NERP

Torres Strait / GBR environmental conditions report:

Recent status and predictions

September 2014

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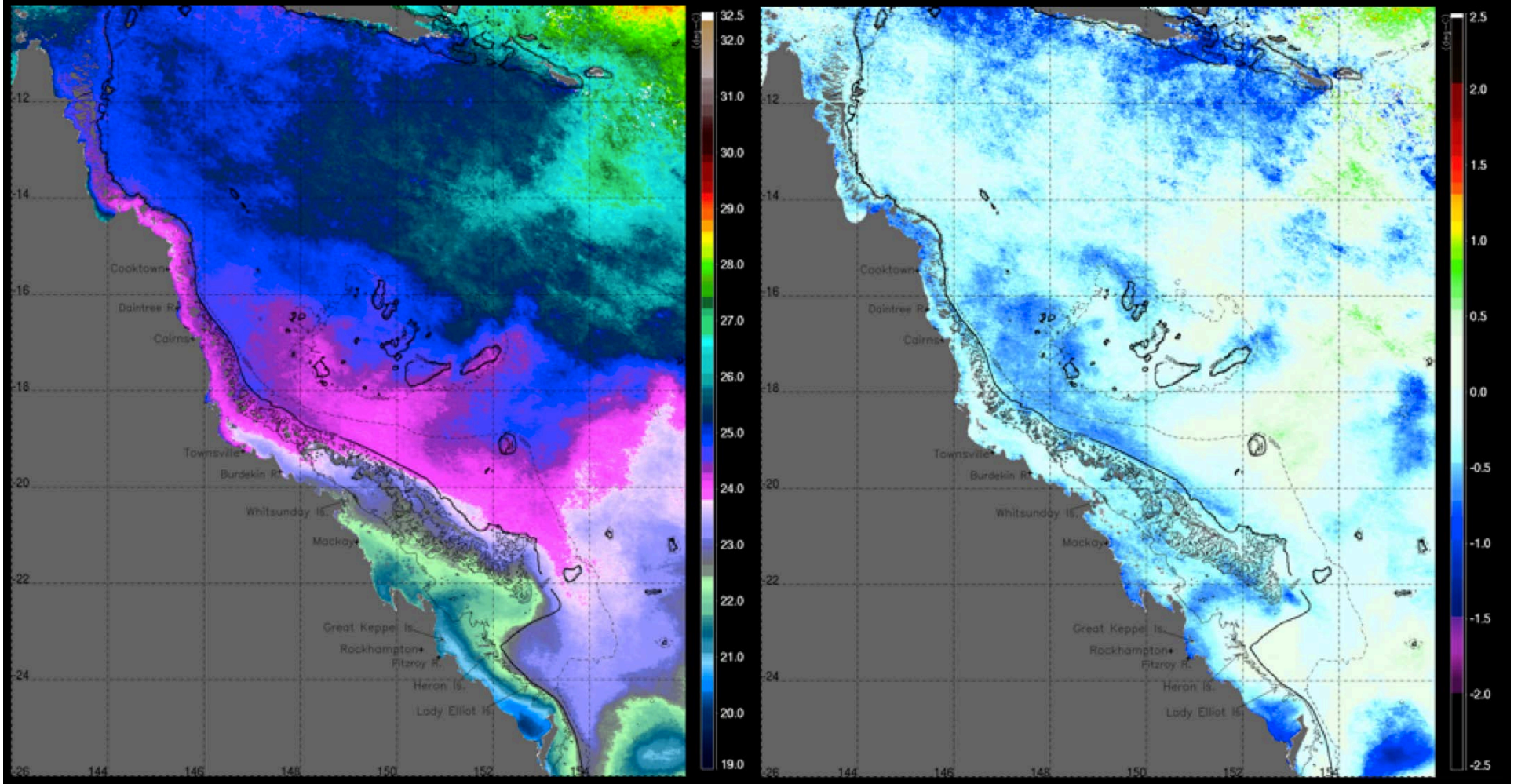
Outline

- Overview
- Recent SST and in situ Temperature evolution
- Monthly means 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

- ENSO neutral conditions continued during September.
- OceanMAPS shows a relatively weaker South Equatorial Current compared to August but with clearly visible East Australia Current flow adjacent to the central-southern GBR.
- MODIS data show stronger negative SST conditions along the length of the GBR and Torres Strait regions for September compared to August.
- *In situ* data for September continue to show sea water temperature fluctuations below the long-term mean for most stations except for Myrmidon Reef and Heron Island sites.
- NOAA Coral Reef Watch indicate further increased potential stress level for regions south of PNG and along the length of GBR, including Torres Strait, as we head into summer. CFS-based (60%) predicted higher stress level particularly for central – southern GBR.
- POAMA continue to forecast close to or marginally above average conditions along the length of the GBR over the next 6 months into February 2015.

