# NERP

## Torres Strait / GBR environmental conditions report:

### Recent status and predictions

9th August 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 average SST prevalent over the entire GBR and Torres Strait areas during June and July

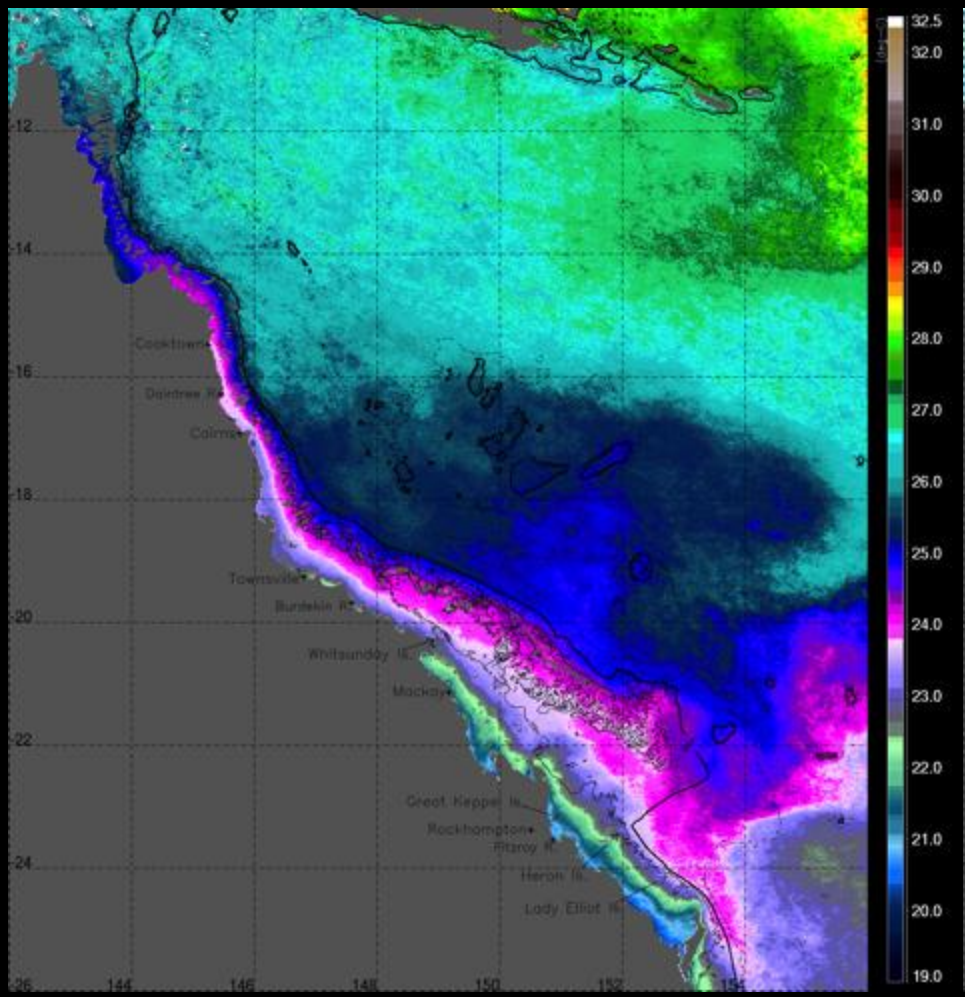
- MODIS Chlorophyll-a concentrations and Photic Depth products showing neutral conditions over the GBR and Torres Strait areas and a strong signal of the PNG Gyre.

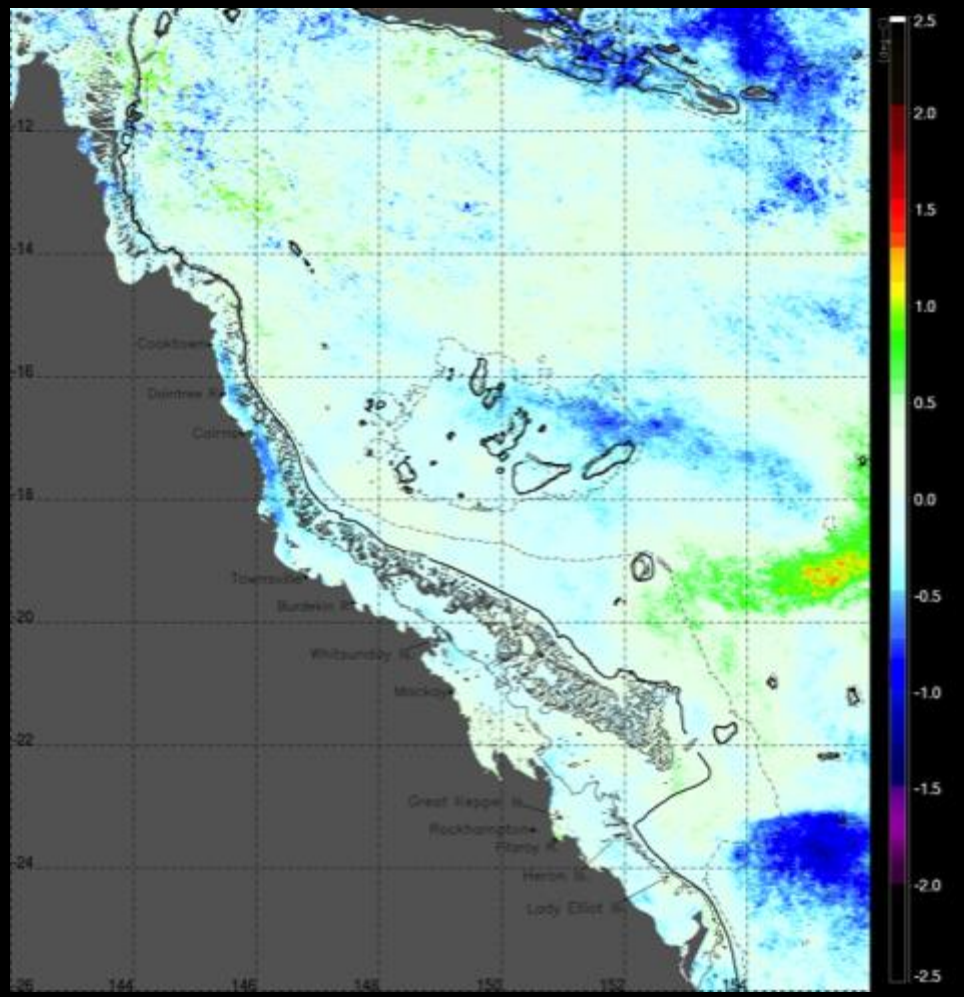
- Forecast of close to average SST along the GBR and Torres Strait and no bleaching alerts for the upcoming months.

- OceanMAPS product showing a strong South Equatorial Current inflow that feeds the North Queensland Current and the PNG Gyre.

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

# MODIS sea surface temperature (day+night) June 2013

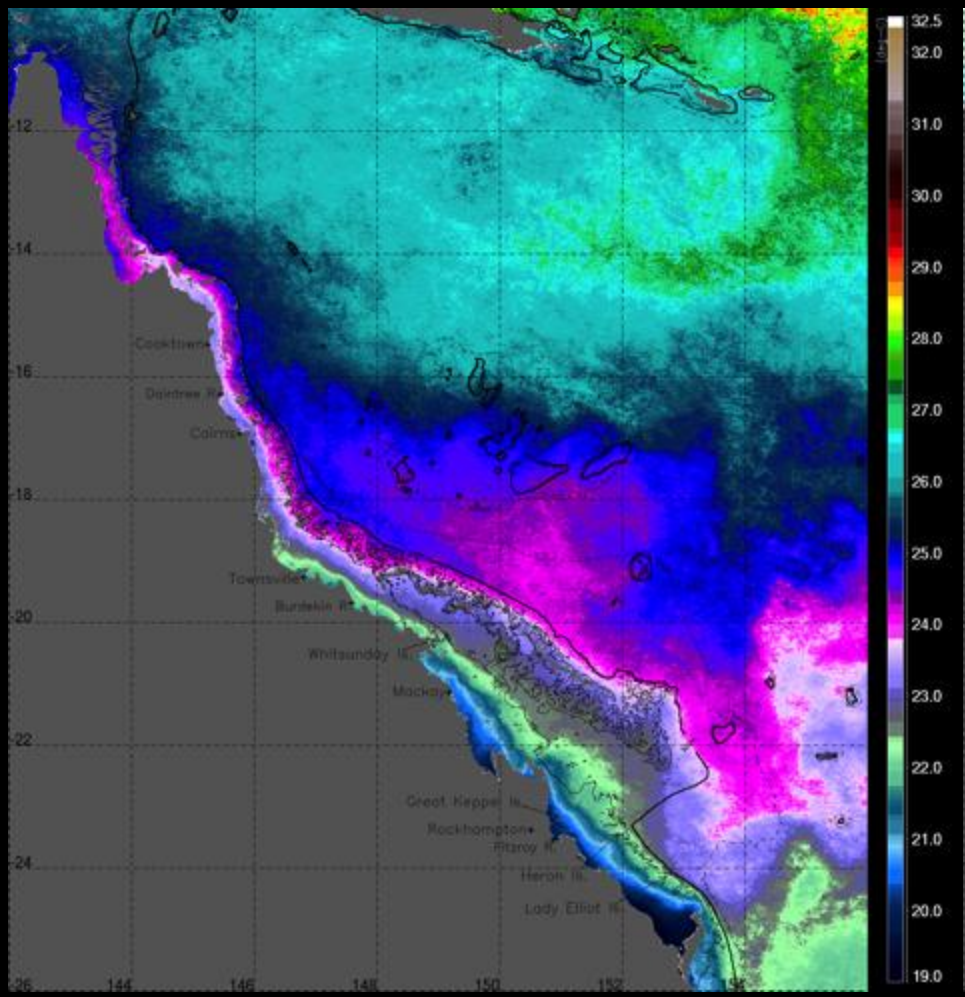


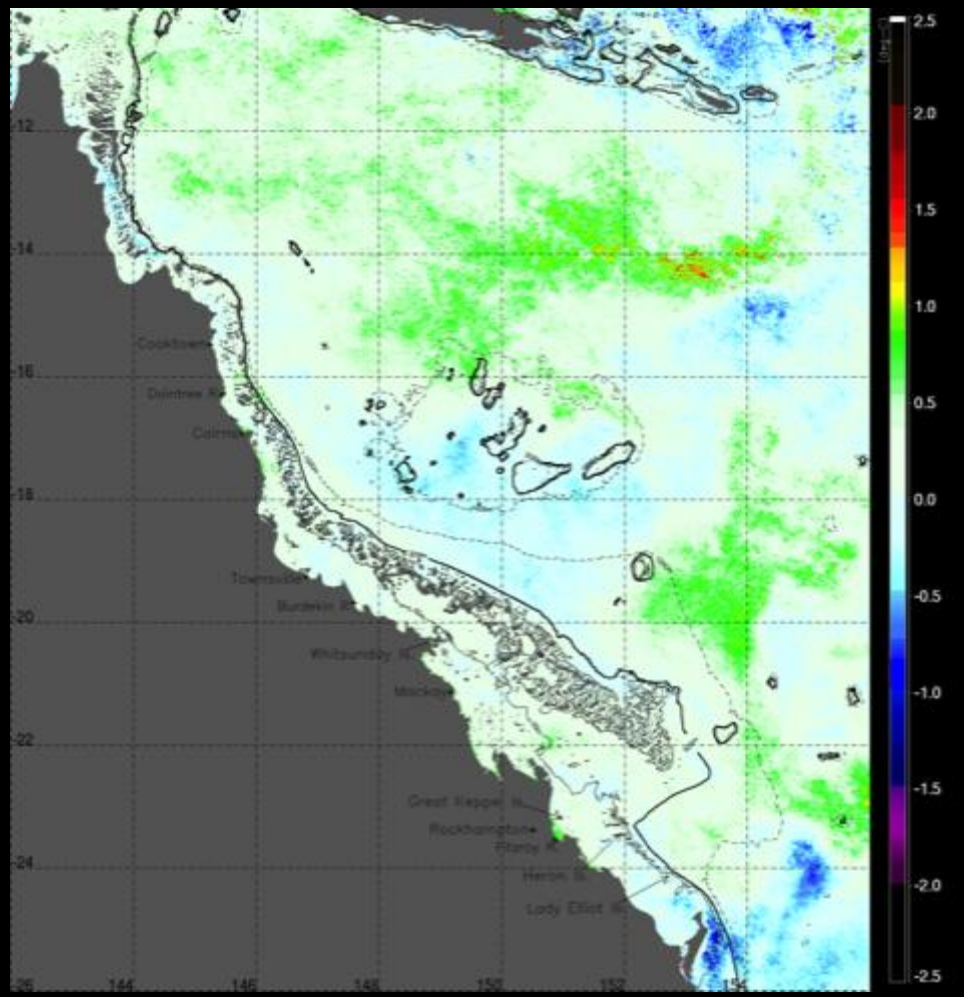




Note:

- Slightly negative SST anomalies to neutral conditions along the length of the GBR during June.

