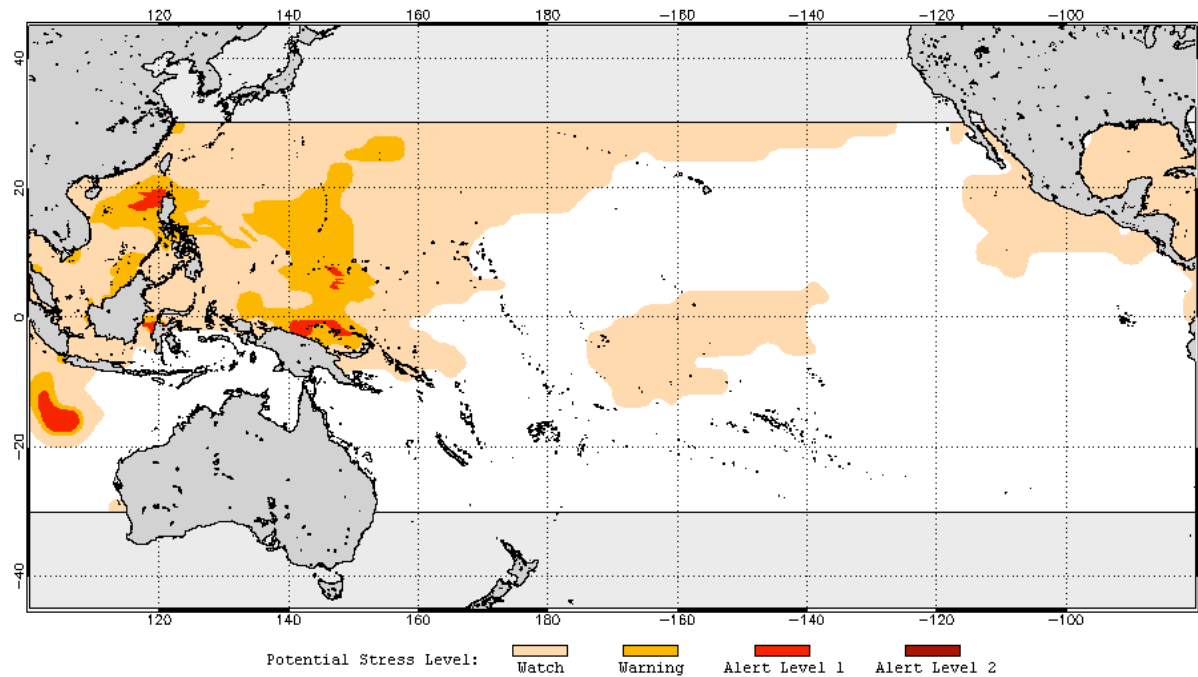
NOAA Coral Reef Watch

Seasonal Coral Bleaching Thermal Stress Outlook (LIM-based)

(Version 2, experimental, weekly, 2x2 degree spatial resolution)

Outlook for May to August 2013

2013 May 07 NOAA Coral Reef Watch Coral Bleaching Thermal Stress Outlook for May–Aug 2013
(Version 2, Experimental)



Note:

- NOAA CRW bleaching thermal stress outlook shows no bleaching alerts for the winter months, as expected.
- This outlook is based on SST prediction from CRW's experimental statistical Linear Inverse Model (LIM)

NOAA Coral Reef Watch

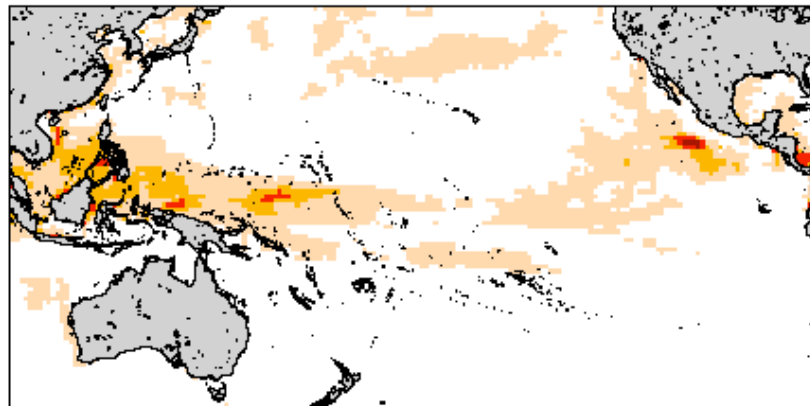
Seasonal Coral Bleaching Thermal Stress Outlook (CFS-based) (Version 2.0, experimental, weekly, 1x1 degree spatial resolution)