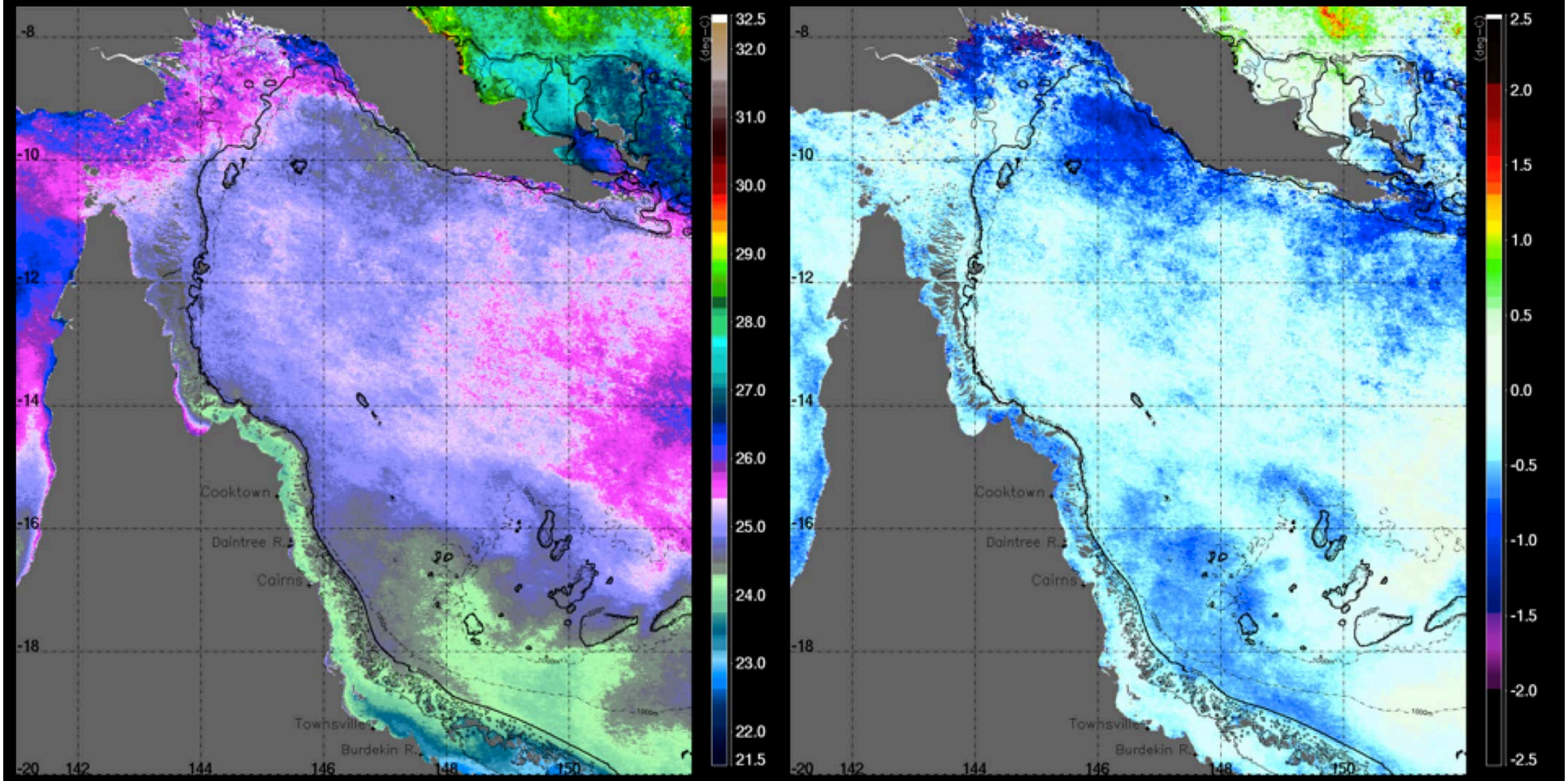
MODIS sea surface temperature (day+night) September 2014



Note:

- Warming of waters through September, especially in NE Coral Sea
- Mostly negative SST anomalies along the length of GBR and inner reefs, and also in the Coral Sea

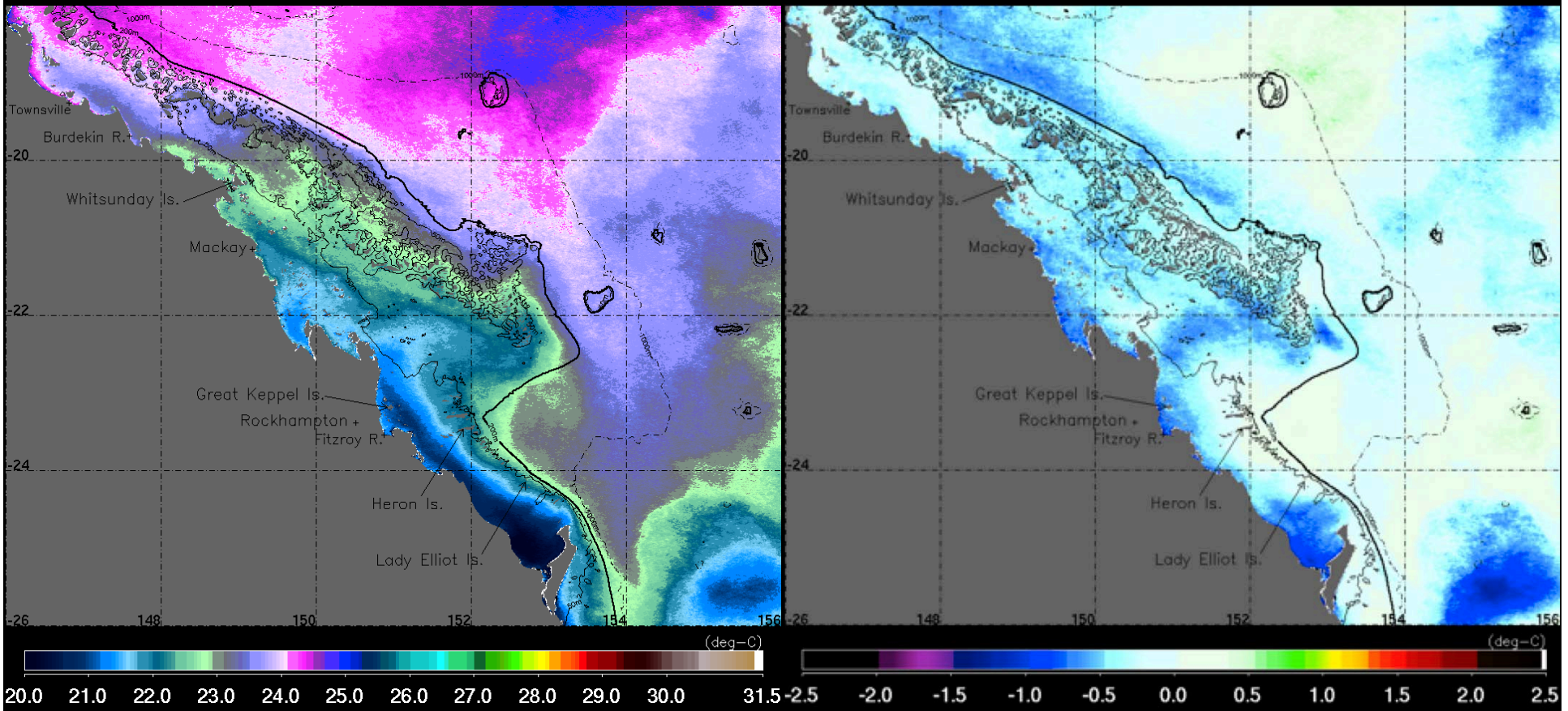
Torres Strait / far northern GBR
MODIS sea surface temperature (day+night)
September 2014