# MODIS sea surface temperature (day+night) July 2013

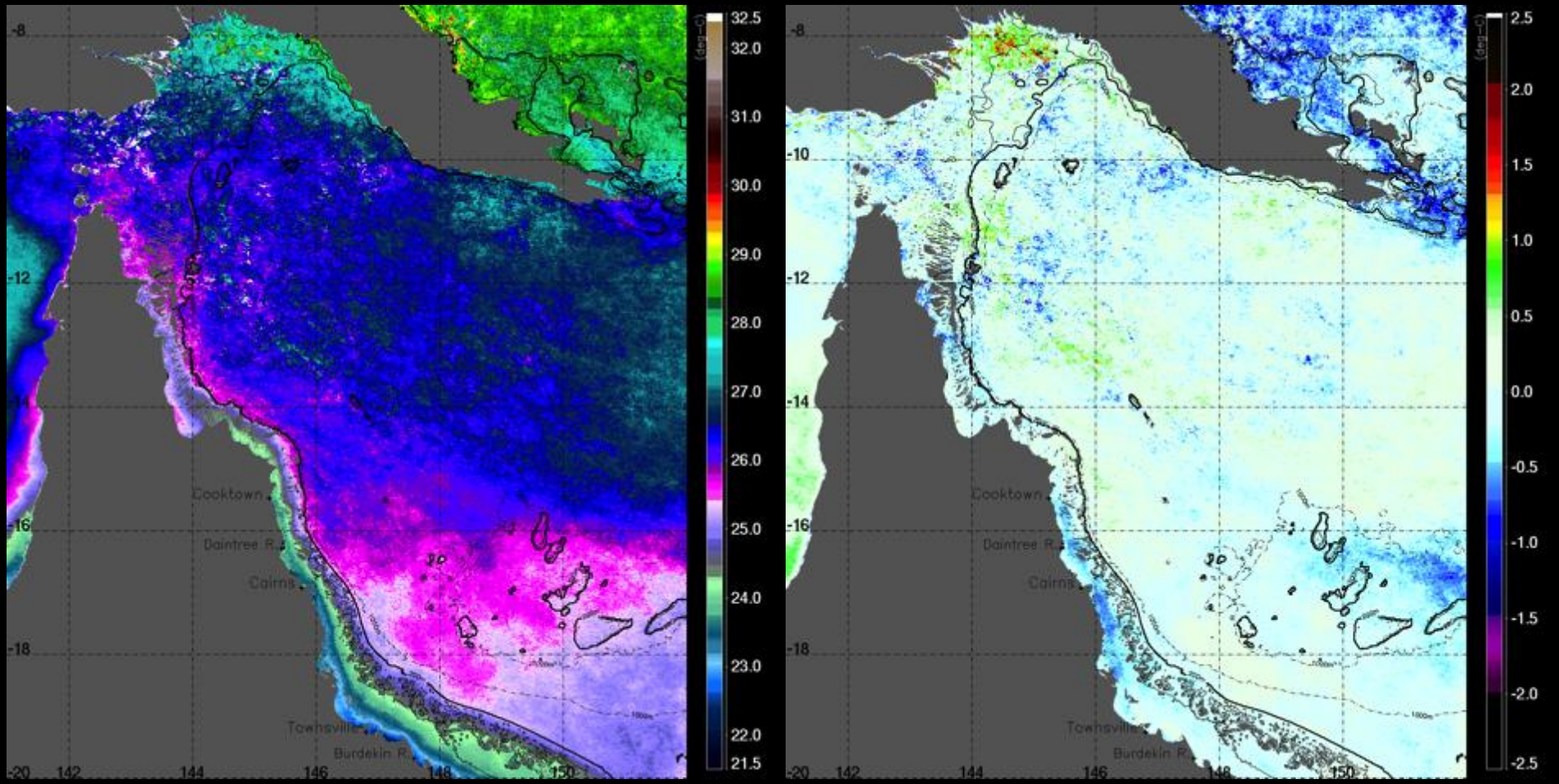



**Note:**

- Neutral SST conditions continued during July along the length of the GBR..

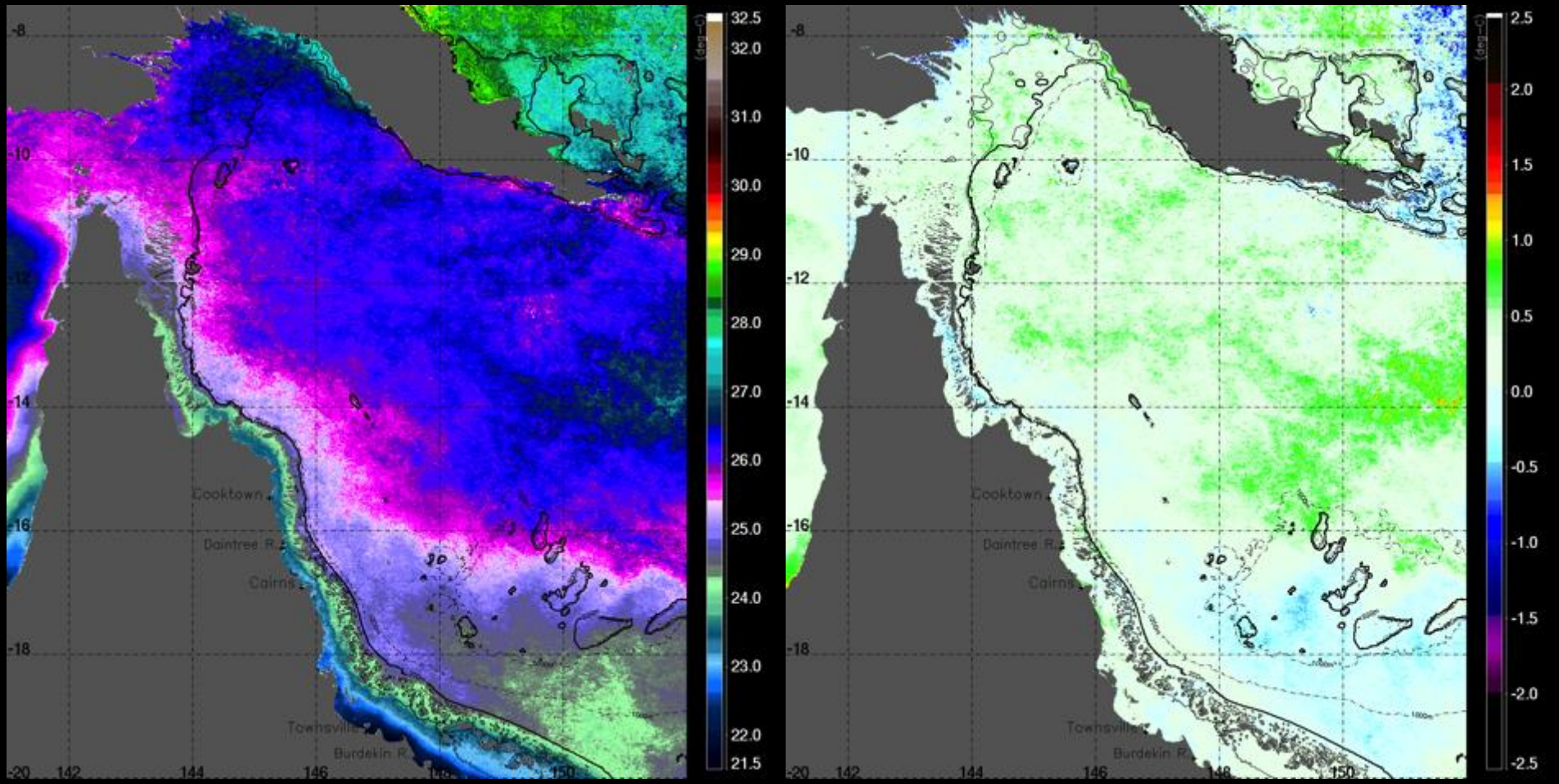
# Torres Strait / far northern GBR
# MODIS sea surface temperature (day+night)
# June 2013




**Note:**

- The Torres Strait and far northern GBR show mostly neutral SST conditions during June.

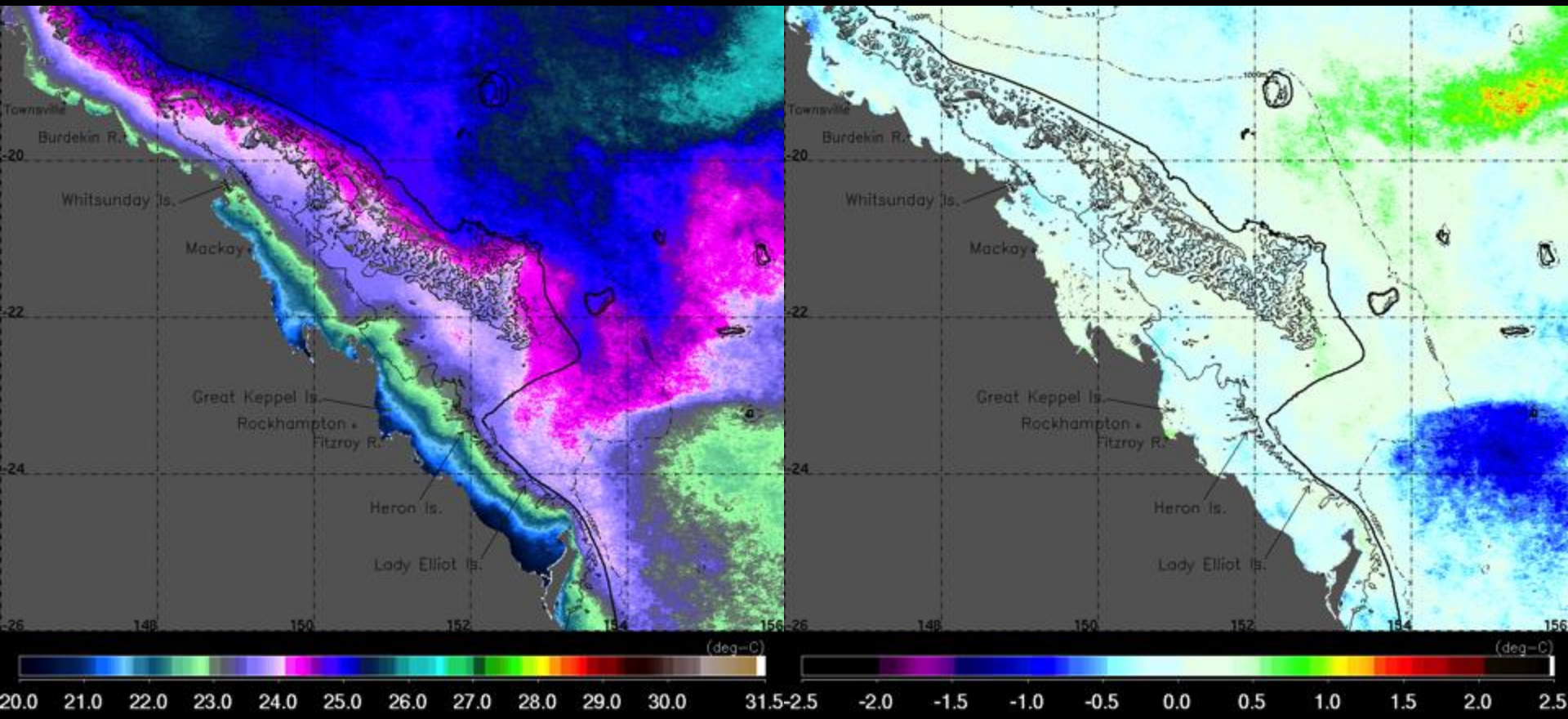
# Torres Strait / far northern GBR
# MODIS sea surface temperature (day+night)
# July 2013




**Note:**

- Neutral SST conditions continued during July.