Probability of bleaching thermal stress for May-Aug 2013:

90%

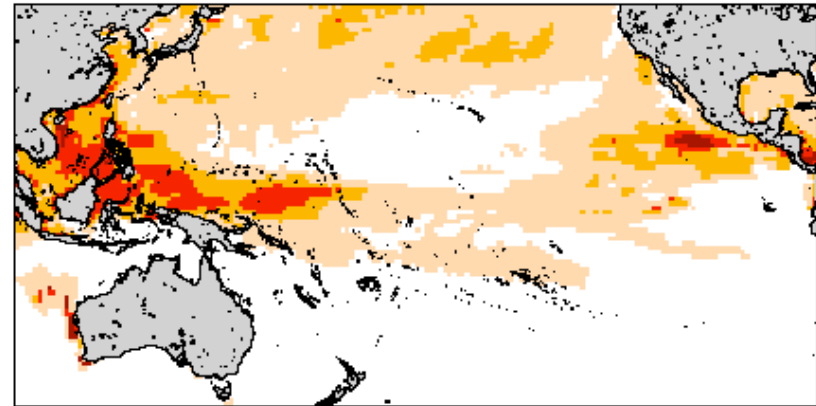
60%

2013 May 7 NOAA 90% Probability Bleaching Thermal Stress for May-Aug 2013
Experimental, v2.0, CFSv2-based, 28-member



Potential Stress Level: Watch Warning Alert Level 1 Alert Level 2

2013 May 7 NOAA 60% Probability Bleaching Thermal Stress for May-Aug 2013
Experimental, v2.0, CFSv2-based, 28-member



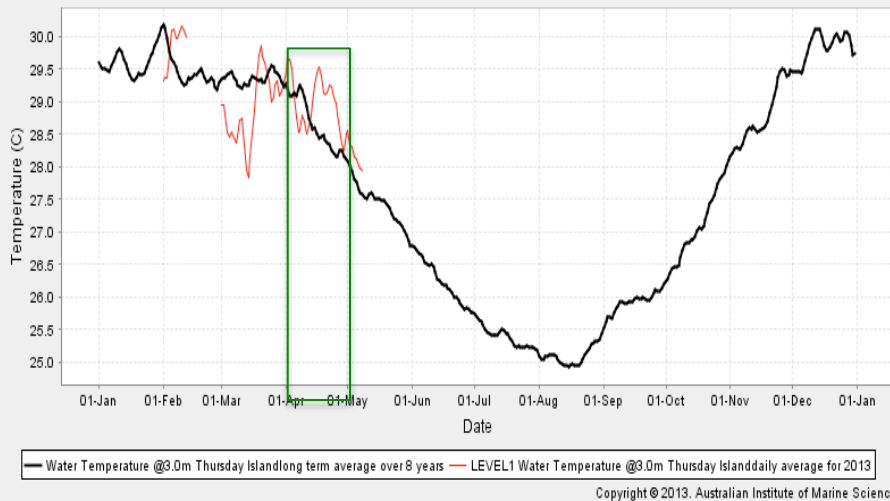
Potential Stress Level: Watch Warning Alert Level 1 Alert Level 2

Note:

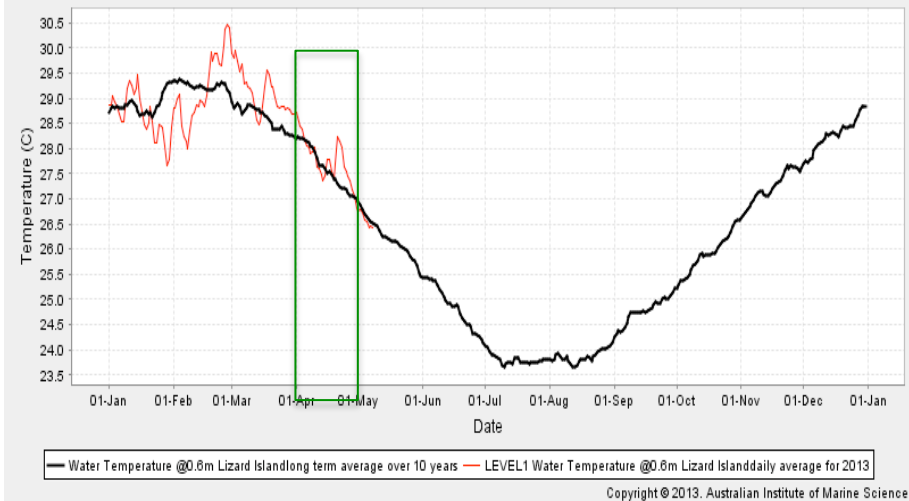
- The CFS-based system predicts no probability of thermal stress events likely in the upcoming months.

Weather Observing System: AIMS Data Centre

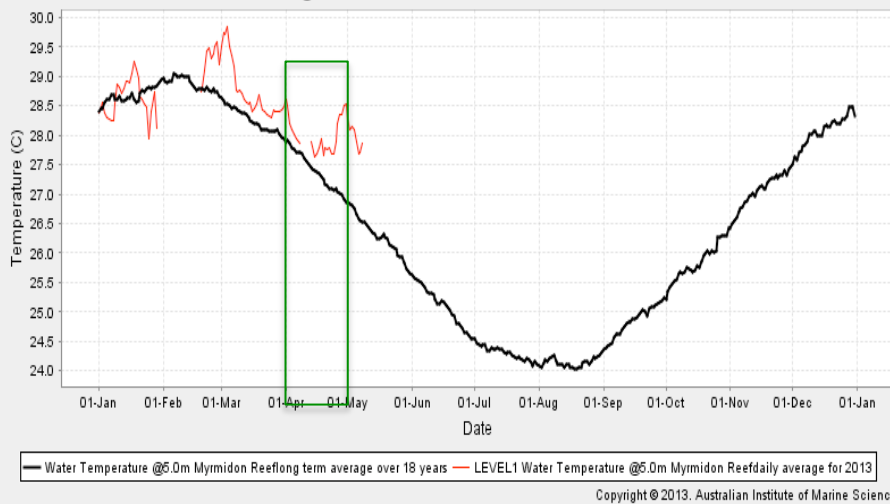
Water temperature @3.0m Thursday Island Weather Station trend against longterm average



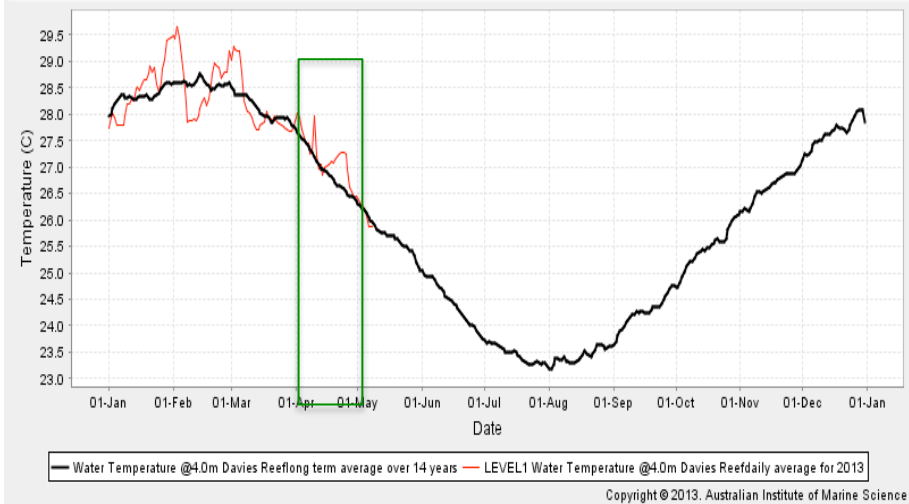
Water temperature @0.6m Lizard Island sensor float trend against longterm average