Note:

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

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

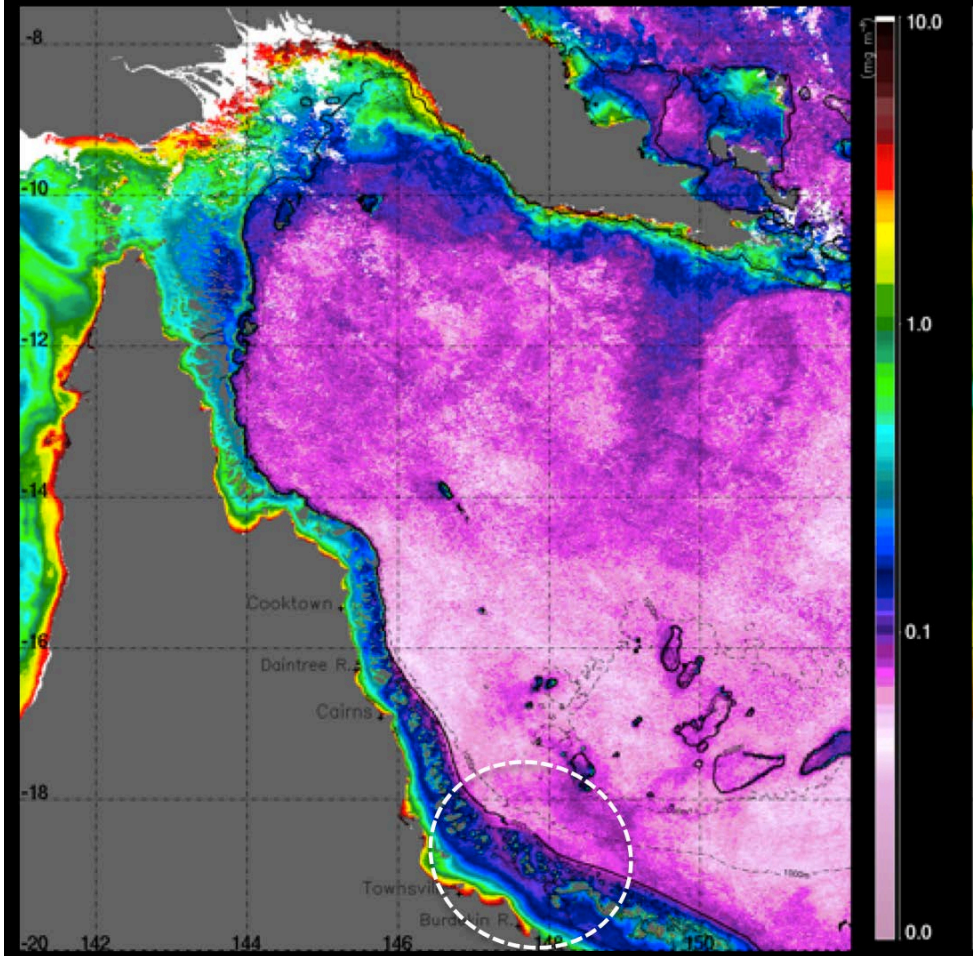


Note:

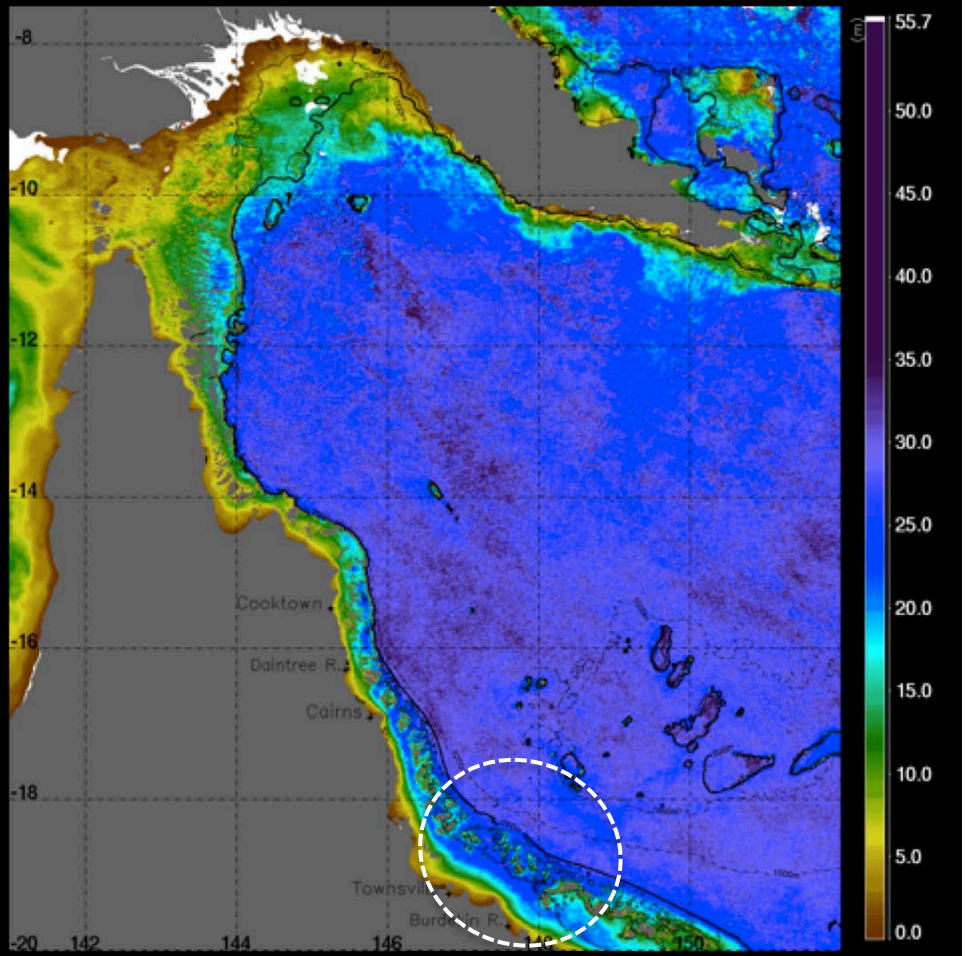
- Moderate to strong negative SST anomalies along the southern GBR, except for the Capricorn Eddy region where average SST conditions persist

Torres Strait / far northern GBR
September 2014

MODIS chlorophyll-*a* concentration



MODIS 10% photic depth

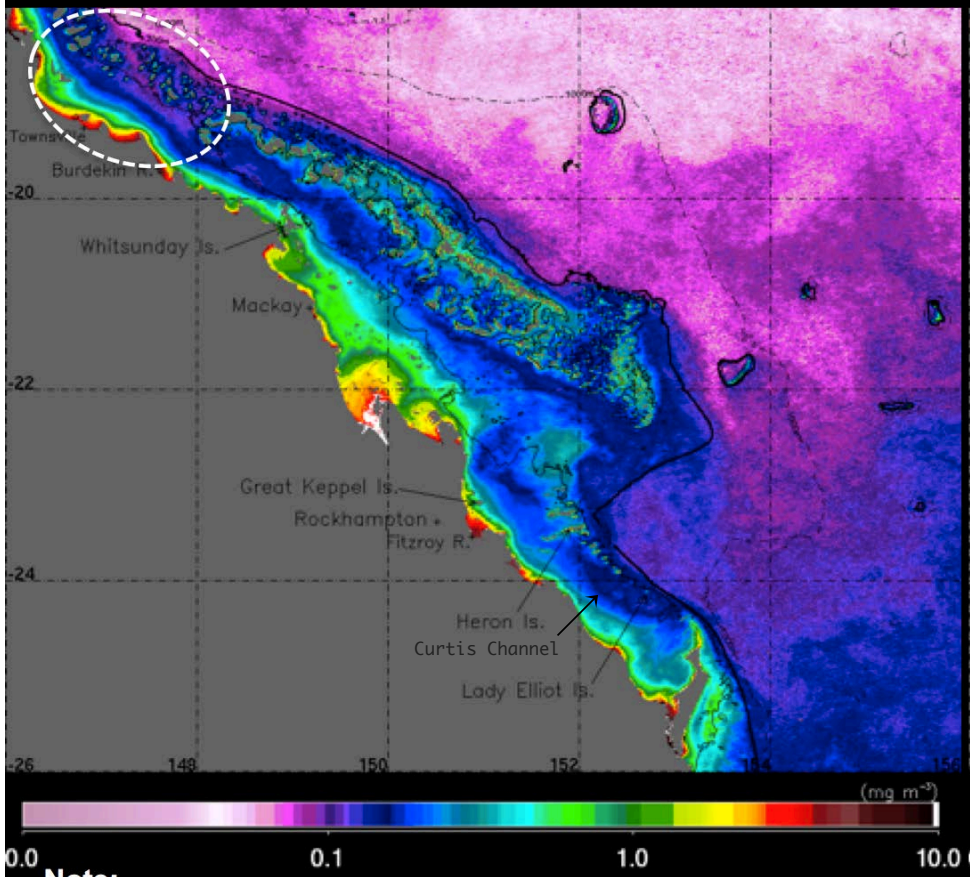


Note:

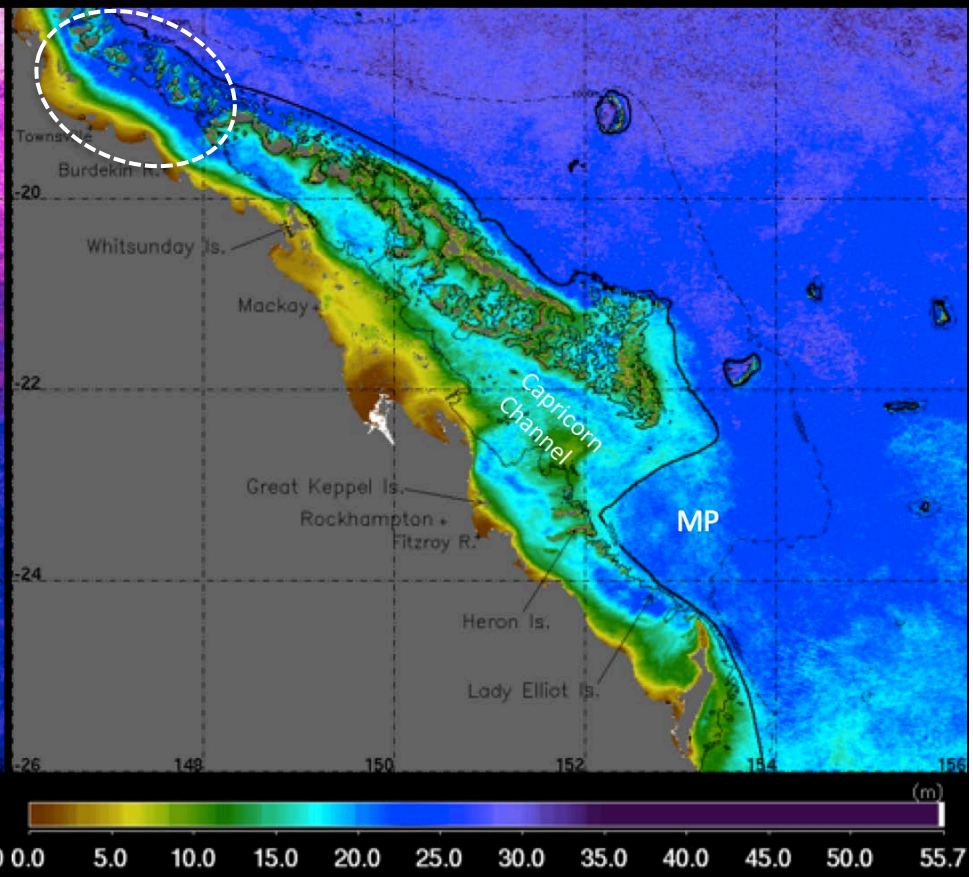
- Strong oceanic intrusions (dashed circle: low-chlorophyll / high photic depth) through the Myrmidon and Palm Passages
- Close-to-average chlorophyll concentrations and photic depth conditions in the Torres Strait / far northern GBR during September

Southern GBR
September 2014

MODIS chlorophyll-*a* concentration



MODIS 10% photic depth



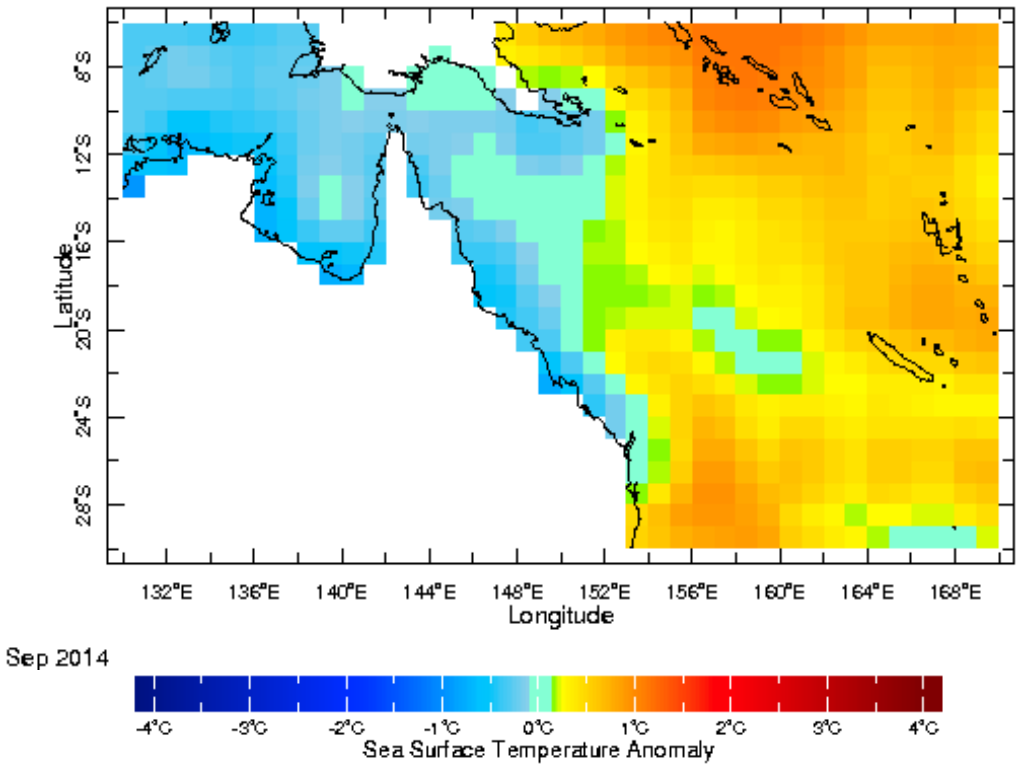
Note:

- Oceanic intrusions through the Myrmidon and Palm Passages in central GBR
- In southern GBR, surface manifestation of the Capricorn Eddy apparent on Marion Plateau (MP), with associated oceanic inflows into the Capricorn and Curtis Channels

Sea Surface Temperature Anomaly

from NOAA NCEP EMC CMB GLOBAL Reyn_SmithOIv2

September 2014



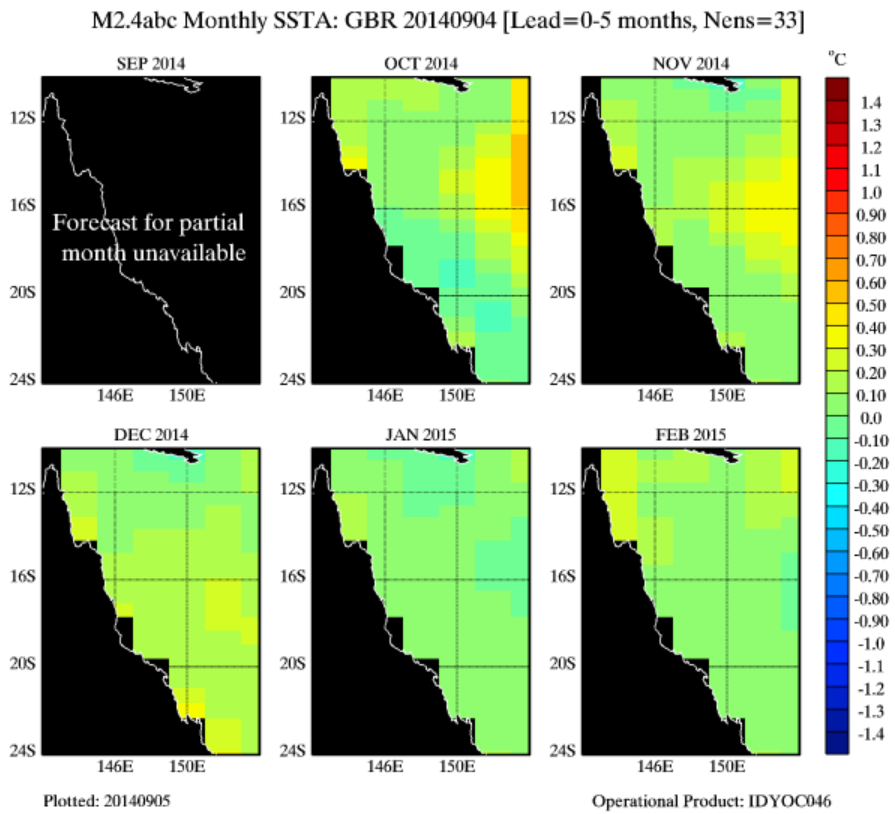
Note:

• NOAA NCEP data depict negative SST anomalies along the length of GBR for September, in agreement with MODIS data.

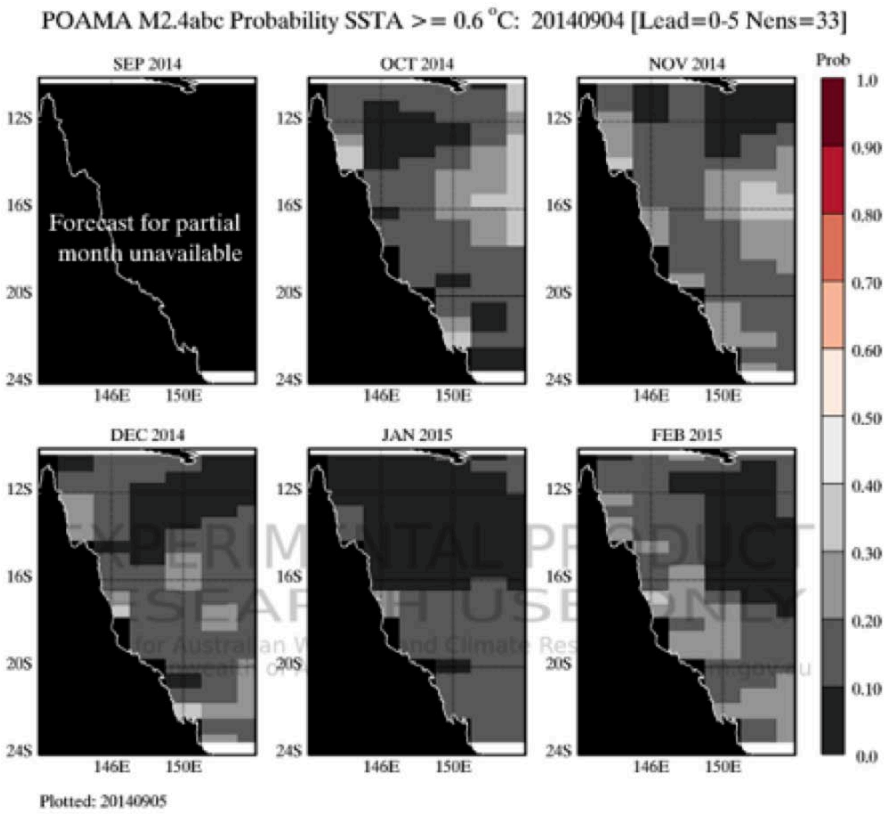
http://iridl.ldeo.columbia.edu/SOURCES/.NOAA/.NCEP/.EMC/.CMB/.GLOBAL/.Reyn_SmithOIv2/

SST anomaly forecast (POAMA-2): Oct 2014 – Feb 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 forecast temperatures close to or marginally above average for the upcoming months.
- Probabilities of temperature anomalies exceeding 0.6°C remain low.