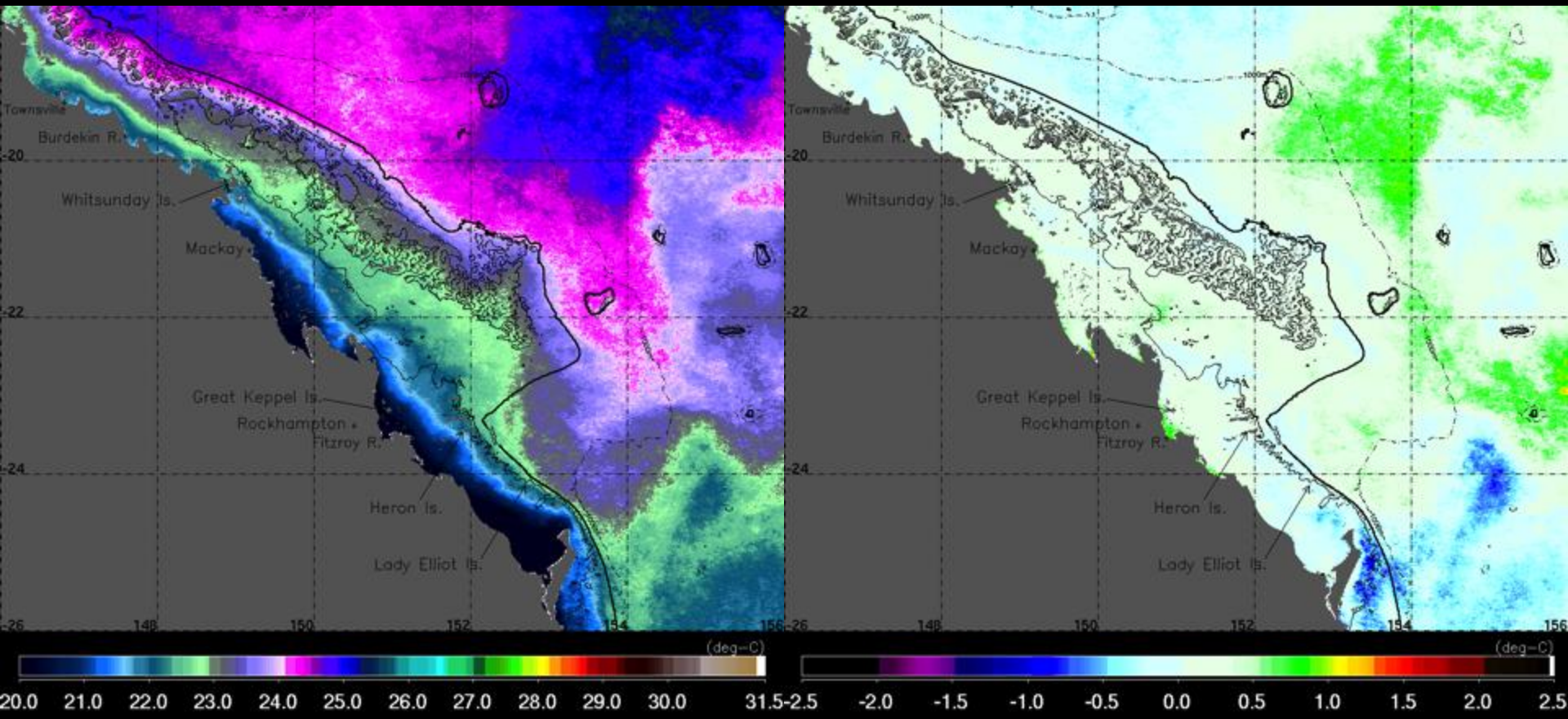
# Southern GBR
# MODIS sea surface temperature (day+night)
# June 2013




**Note:**

- **M**ostly neutral SST conditions along the southern GBR during June.

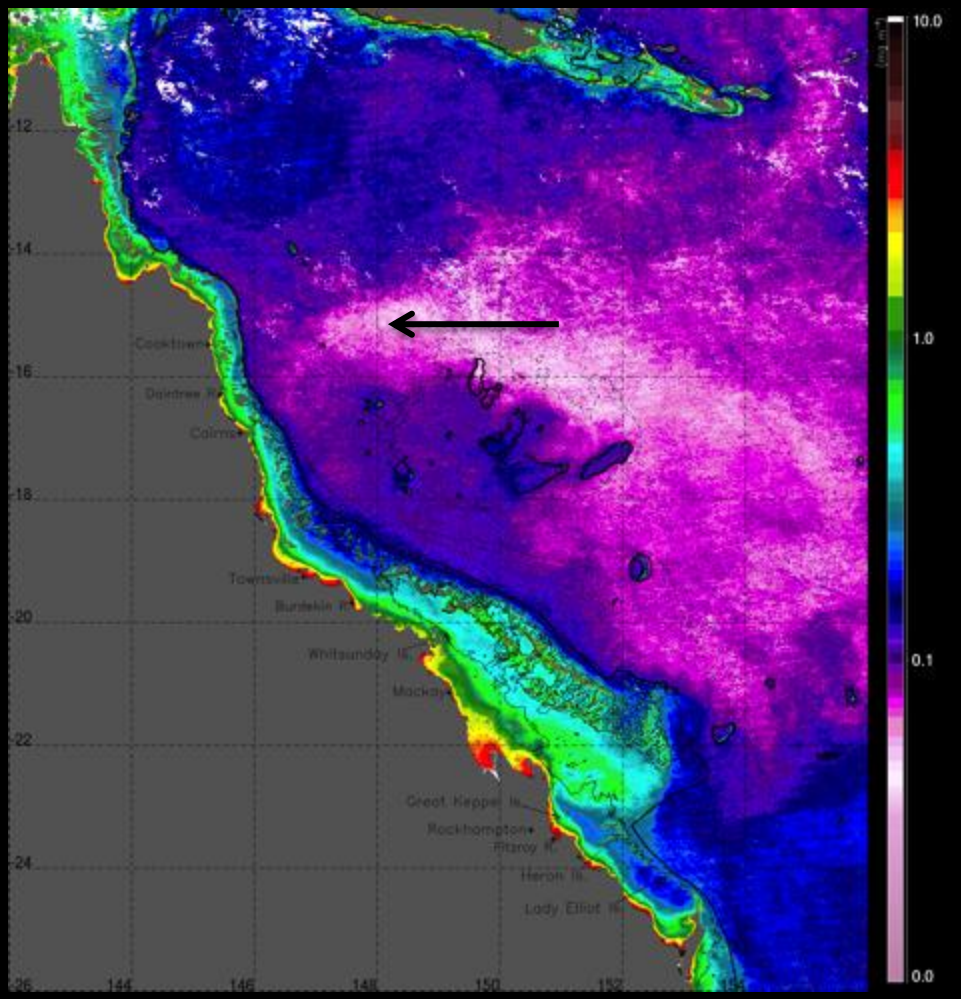
# Southern GBR
# MODIS sea surface temperature (day+night)
# July 2013

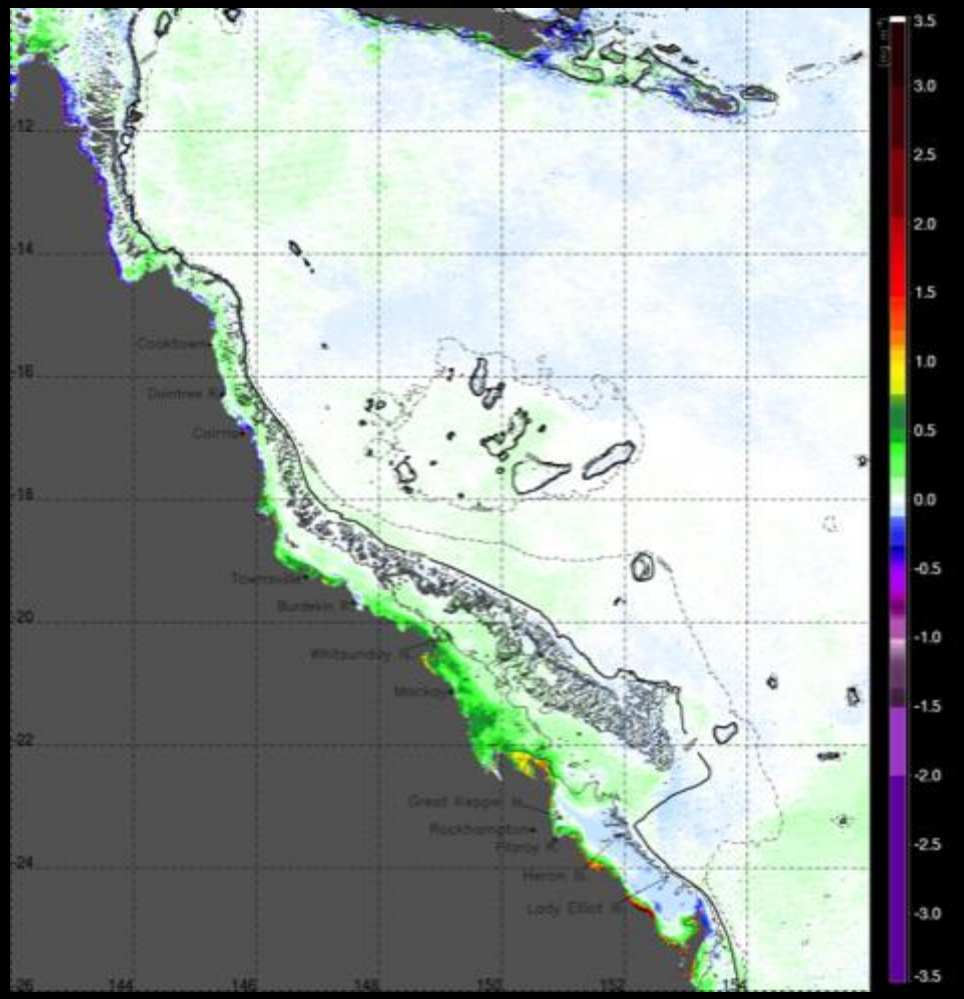



**Note:**

- Neutral SST conditions continued during July.

