NERP

Torres Strait / GBR environmental conditions report:

Recent status and predictions

October 2014

By Marites Magno-Canto & Dr. Scarla Weeks
Contact: m.canto@uq.edu.au

UQ-GPEM Biophysical Oceanography Group

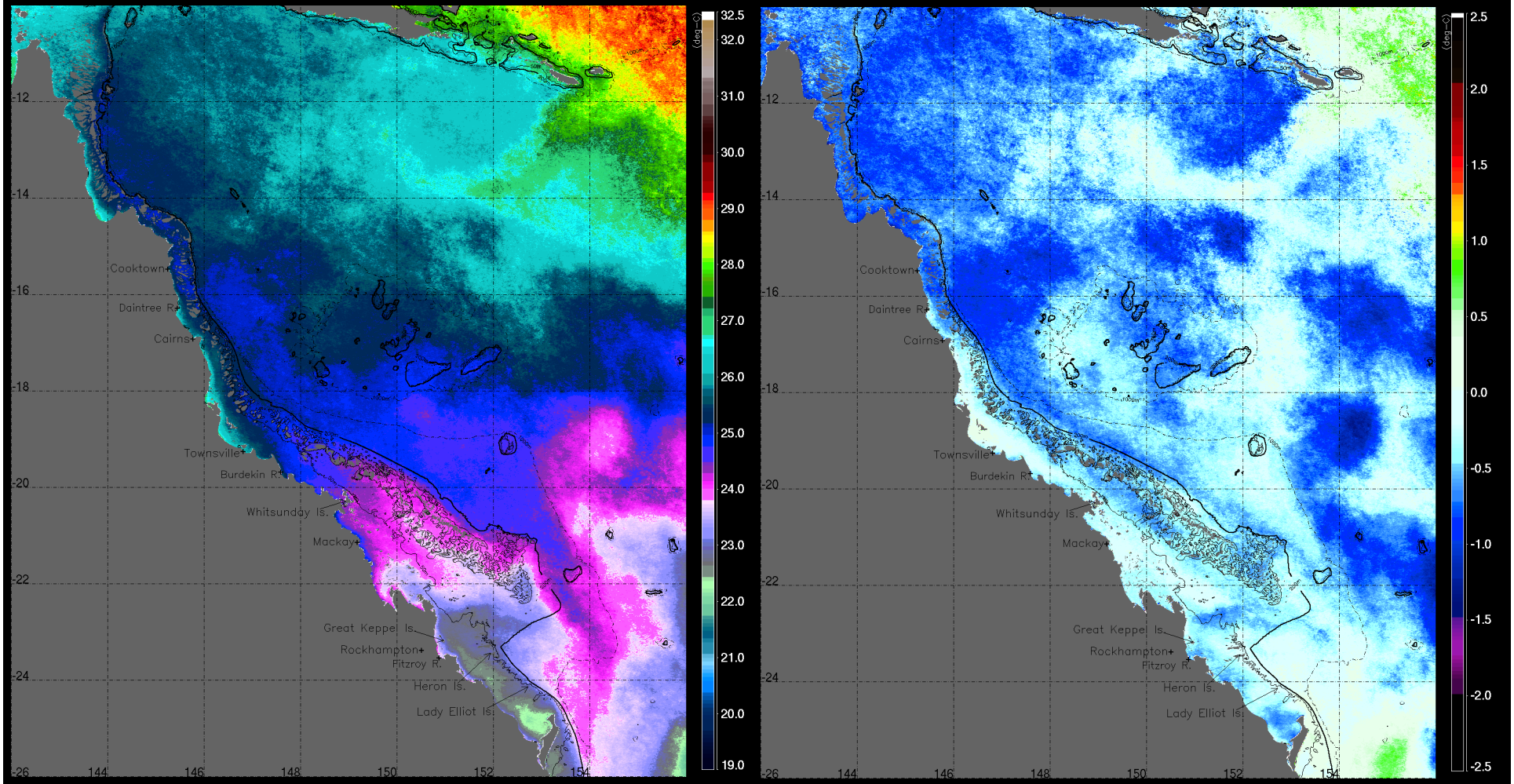
Outline

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

Overview

- ENSO neutral conditions continued in the Pacific during October.
- OceanMAPS continue to show relatively weaker South Equatorial Current inflow and an intensified East Australia Current flow adjacent to the GBR compared to September.
- Negative SST conditions continued over the GBR and Torres Strait regions during October, while positive SST anomalies were maintained in the NE Coral Sea. Corresponding MODIS Chlorophyll-a concentration and 10% Photic Depth products suggest weakened intrusions of oceanic waters into the shelf compared to September.
- *In situ* temperature fluctuations for October remained below the long-term mean for most stations except for Myrmidon Reef and Heron Island sites.
- NOAA Coral Reef Watch indicate an overall increased potential stress level for Torres Straits and GBR regions as we head into summer. CFS-based (60%) predicted higher stress level particularly for GBR indicating an “Alert Level1” potential stress.
- POAMA, however, continue to forecast close to average conditions along the length of the GBR over the next 6 months into March 2015.