Water temperature @5.0m Myrmidon sensor float trend against longterm average



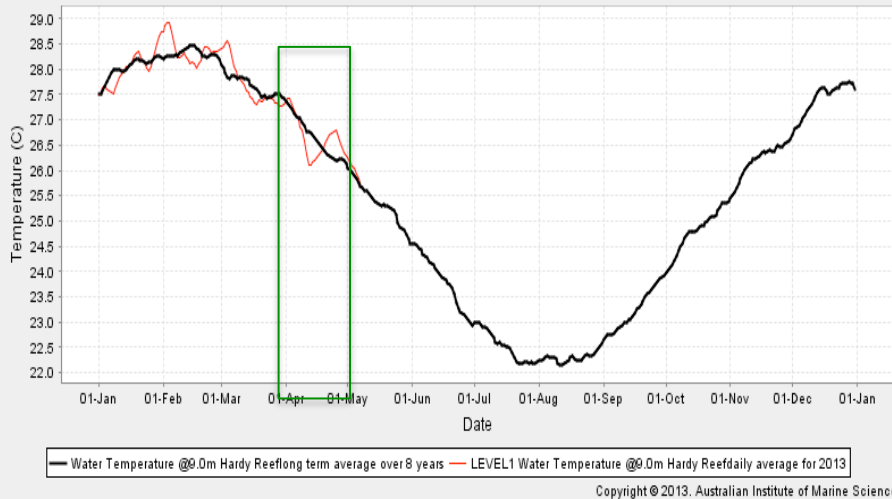
Water temperature @4.0m Davies Reef platform trend against longterm average



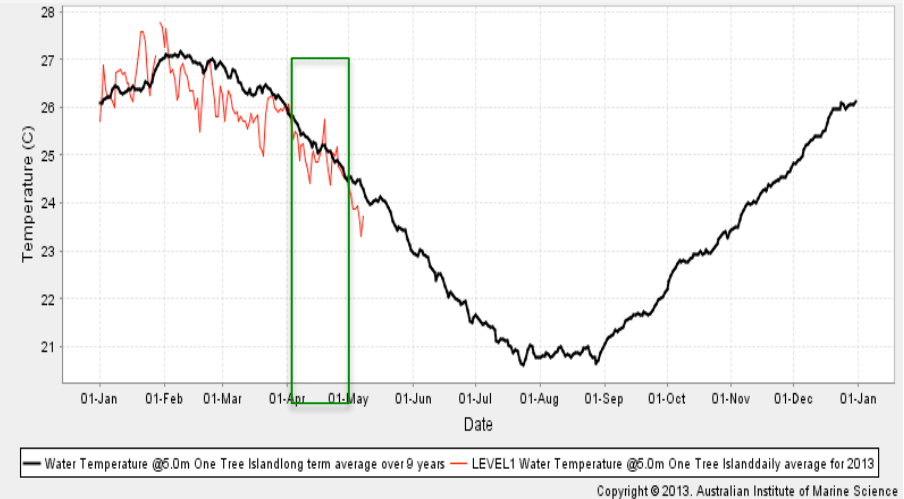
- AIMS weather stations showed ocean temperatures close to longterm mean for most of the stations during April, with the exception of Thursday Island (in the Torres Strait) and Myrmidon Reef, which showed values over the longterm mean.

Weather Observing System: AIMS Data Centre

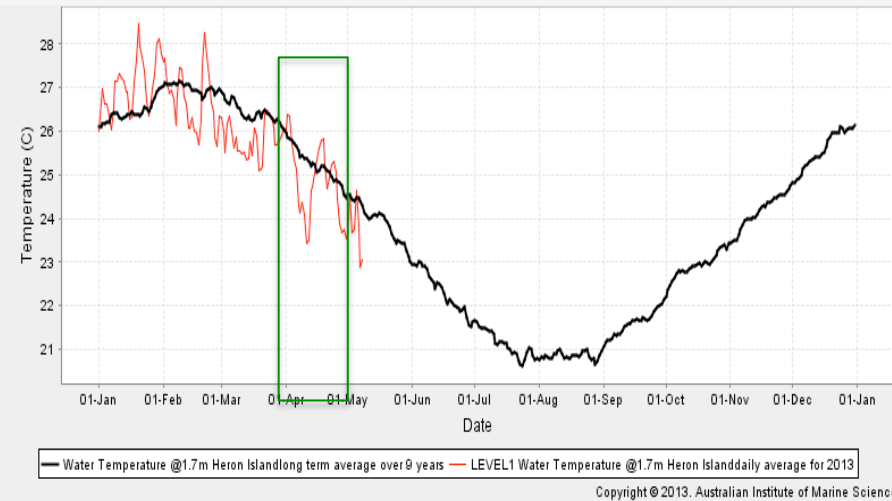
Water temperature @9.0m Hardy Reef platform trend against longterm average