# MODIS Chlorophyll-*a* concentration June 2013

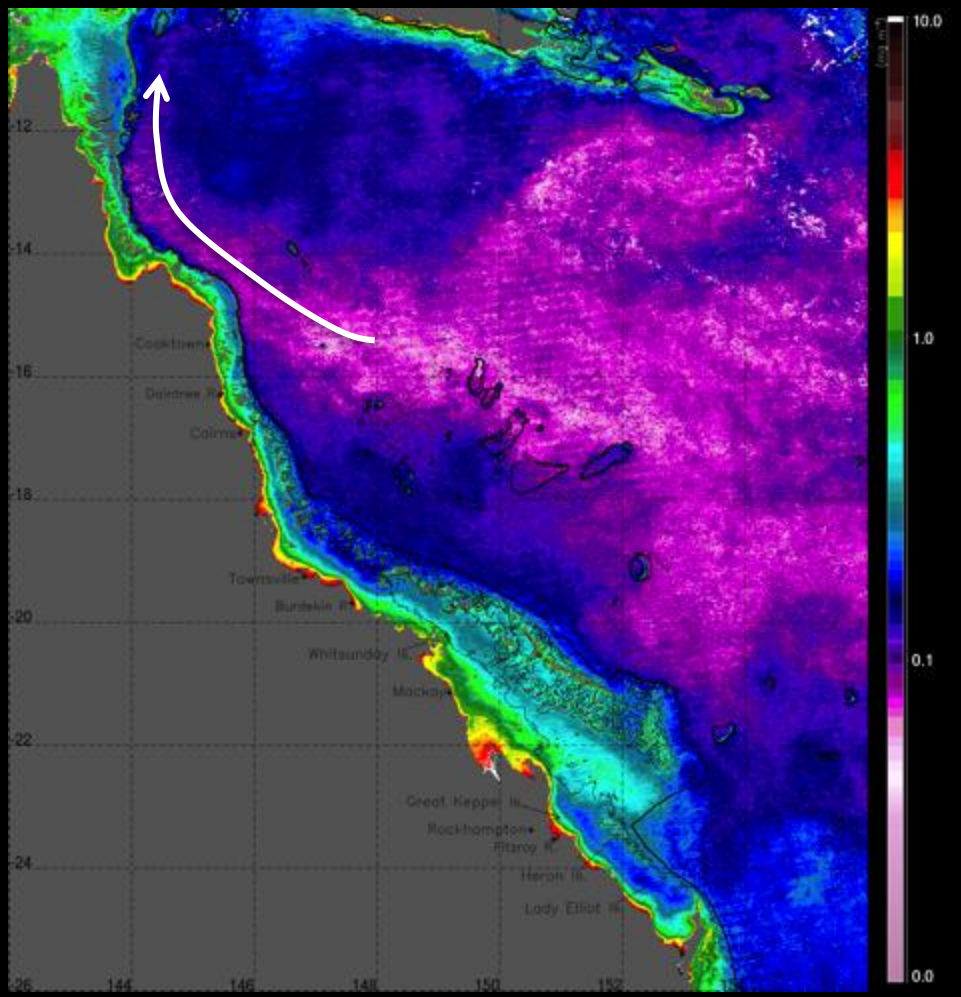


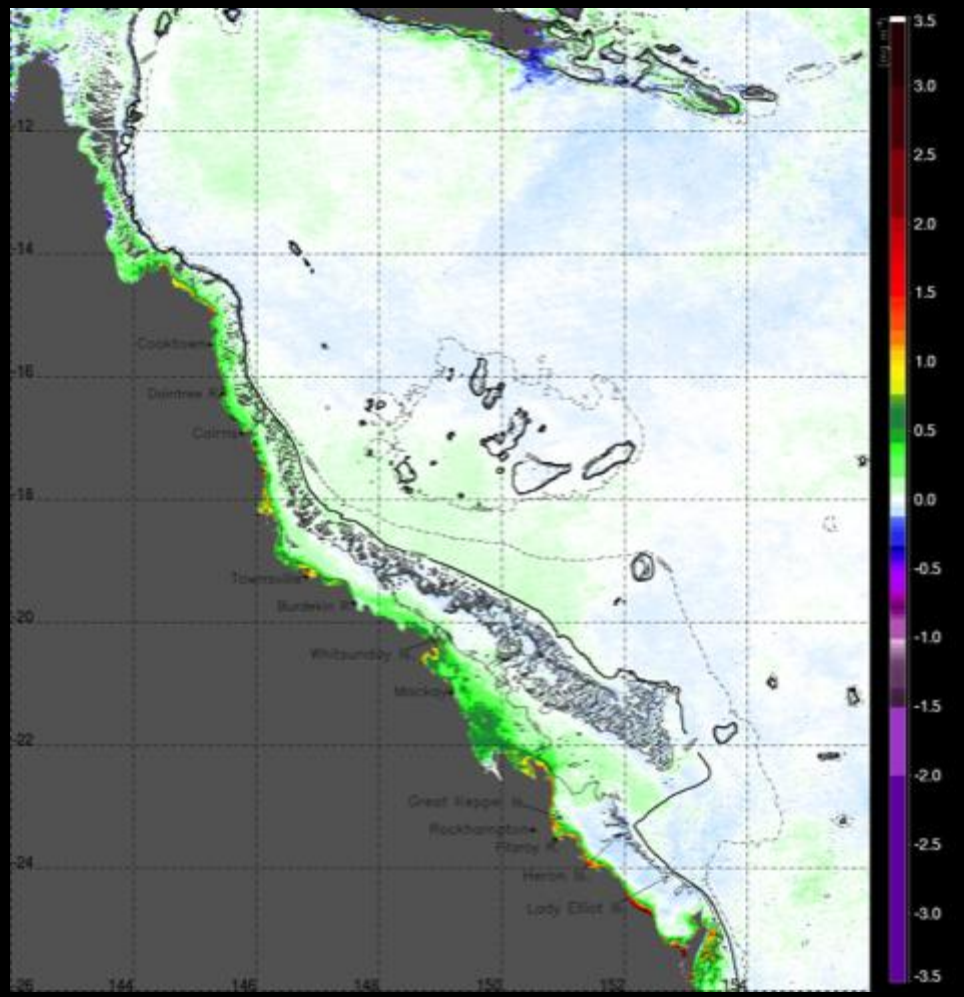




**Note:**

- Chlorophyll-a values showed mostly average conditions during June along the length of the GBR.
- Strong South Equatorial Current signal apparent as low chlorophyll-a concentration waters (black arrow) with the main jet reaching the shelf around 15°S.

# MODIS Chlorophyll-*a* concentration July 2013

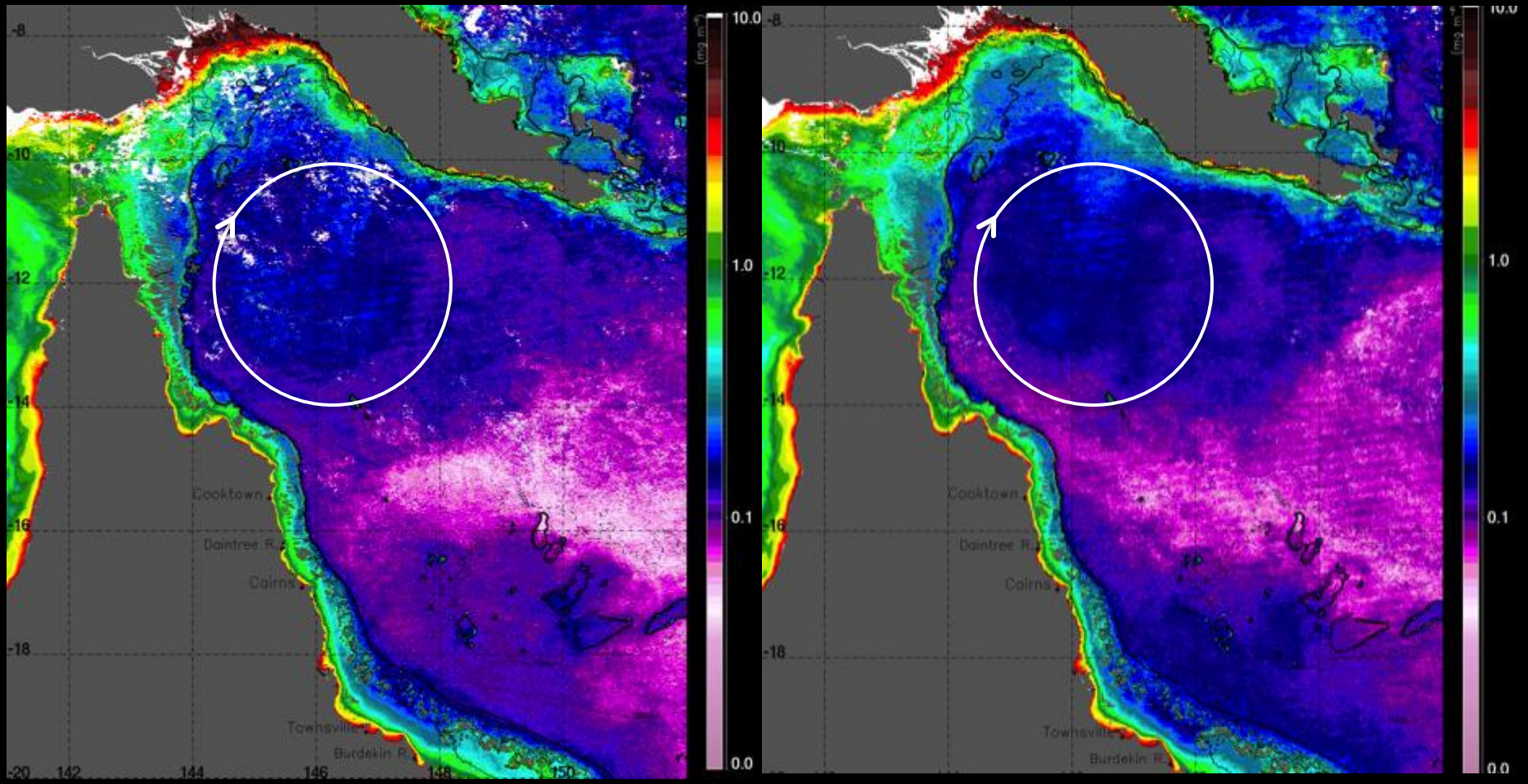



**Note:**

- Chlorophyll-a values mostly average during July but with slightly higher positive anomalies along the coast.
- Strong North Queensland Current signal (white arrow) flowing northward along the shelf.

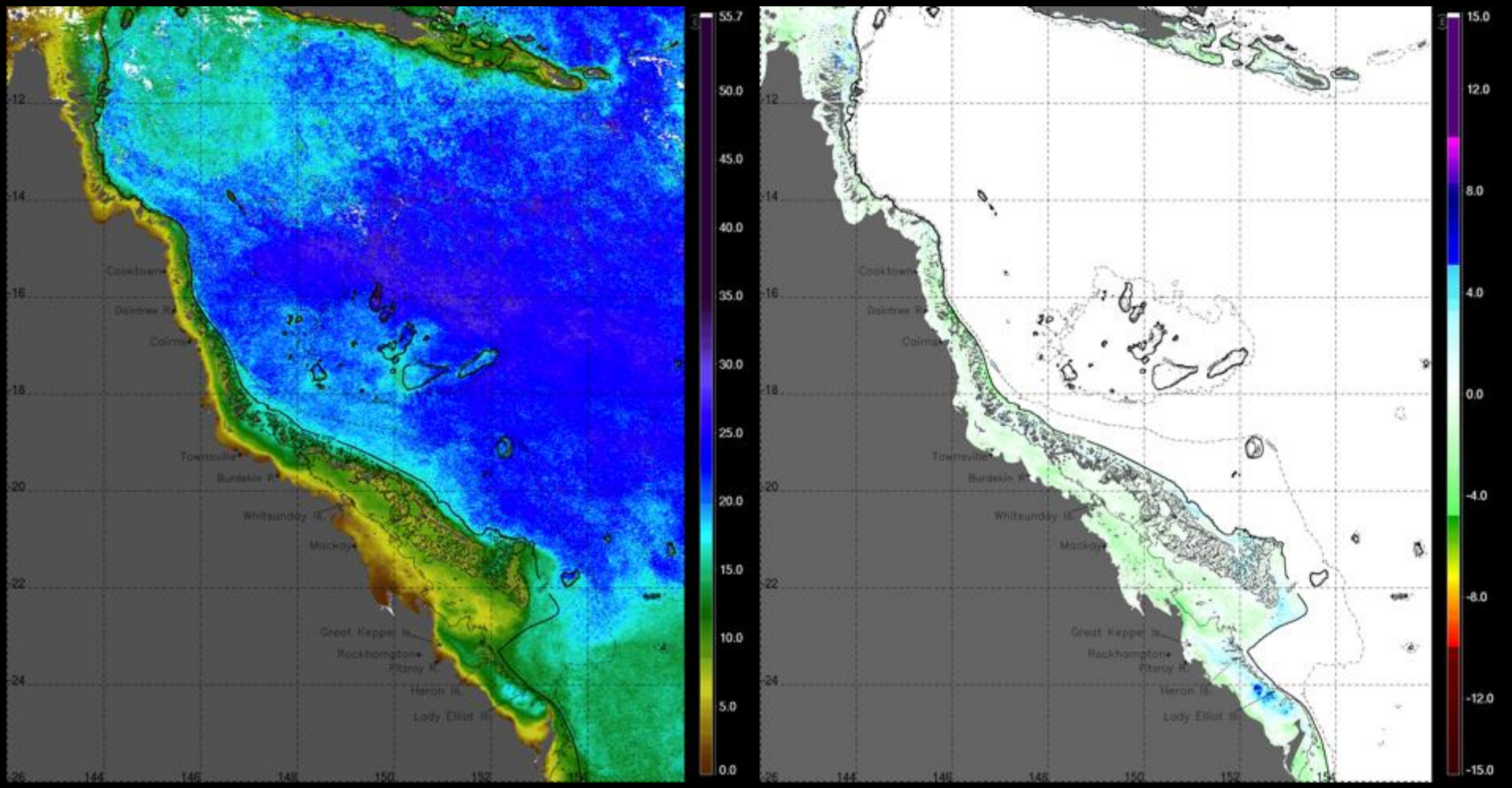
# Torres Strait / far northern GBR
# MODIS chlorophyll-*a* concentration
# June-July 2013




**Note:**

- Strong signal of the PNG gyre, especially marked during July. The low chlorophyll-a waters from the South Equatorial Current turning northwards along the GBR (known as the North Queensland Current) feed the PNG gyre.