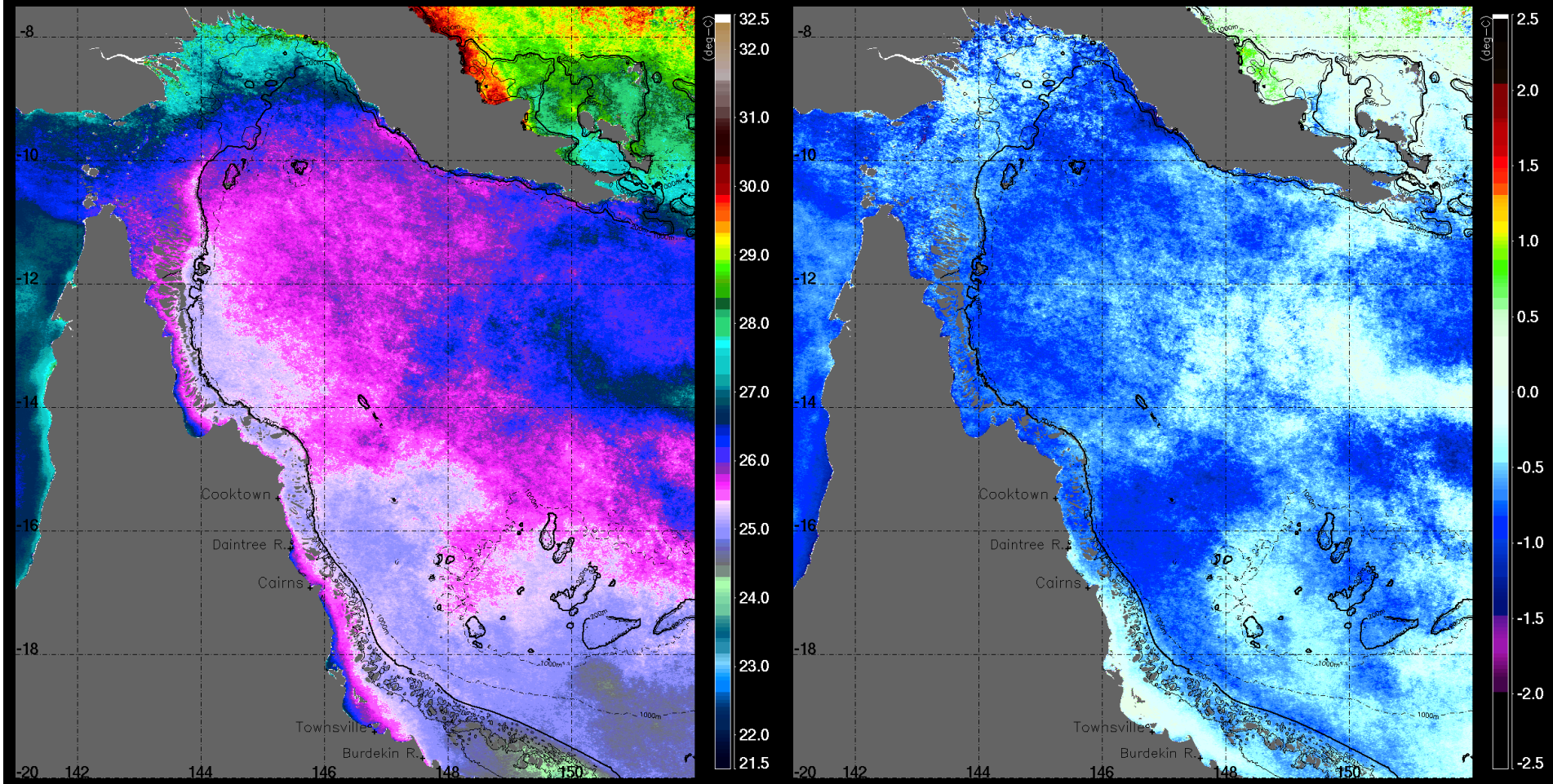
MODIS sea surface temperature (day+night) October 2014



Note:

- Apparent warming of waters through October particularly in NE Coral Sea
- Mostly intense negative SST anomalies, especially along the northern portion of GBR and inner reefs, and in the Coral Sea

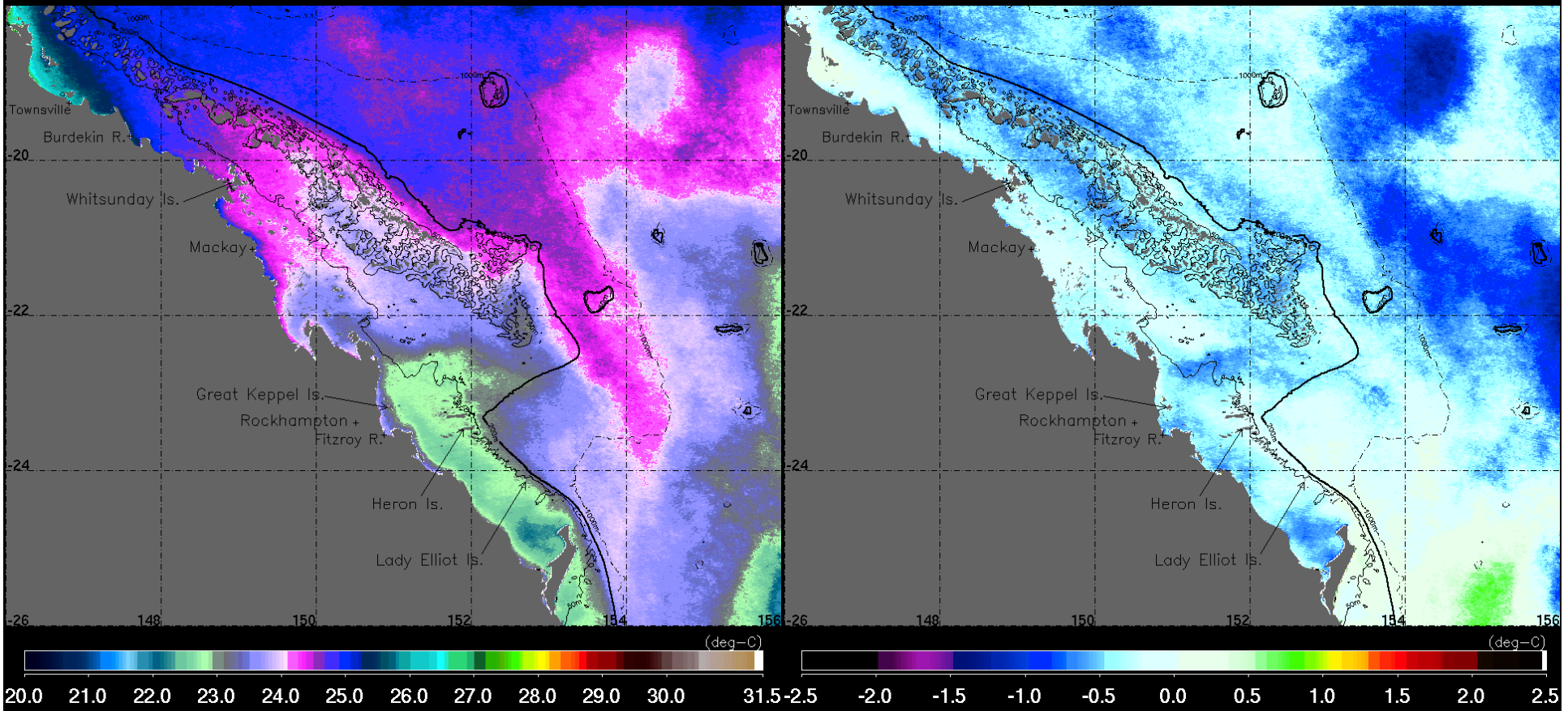
Torres Strait / far northern GBR
MODIS sea surface temperature (day+night)
October 2014