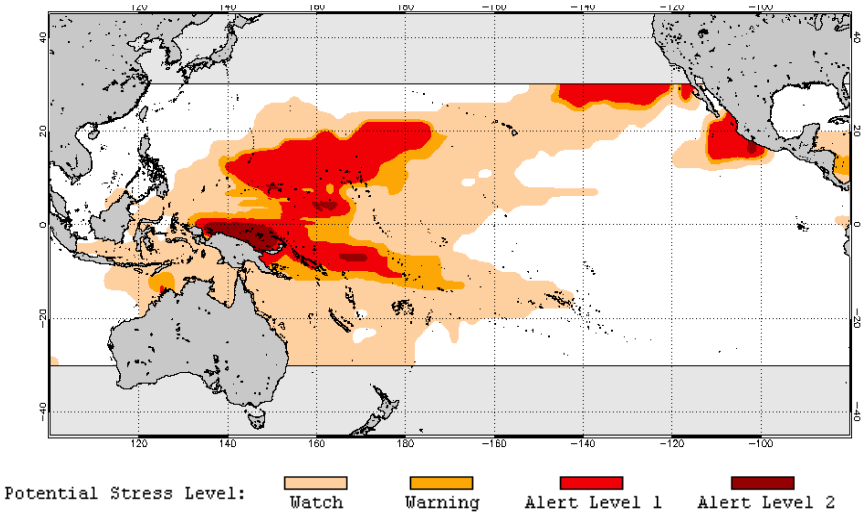
NOAA Coral Reef Watch

Seasonal coral bleaching thermal stress outlook

October 2014 to January 2015

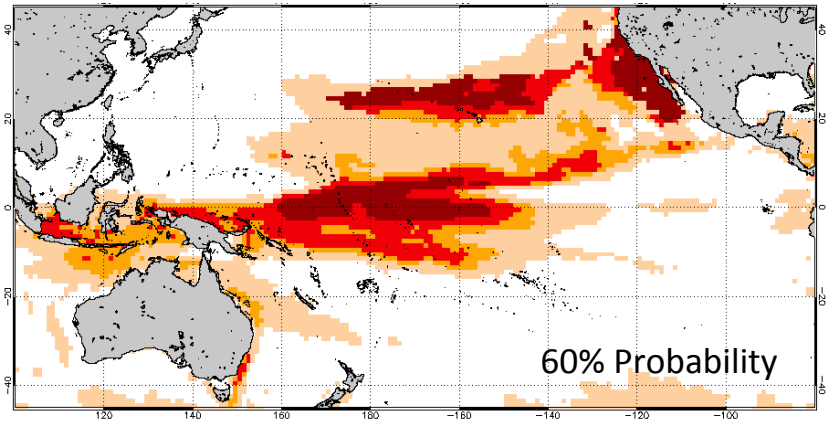
LIM-based

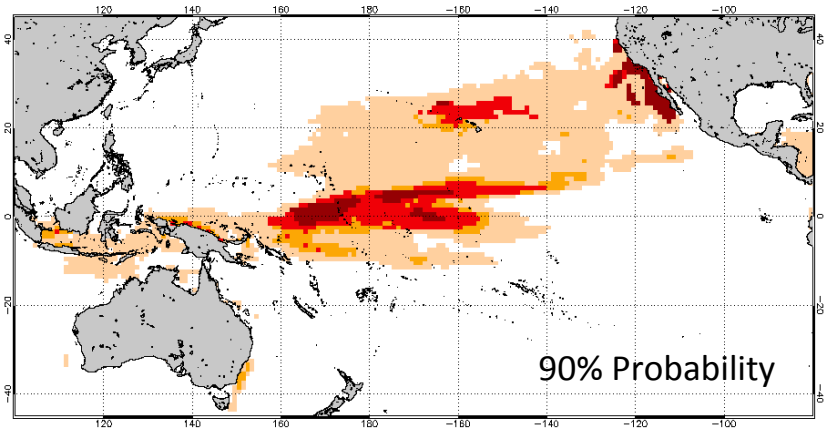
Version 2, experimental, weekly 2x2 degree spatial resolution



CFS-based

Version 2, experimental, weekly 1x1 degree spatial resolution





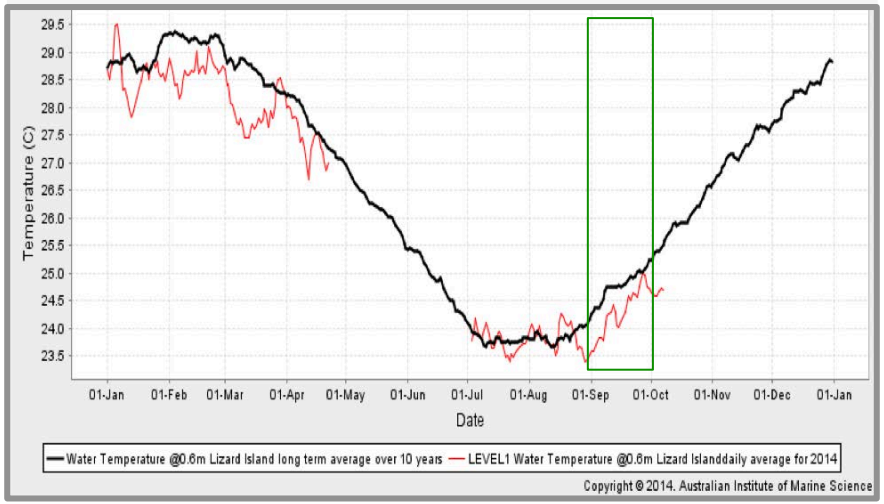
Note:

- Outputs from Coral Reef Watch LIM-based suggests “Watch” stress level along the length of the GBR and PNG, including Torres Strait, as we head into summer. The CFS-based (60%) prediction shows “Warning” stress level along central and southern GBR but suggests “Watch” stress for northern GBR and no stress in Torres Strait. “Alert Level 1” off New South Wales coast is also predicted.