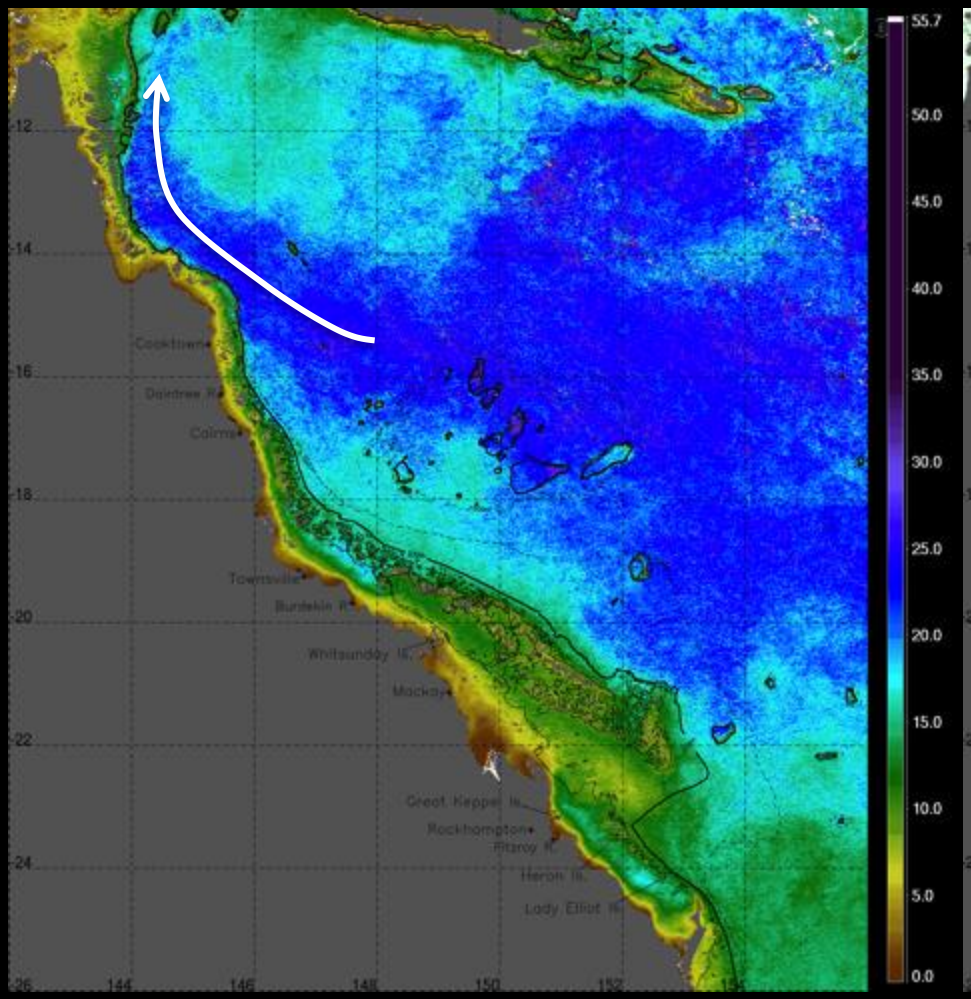
# MODIS 10% Photic Depth
# June 2013

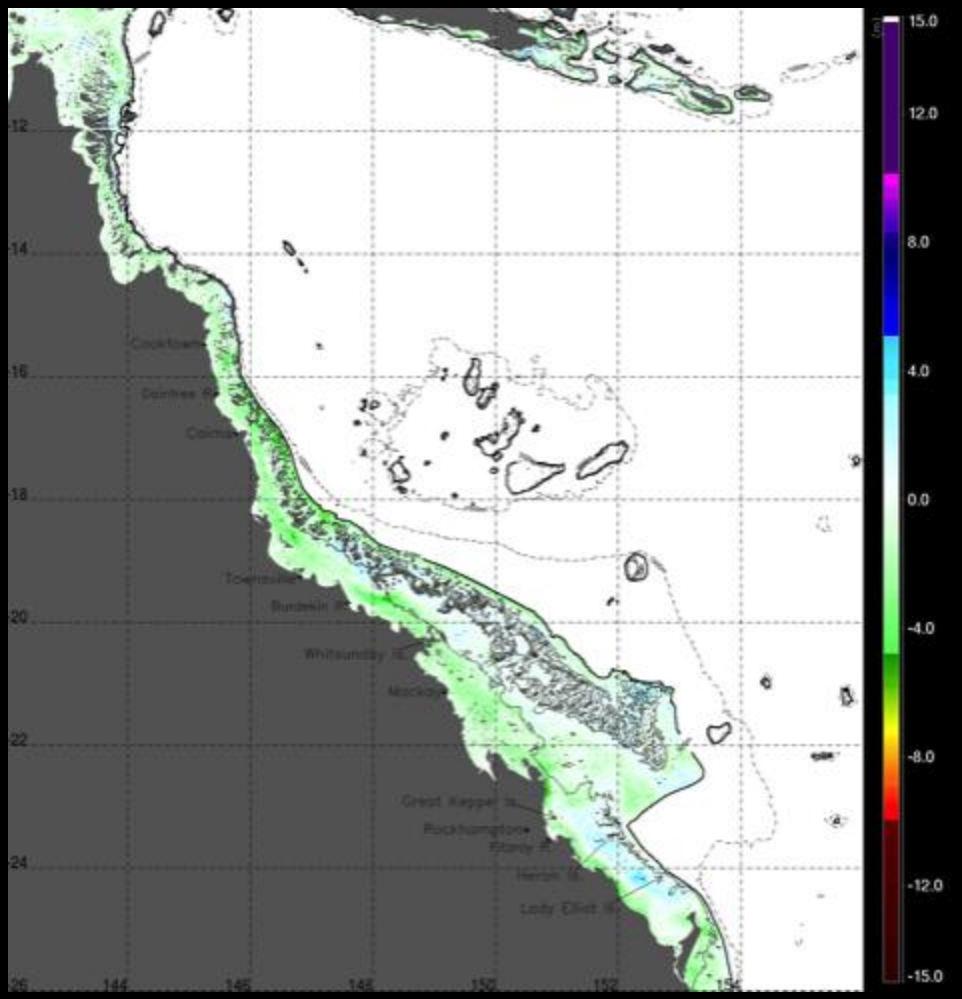



**Note:**

- Satellite derived 10% photic depth product showed average conditions along the GBR during June.
- Strong PNG gyre signal clearly apparent on the Gulf of Papua.

# MODIS 10% Photic Depth
# July 2013

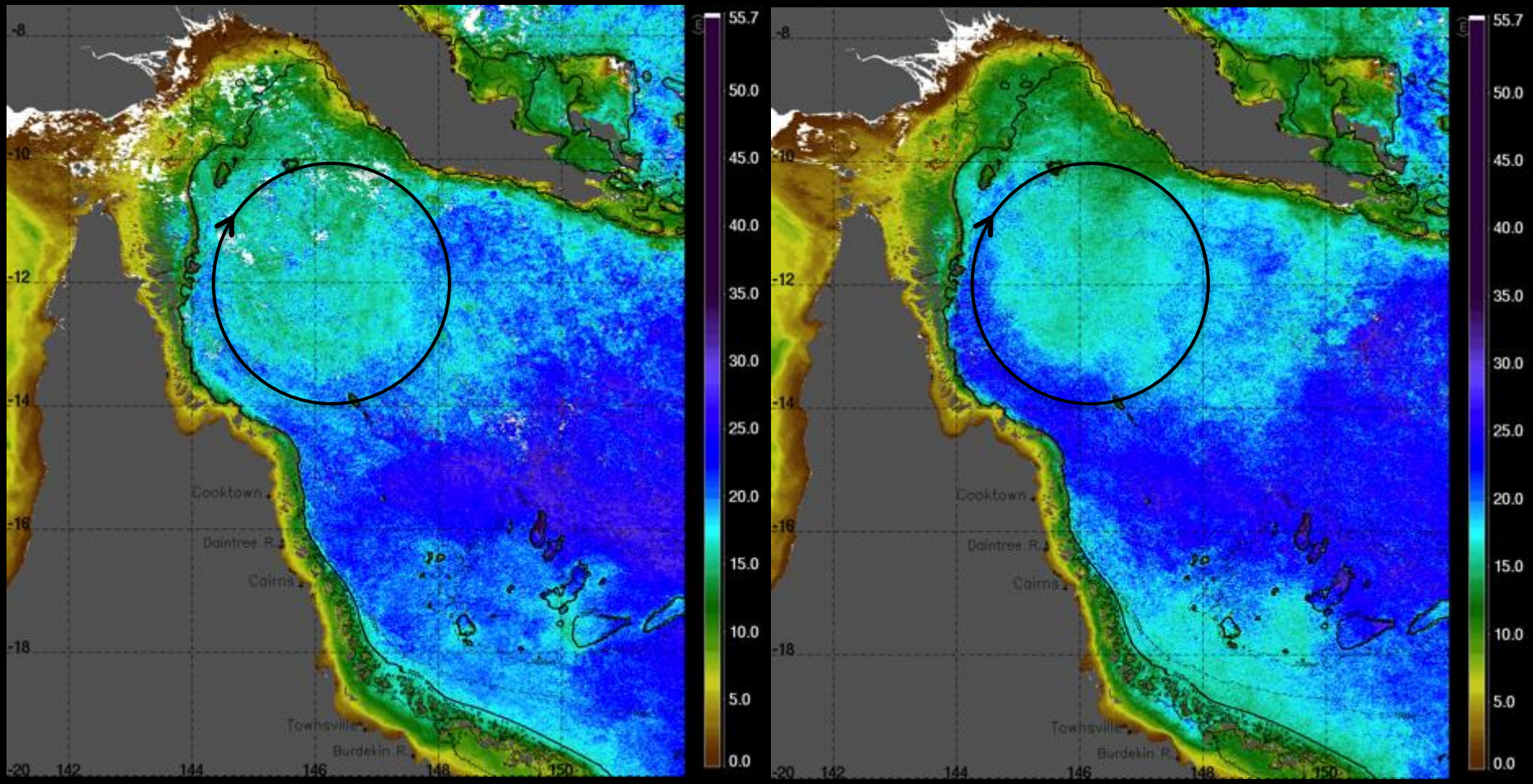



**Note:**

- Average conditions along the GBR continued during July.
- Strong PNG gyre signal clearly apparent on the Gulf of Papua.