Note:

- Intense negative SST anomalies along the northern GBR and Torres Strait regions

Southern GBR
MODIS sea surface temperature (day+night)
October 2014

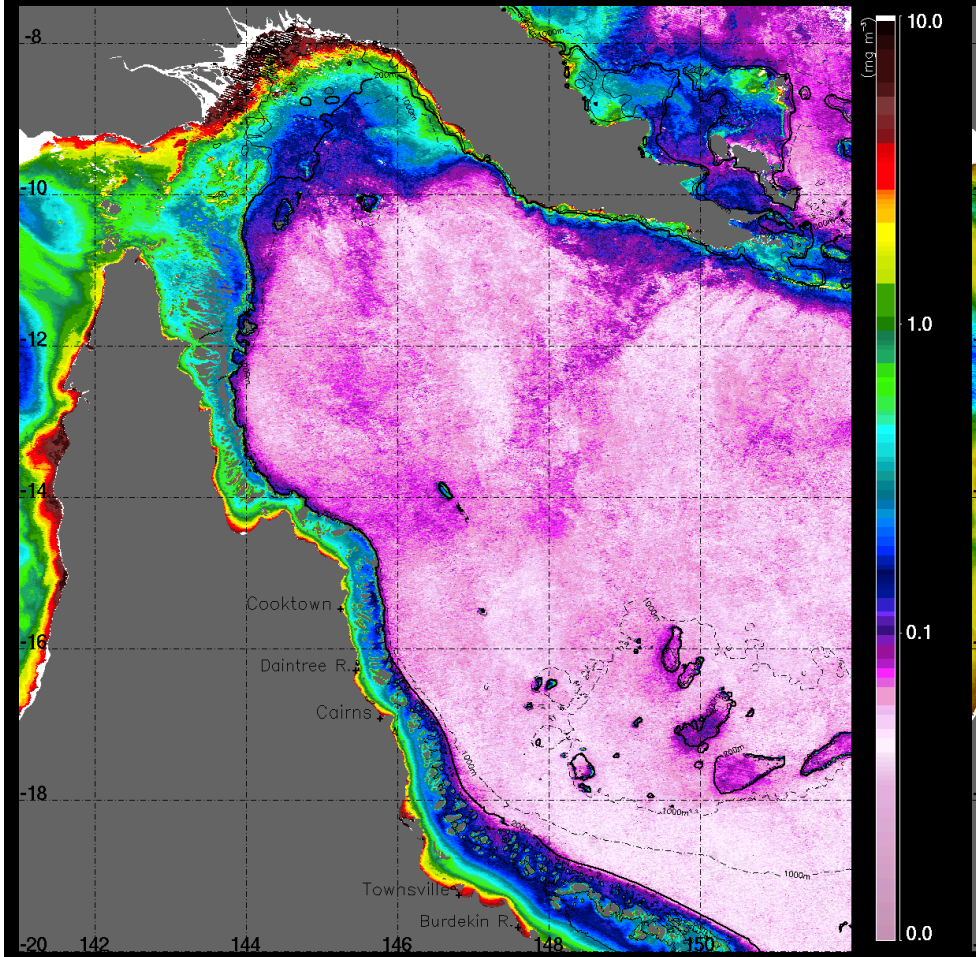


Note:

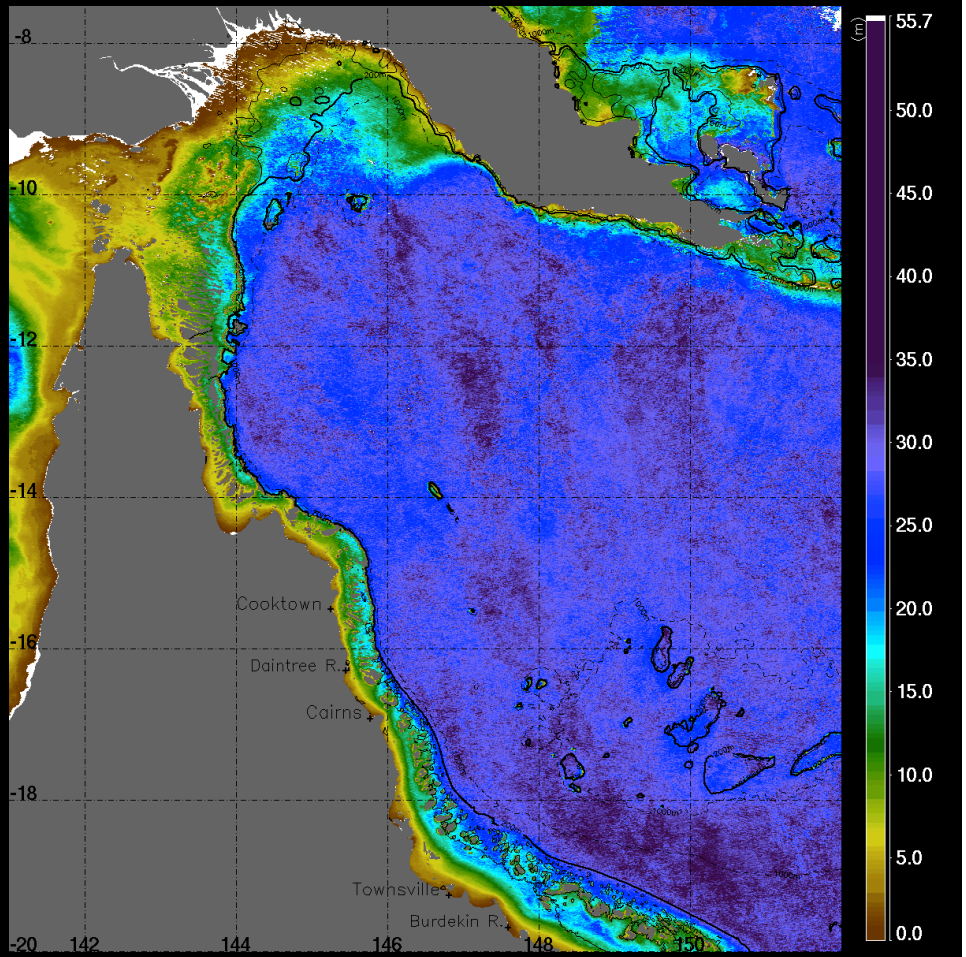
- Moderate to strong negative SST anomalies along the southern GBR continued through October