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



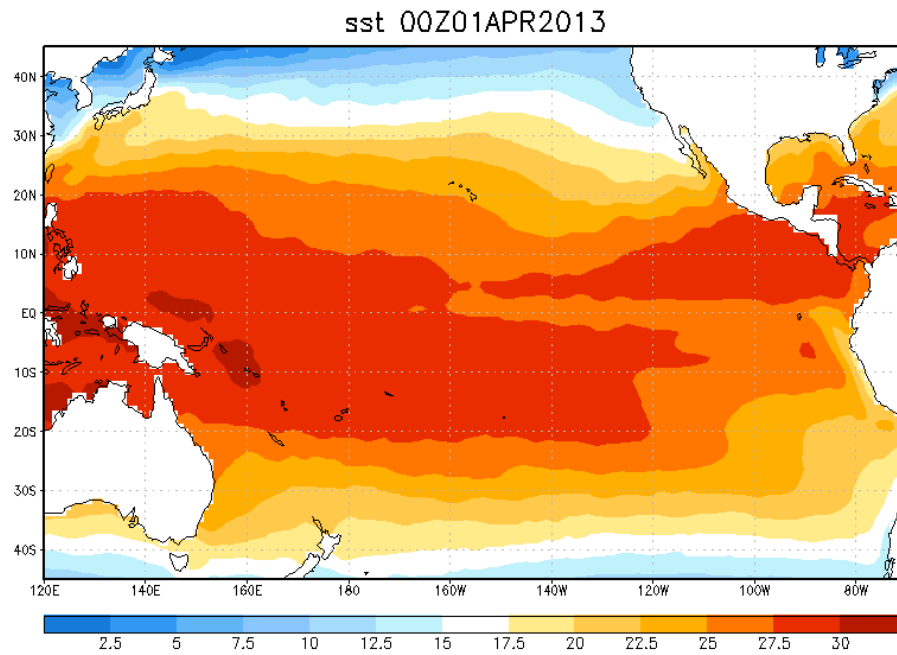
Water temperature @1.7m Heron Island Relay Pole trend against longterm average



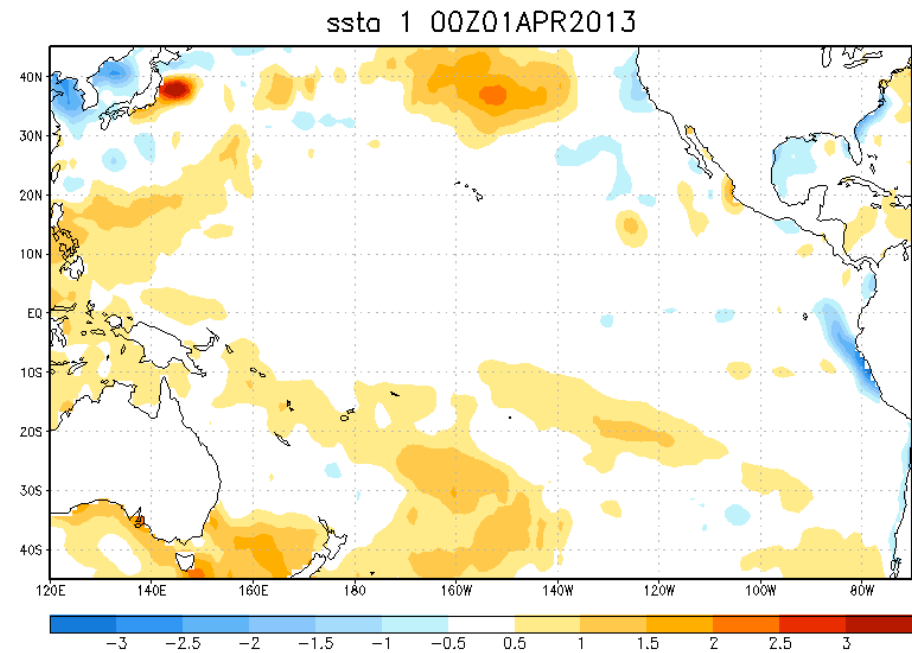
- The AIMS weather stations located on the southern GBR showed temperatures close to the longterm mean during April, coincident with the MODIS data.