# Torres Strait / far northern GBR
# MODIS 10% photic depth
# June-July 2013



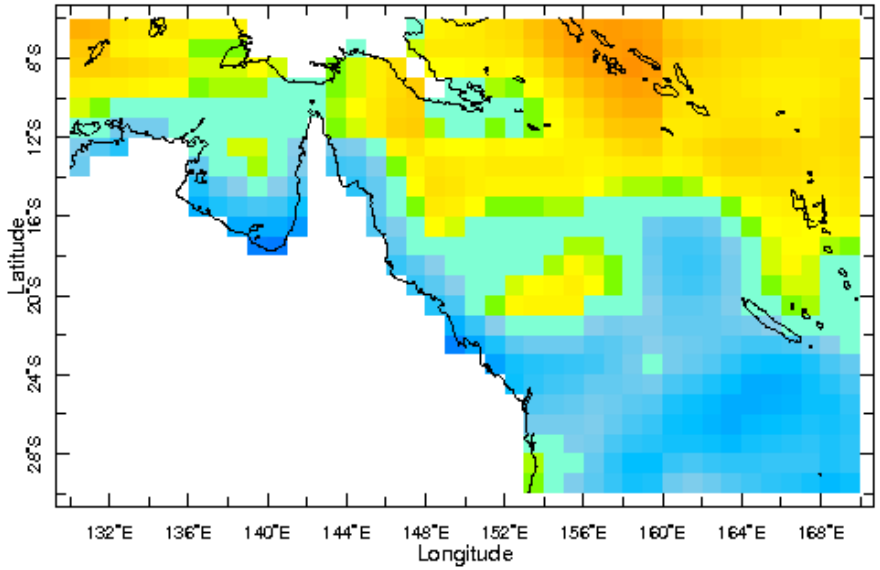

**Note:**

- Strong signal of the westward flowing South Equatorial Current (high clarity waters) that turns northwards as it encounters the GBR, feeding the North Queensland Current and subsequently the PNG gyre.

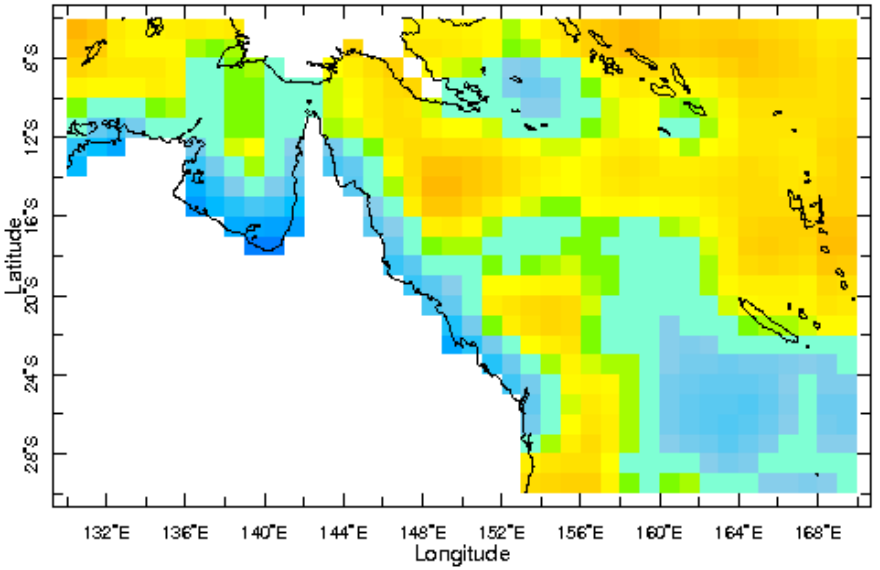
# Sea Surface Temperature Anomaly

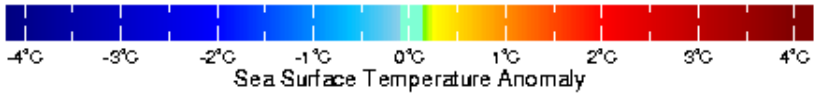
## from NOAA NCEP EMC CMB GLOBAL Reyn_SmithOIv2

June 2013




July 2013



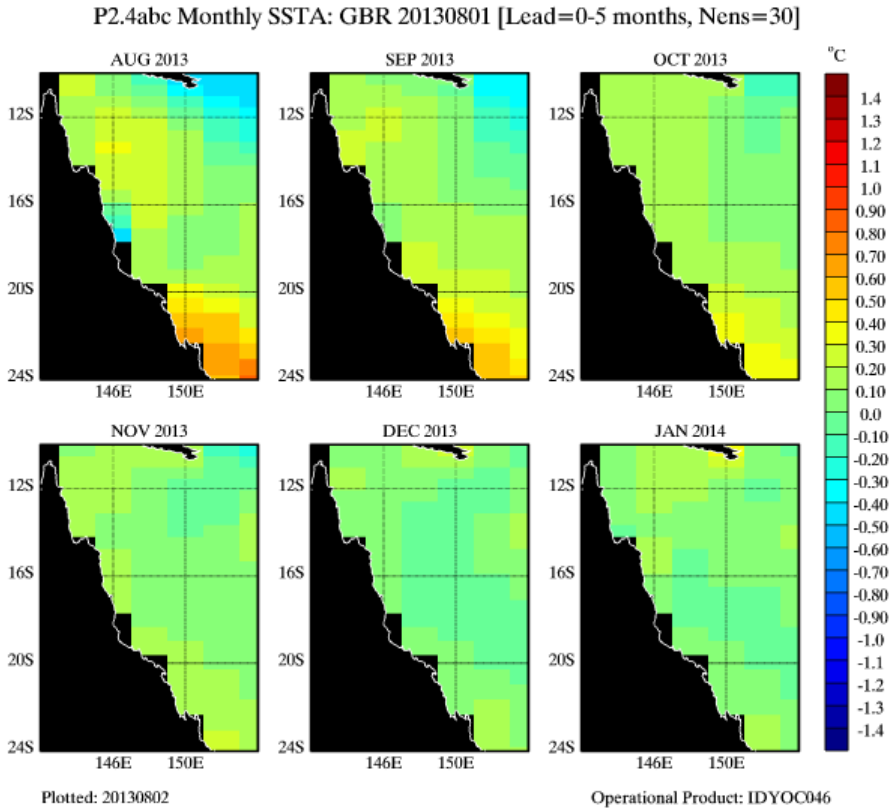

Note:

- Mostly neutral/slightly negative SST anomaly conditions are also shown by the Reynolds SST anomaly data.

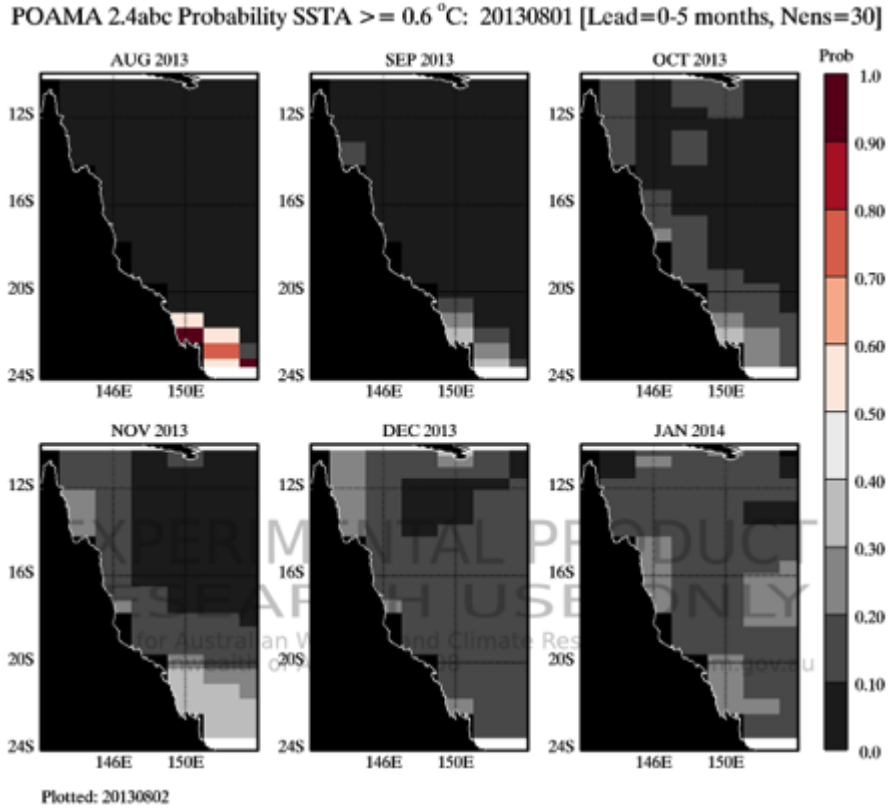
http://iridl.ldeo.columbia.edu/SOURCES/.NOAA/.NCEP/.EMC/.CMB/.GLOBAL/.Reyn_SmithOIv2/

# 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:

- POAMA forecast still showing temperatures close to or slightly above average for the upcoming months. The probabilities of temperature anomalies exceeding 0.6°C remain low.

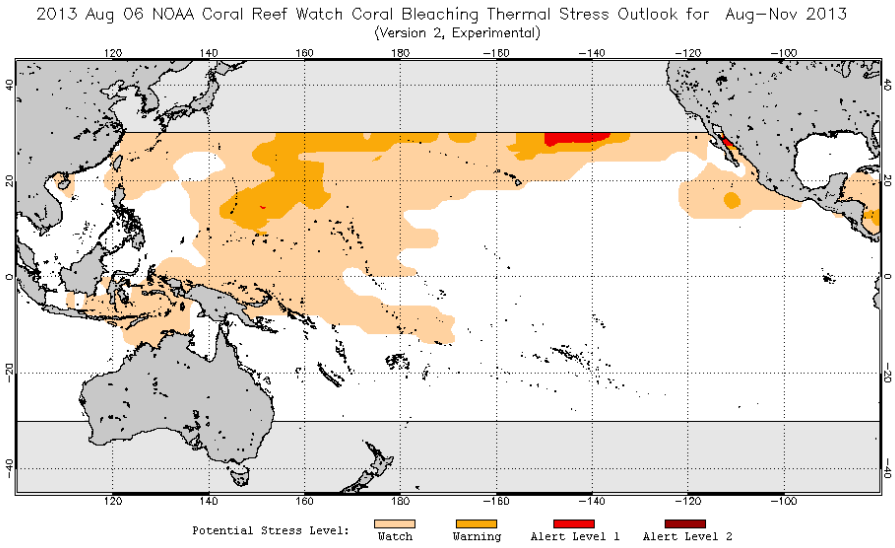
# NOAA Coral Reef Watch

## Seasonal coral bleaching thermal stress outlook

## August to November 2013

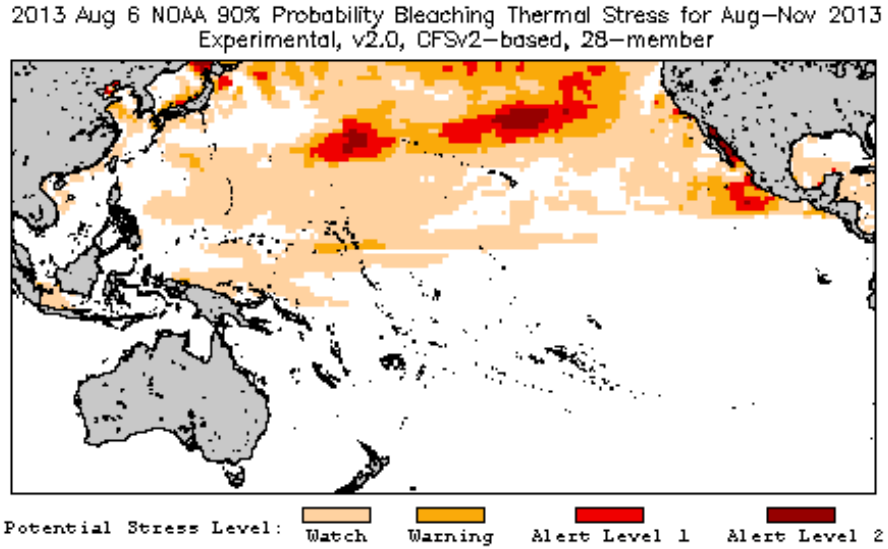
### LIM-based

Version 2, experimental, weekly 2x2 degree spatial resolution




### CFS-based

Version 2, experimental, weekly 1x1 degree spatial resolution (90% probability)