Torres Strait / far northern GBR
October 2014

MODIS chlorophyll-*a* concentration



MODIS 10% photic depth



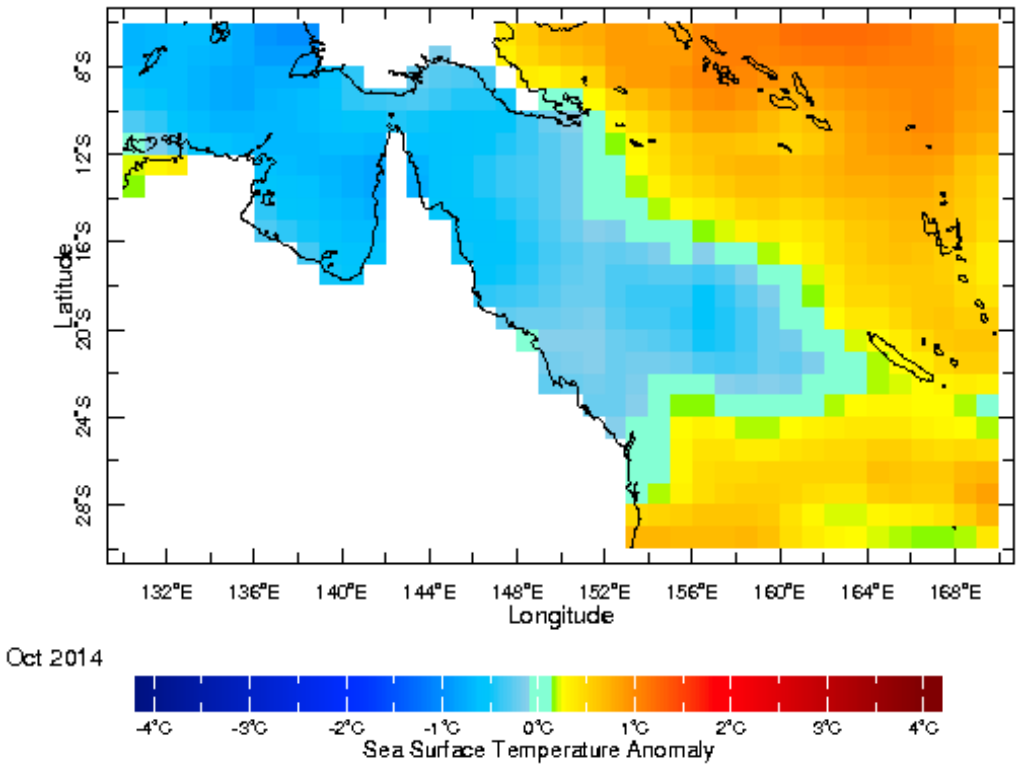
Note:

- Close to average chlorophyll concentrations and photic depth conditions in far northern GBR and Torres Strait regions during October with considerably weaker oceanic intrusions into the shelf through the Myrmidon / Palm Passages compared to September

Sea Surface Temperature Anomaly

from NOAA NCEP EMC CMB GLOBAL Reyn_SmithOIv2

October 2014



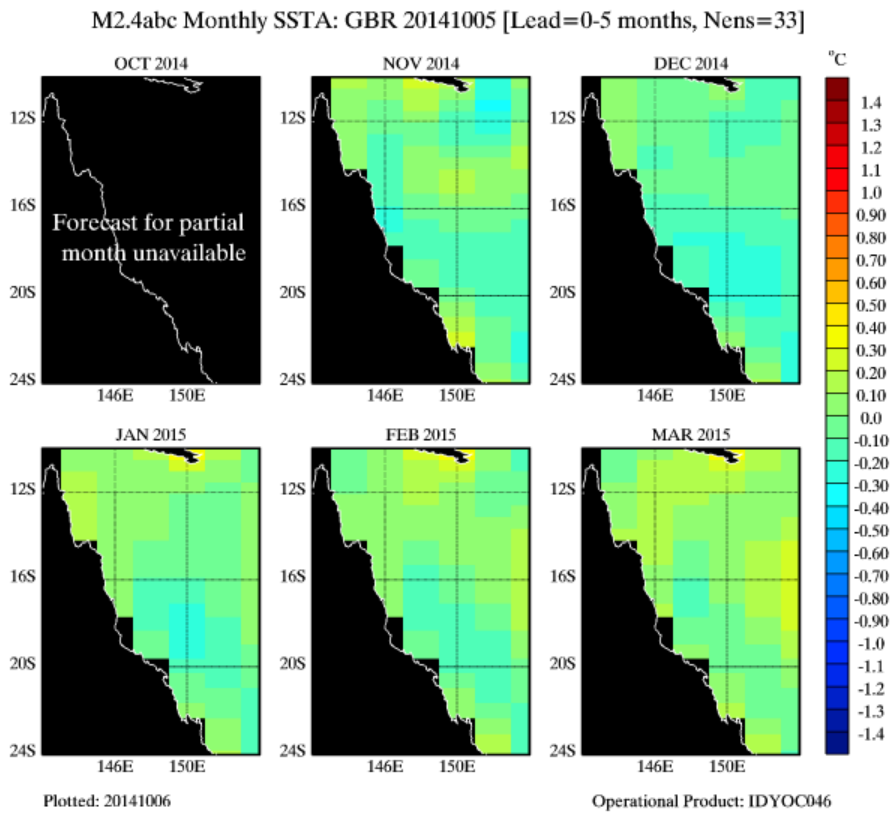
Note:

• In agreement with MODIS data, the Reynolds SST anomaly data presented negative SST anomalies along the length of GBR for October

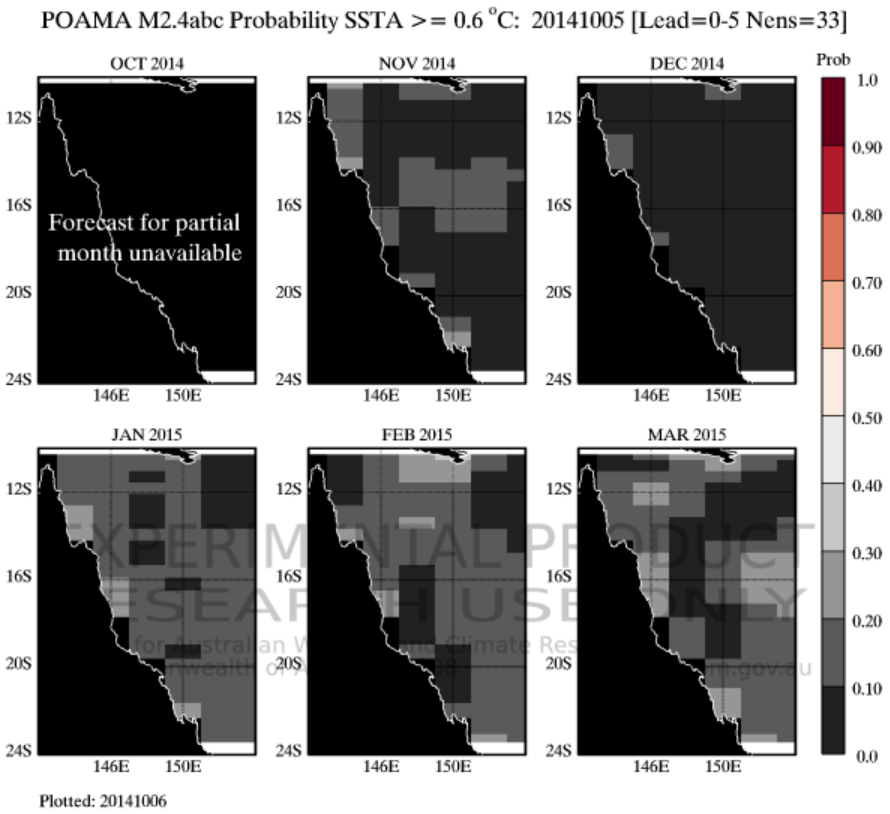
http://iridl.ldeo.columbia.edu/SOURCES/.NOAA/.NCEP/.EMC/.CMB/.GLOBAL/.Reyn_SmithOIv2/

SST anomaly forecast (POAMA-2): Nov 2014 – Mar 2015

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 continue to forecast temperatures close to average SST conditions with no probabilities of temperature anomalies exceeding 0.6°C for the upcoming months.