NOAA Optimum Interpolation Sea Surface Temperature Analysis:

OI SST: APRIL 2013



OI SST ANOMALY: APRIL 2013



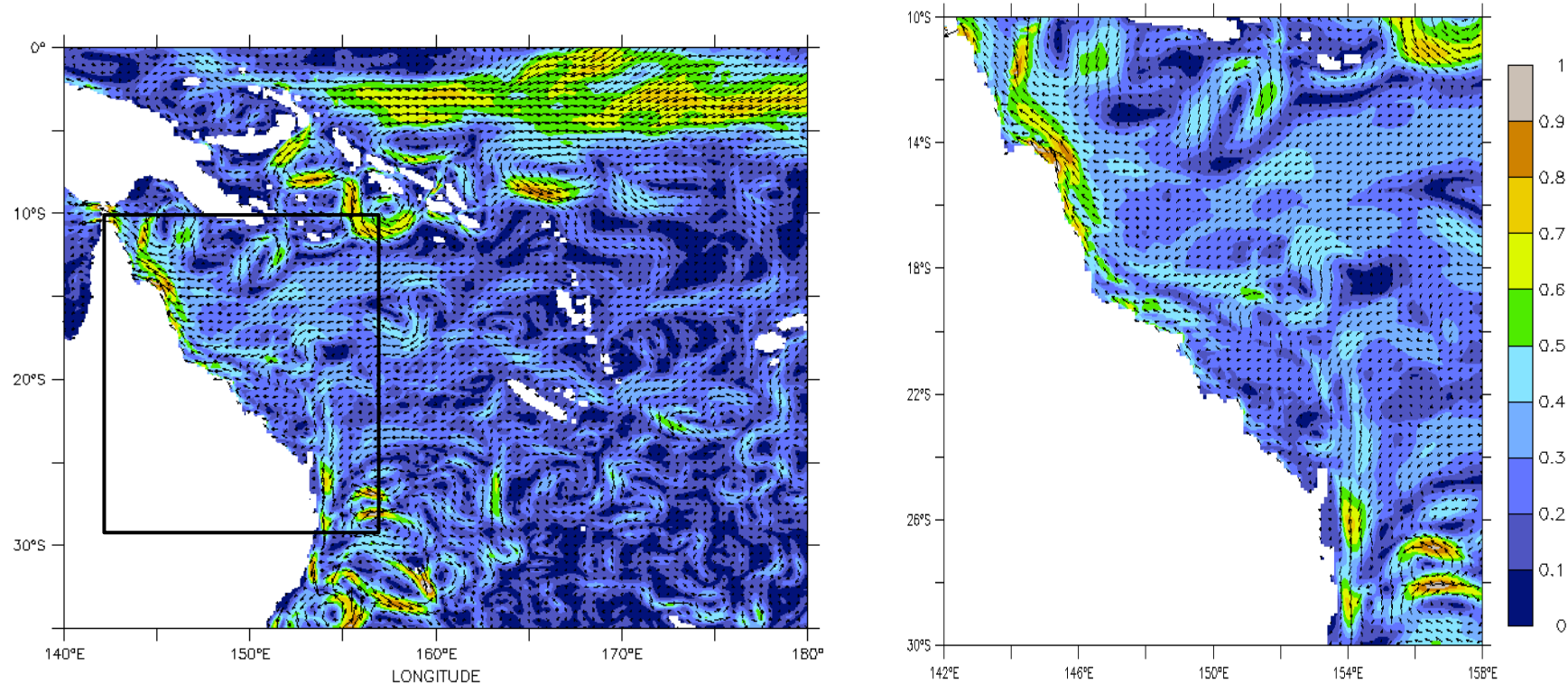
Note:

- Mostly average temperatures for the equatorial Pacific continued during April, corresponding with a neutral phase of ENSO.