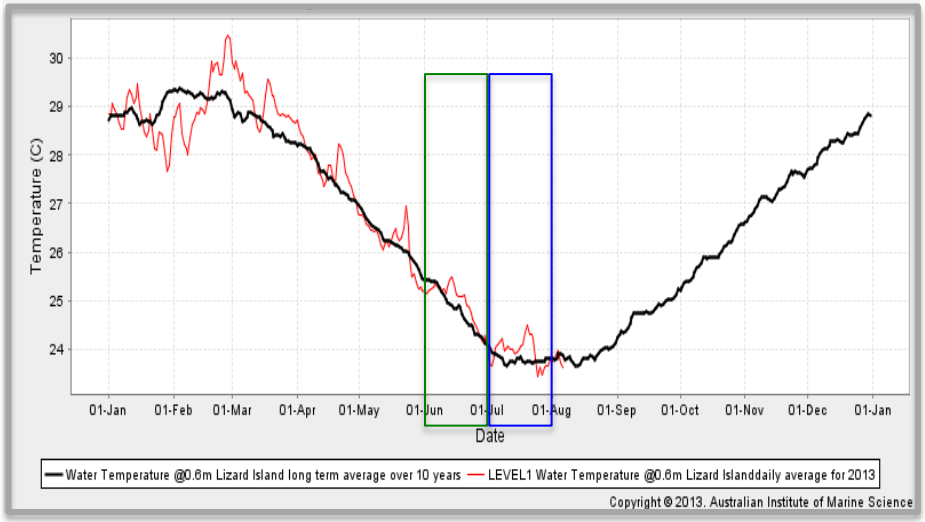



Note:

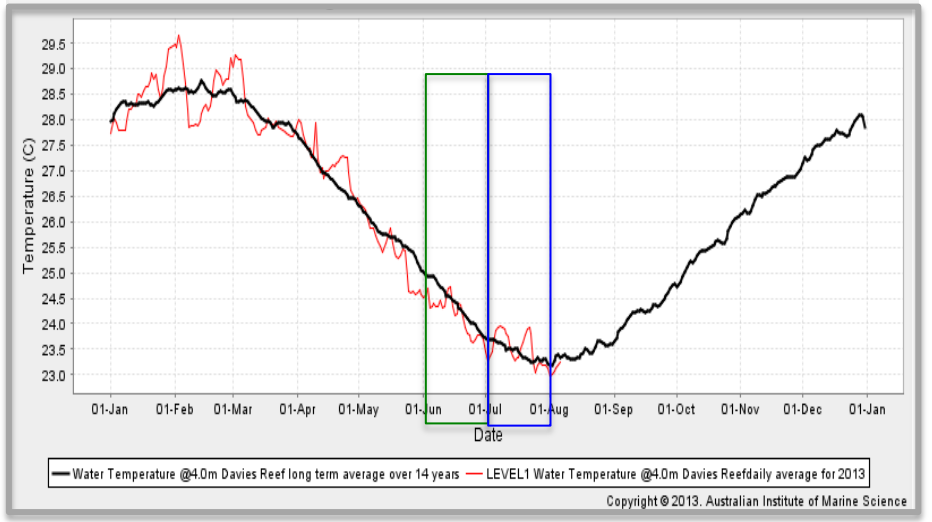
- Both NOAA CRW bleaching thermal stress outlooks show no bleaching alerts for the upcoming months (August to November).
- These outlooks are based on SST predictions from: 1) CRW's experimental statistical Linear Inverse Model (LIM-based) and 2) the NCEP climate forecast system (CFS-based) system.

# Weather Observing System: AIMS Data Centre

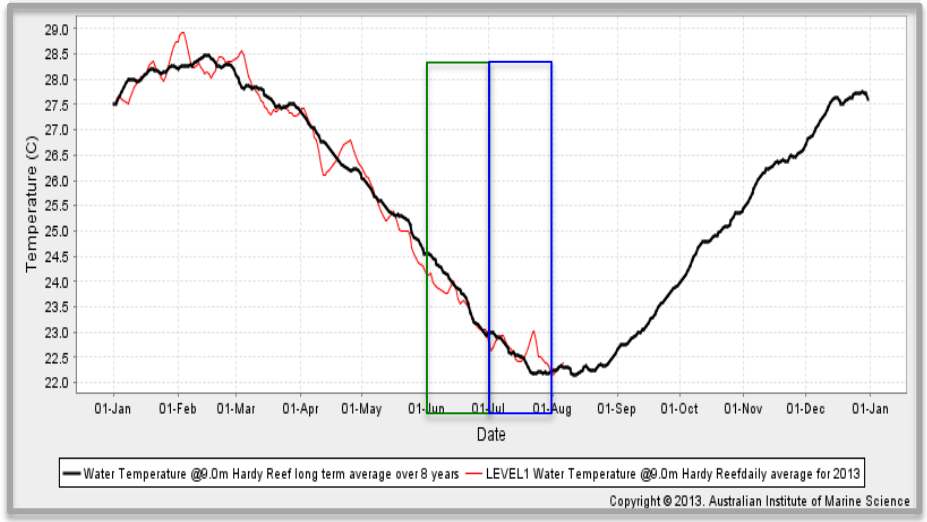
Water temperature @0.6m Lizard Island Sensor float 3 trend against longterm average



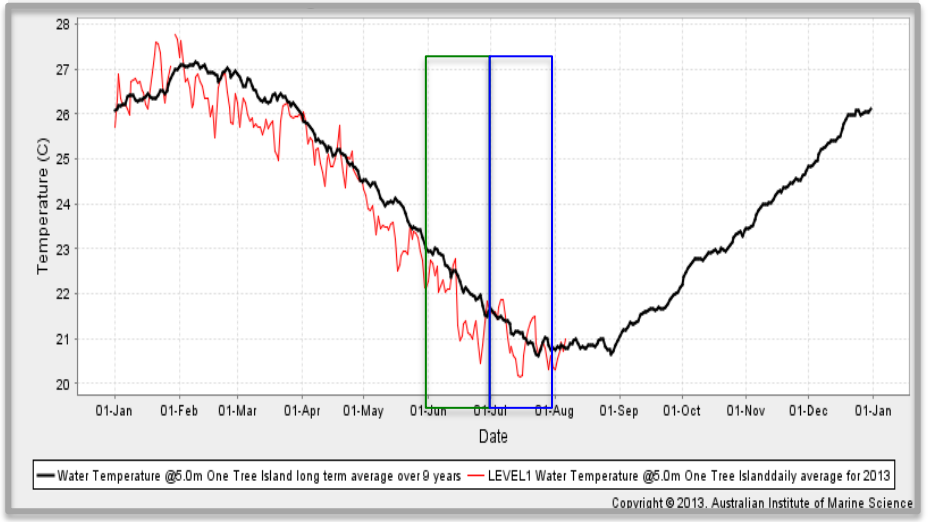

Water temperature @4.0m Davies Reef Platform trend against longterm average




Water temperature @9.0 Hardy reef Platform trend against longterm average




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




Note:

- Consistent with the SST data, most of the AIMS weather stations show water temperatures oscillating around the long-term mean.

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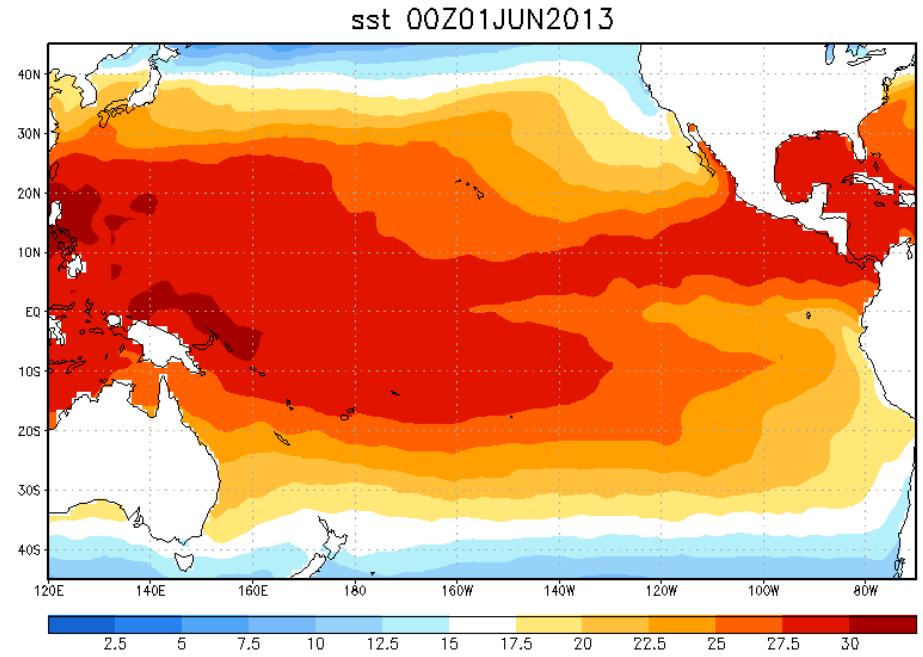
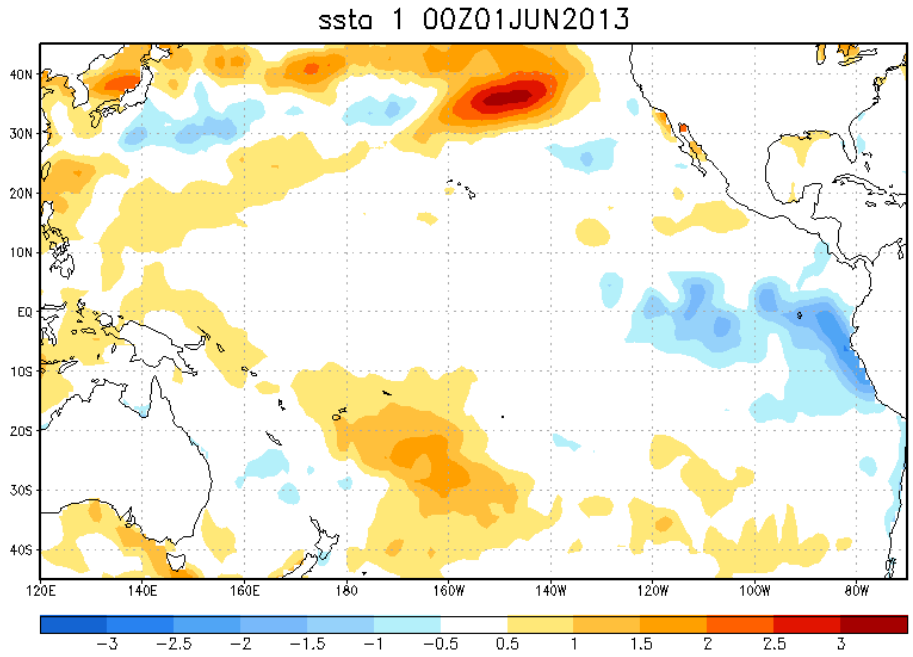
# NOAA optimum interpolation sea surface temperature