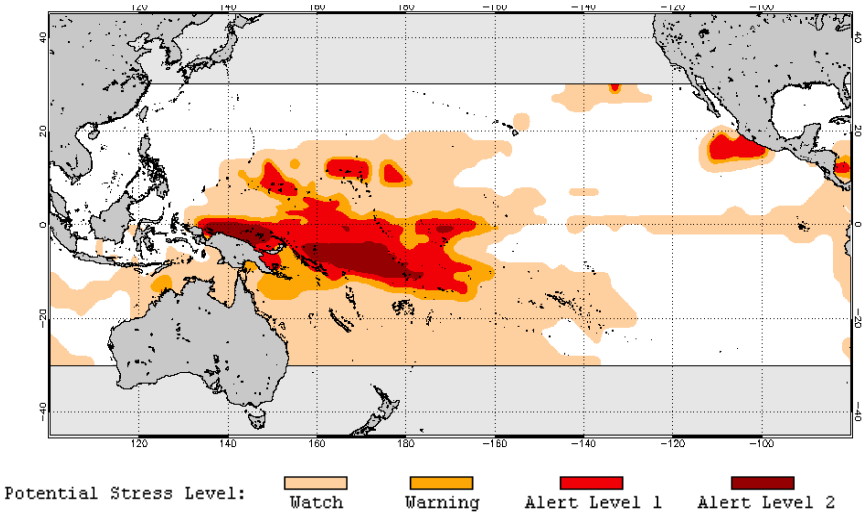
NOAA Coral Reef Watch

Seasonal coral bleaching thermal stress outlook

November 2014 to February 2015

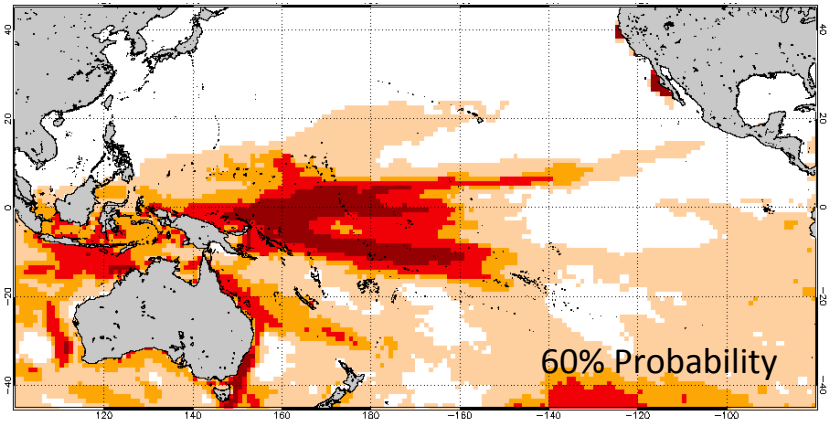
LIM-based

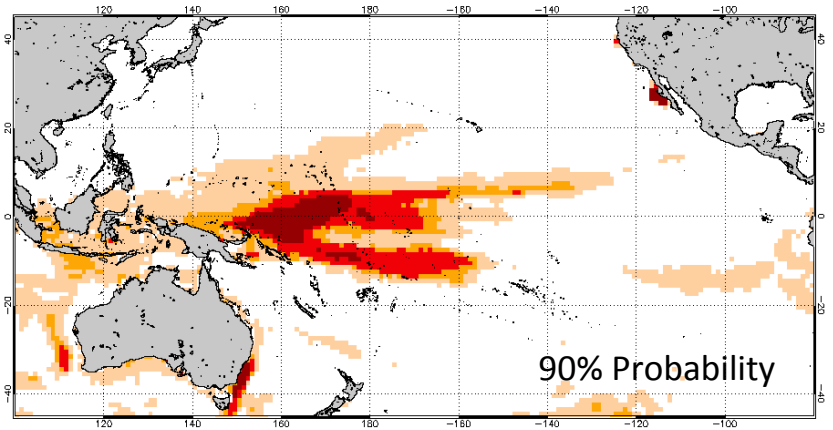
Version 2, experimental, weekly 2x2 degree spatial resolution



CFS-based

Version 2, experimental, weekly 1x1 degree spatial resolution





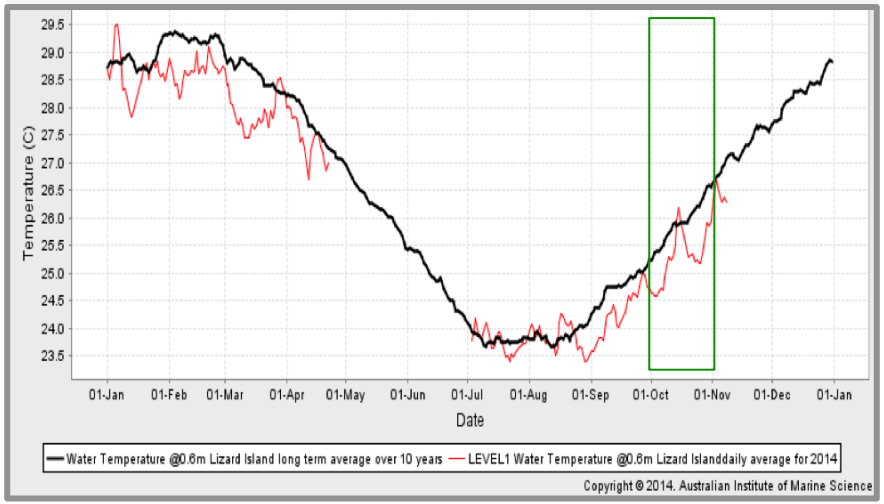
Note:

- Outputs from Coral Reef Watch LIM-based continued to suggest mostly “Watch” stress level along the length of the GBR and PNG, including Torres Strait, as we head into summer.
- The CFS-based (60%) prediction however shows increased stress level with “Alert Level1” along the length of GBR, “Watch to Warning” stress level for far northern GBR and Torres Strait. “Watch” stress level also suggested for central (inner) GBR based on 90% CFS predictions.

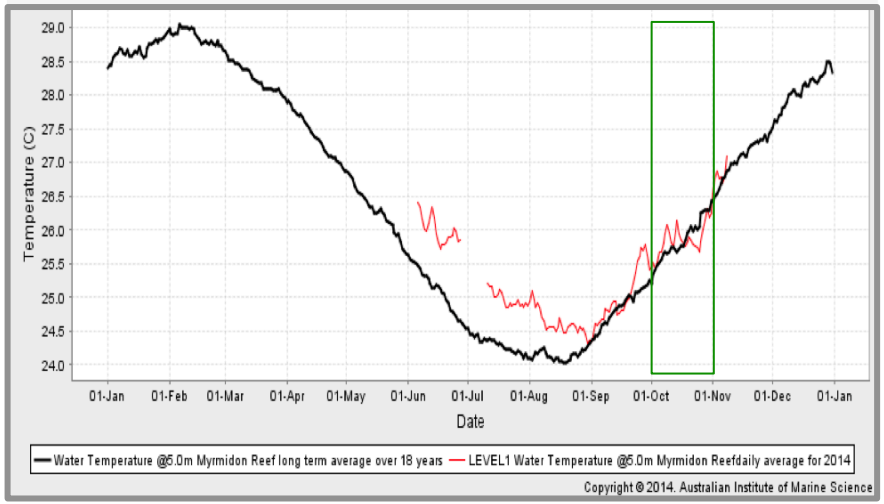
These outlooks are based on SST predictions from: CRW’s experimental statistical Linear Inverse Model (LIM-based – left panel) and the NCEP Climate Forecast System (CFS-based – right panel) systems

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

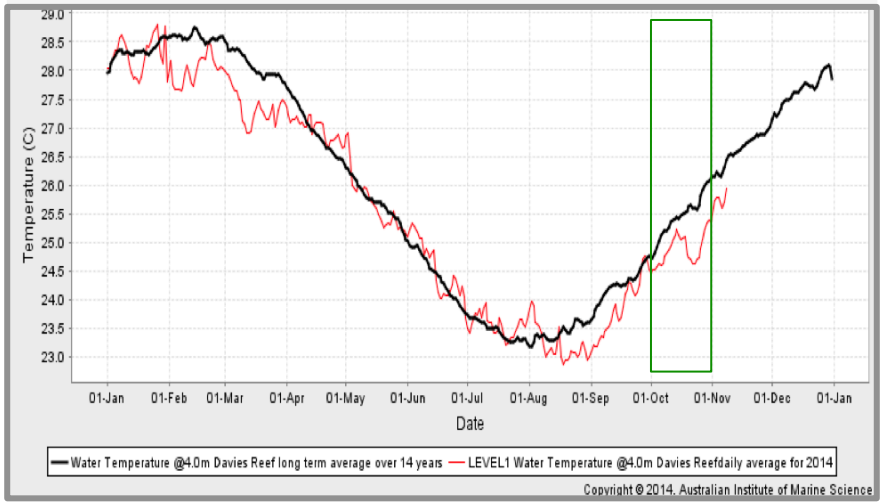
Water temperature @0.6m Lizard Island Sensor Float 3Trend against longterm average