OceanMAPS 15m Depth-Average Currents

April 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.

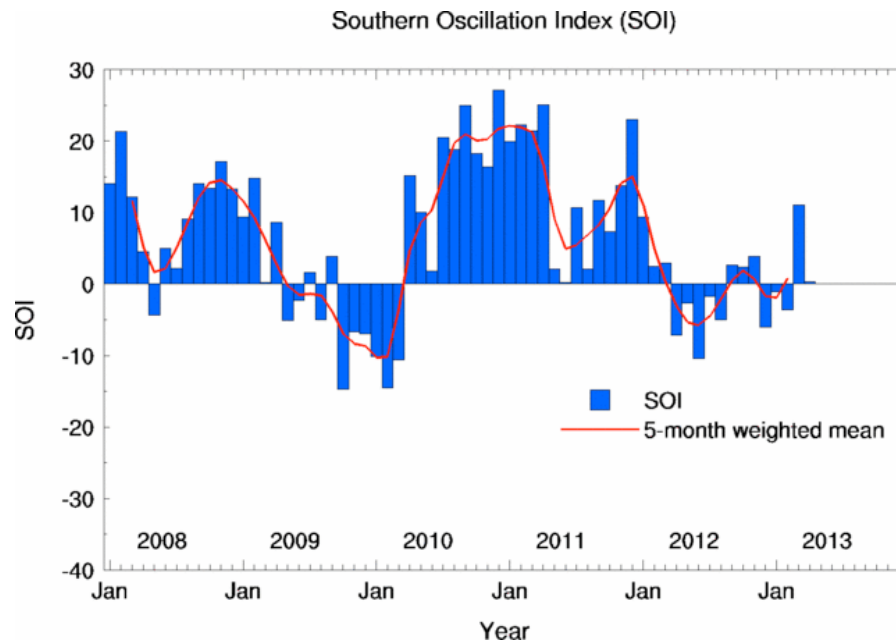


Behind Real Time analysis
15 m Depth-Averaged Currents (m/s).

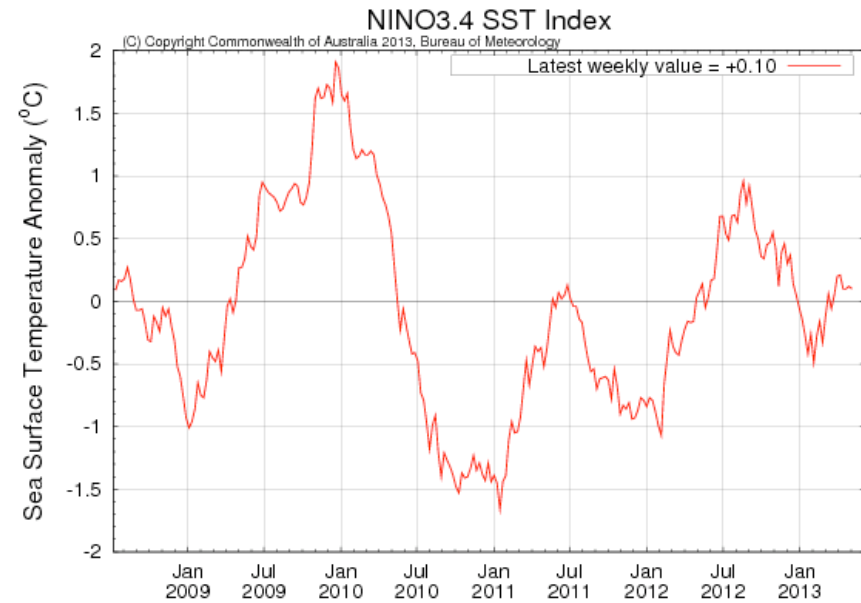
Note:

- Weak East Australian Current (EAC) along the GBR and strong northward flow visible north of ~17°S, due to the seasonality of the EAC and prevalence of strong Southeasterly winds during April.
- Clear signal for the Gulf of Papua Gyre.

ENSO index



Negative SOI = El Niño



Positive Nino 3.4 index= El Niño

Note:

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