## OISST June 2013




## OISST anomaly June 2013

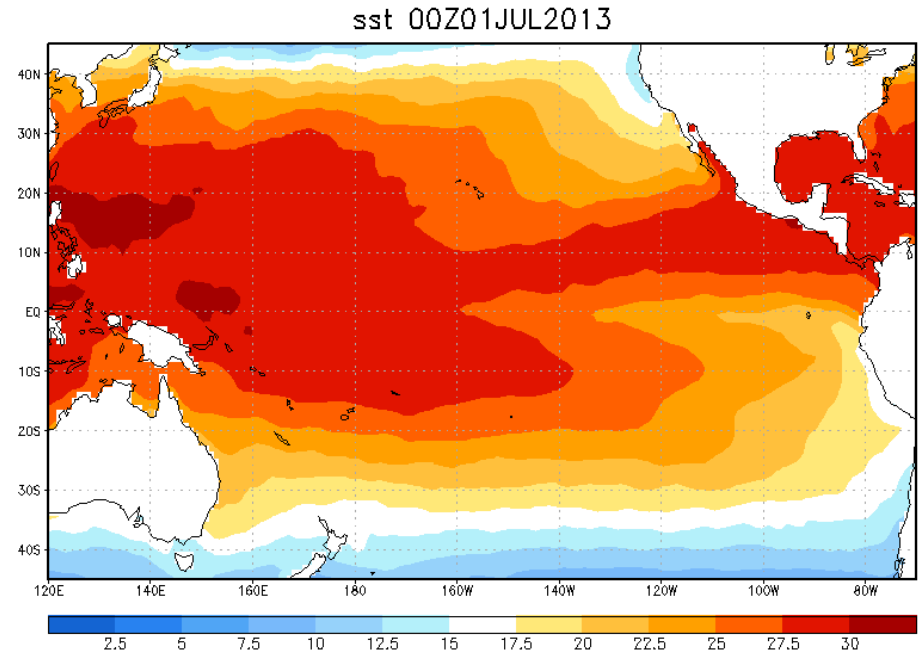



Note:

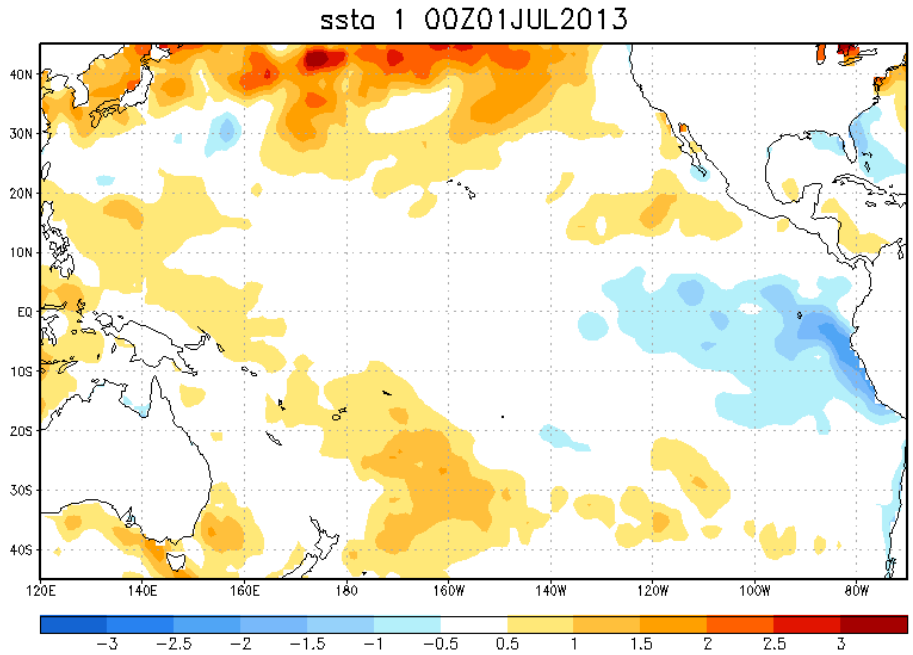
- SST remained near average in the western and central equatorial Pacific, while negative SST anomalies persisted in the East during June.

# NOAA optimum interpolation sea surface temperature

## OISST July 2013




## OISST anomaly July 2013




Note:

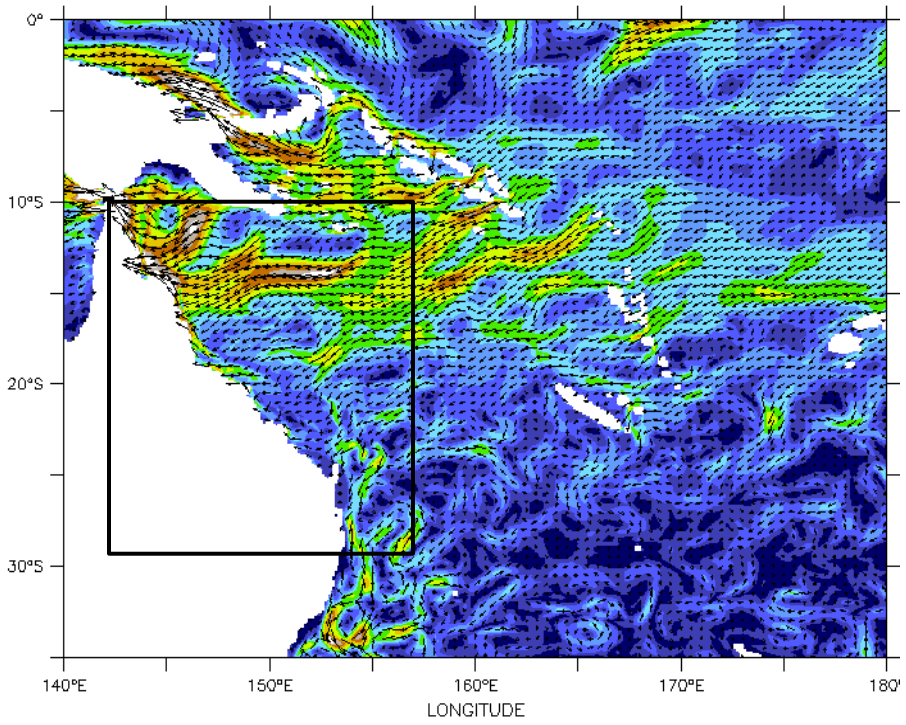
- The same pattern of SST continued during July: near average SST in the western and central equatorial Pacific and negative SST anomalies in the East.

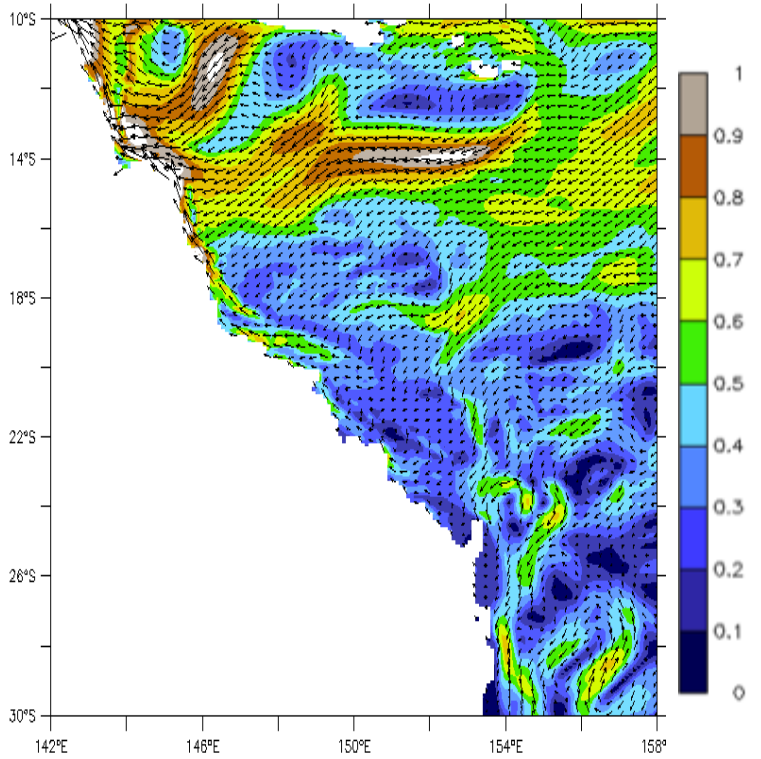
http://www.emc.ncep.noaa.gov/research/cmb/sst_analysis/

# OceanMAPS 15m Depth-Average Currents

## July 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.



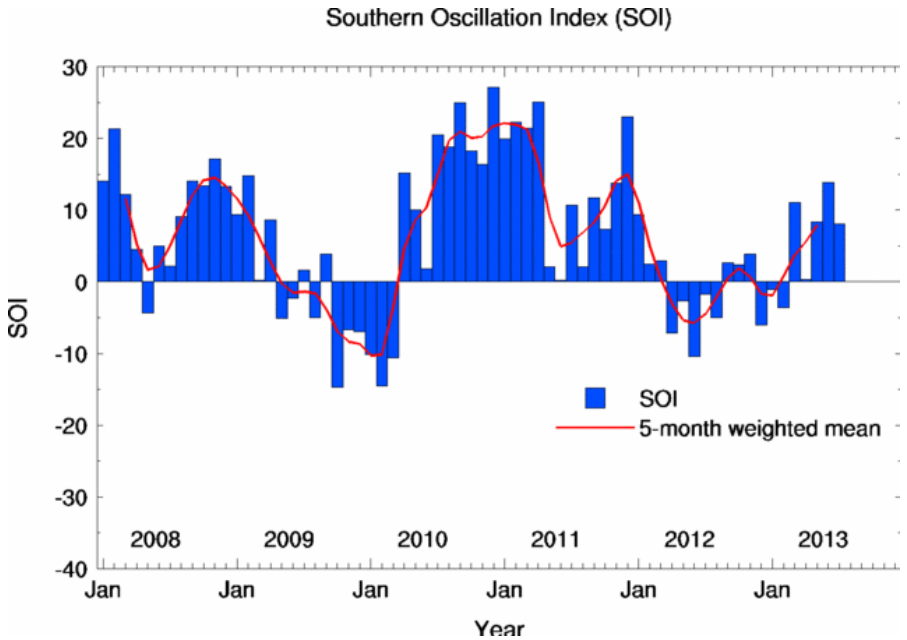




Behind Real Time analysis
15 m Depth-Averaged Currents (m/s).

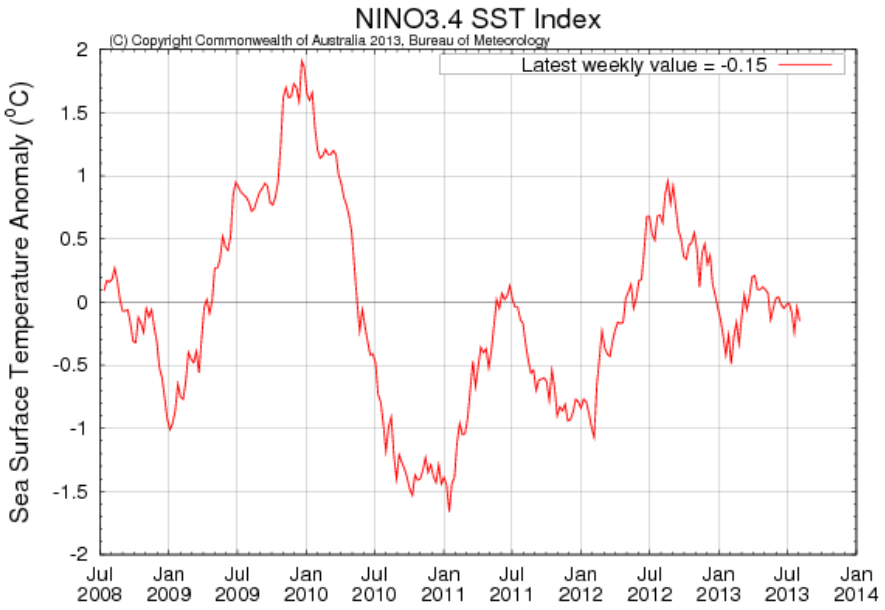
Note:

- Strong westward South Equatorial Current (SEC) inflow reaching the shelf at ~15°S
- Most of the SEC turns northwards resulting in a strong North Queensland Current and a strong PNG gyre that recirculates feeding itself.

# ENSO Index




Negative SOI = El Niño




Positive Nino 3.4 index= El Niño

Note:

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