Water temperature @5.0m Myrmidon Reef Platform trend against longterm average



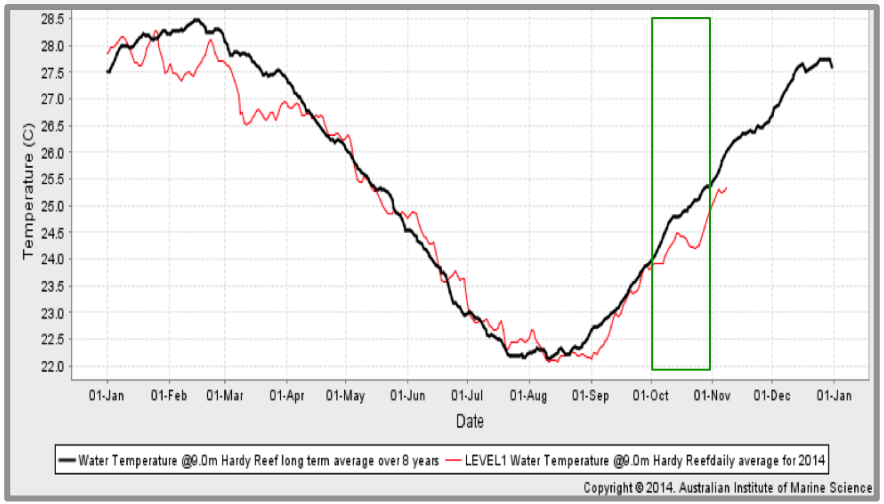
Water temperature @4.0m Davies Reef Platform trend against longterm average



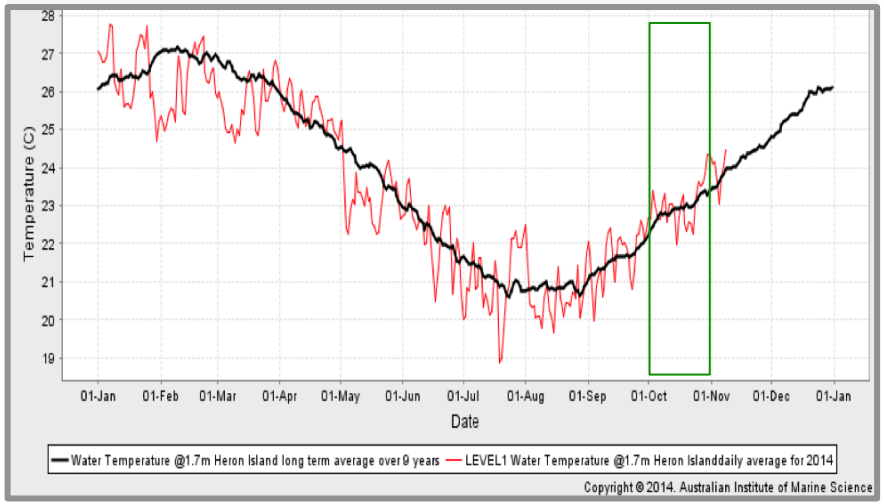
- Lizard Island and Davies Reef sensors continue to show below average temperatures for October while Myrmidon Reef weather station sensor shows temperatures close to long term mean

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

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



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



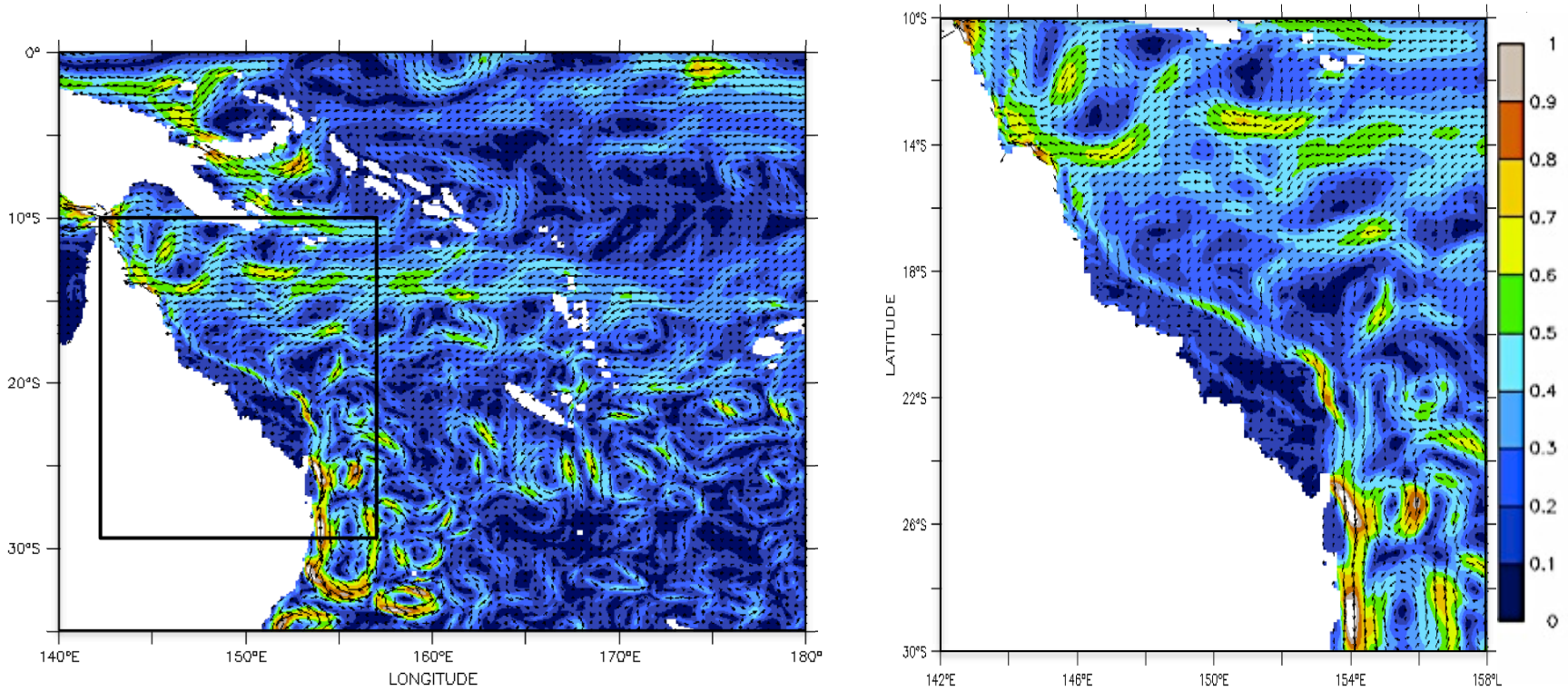
Note:

- Hardy Reef continue to show *in situ* sea water temperature mostly below the longterm average for October. Heron Is. data, on other hand, continue to show fairly strong fluctuations relative to the longterm mean

OceanMAPS 15m Depth-Average Currents

October 2014

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.

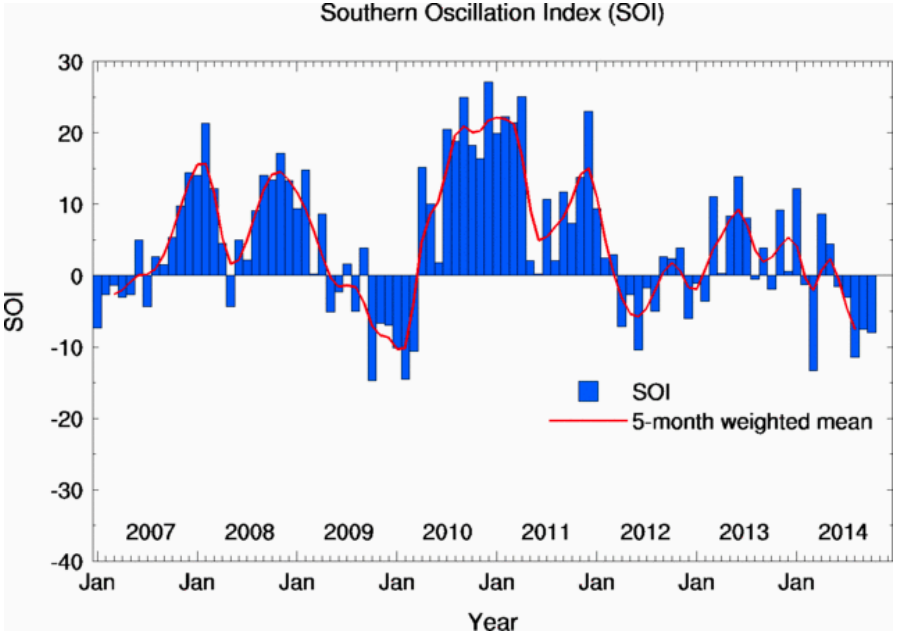


Behind Real Time analysis 15 m Depth-Averaged Currents (m/s)

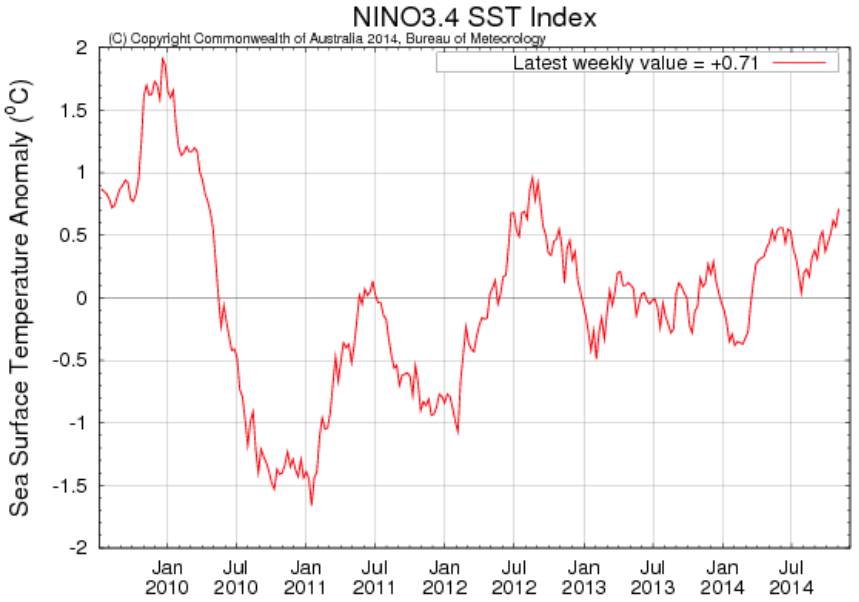
Note:

- Weak South Equatorial Current (SEC) inflow into the northern GBR continued through October
- Stronger East Australia Current (EAC) visible as a narrow southward flow adjacent to GBR compared to September. EAC further intensified off Fraser Island feeding the eddy dynamics in Tasman Sea

ENSO Index



Negative SOI = El Niño



Positive Nino 3.4 index= El Niño

Note:

- ENSO neutral conditions continued during October
- SOI remained negative while Nino3.4 index continued to show overall warming. These and existing surface conditions across the tropical Pacific suggest borderline El Nino conditions. However, combined oceanic and atmospheric states still suggest ENSO-neutral conditions.

SOI: http://www.bom.gov.au/climate/current/soi2.shtml ; ONI: http://134.178.63.141/climate/enso/indices.shtml