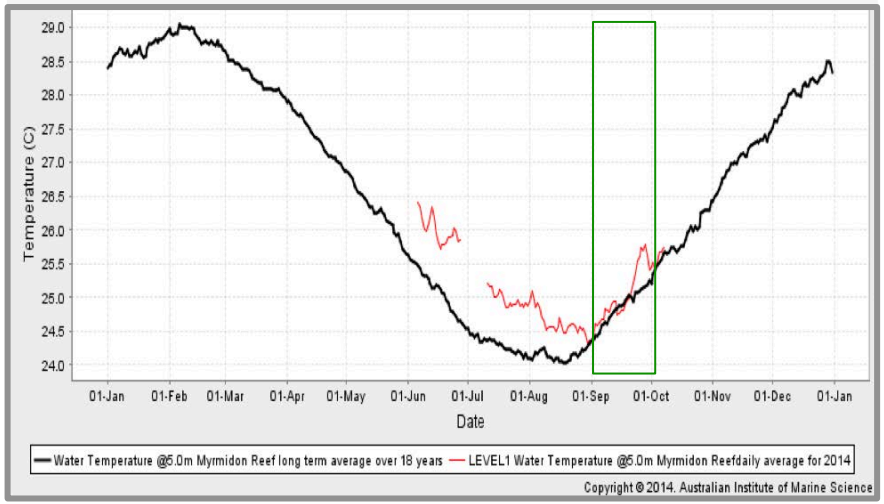
These outlooks are based on SST predictions from: CRW’s experimental statistical Linear Inverse Model (LIM-based – left panel) and the NCEP Climate Forecast System (CFS-based – right panel) systems

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

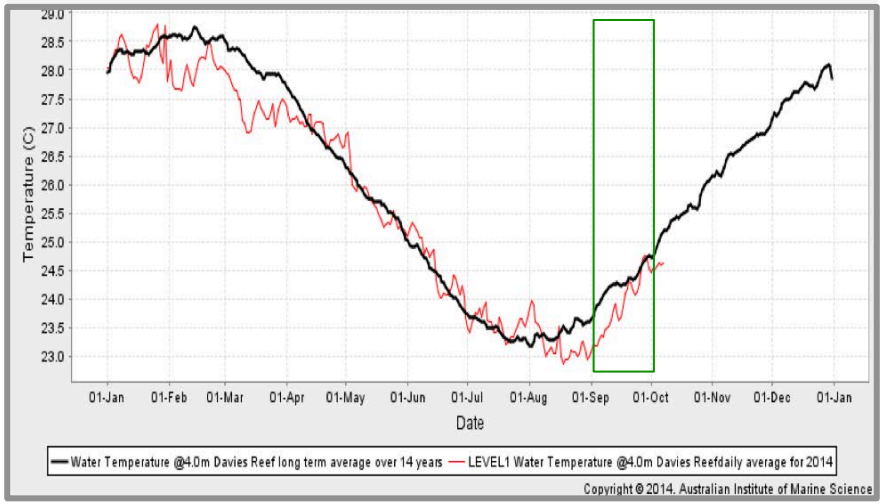
Water temperature @0.6m Lizard Island Sensor Float 3Trend against longterm average



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



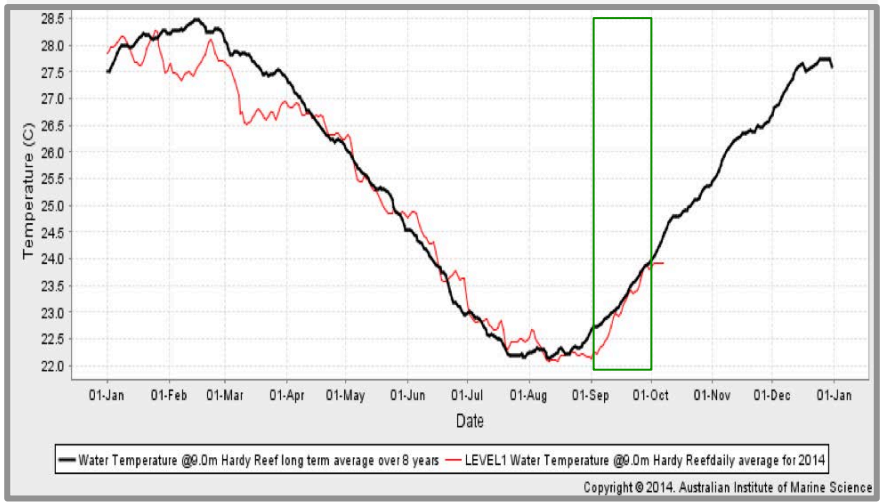
Water temperature @4.0m Davies Reef Platform trend against longterm average



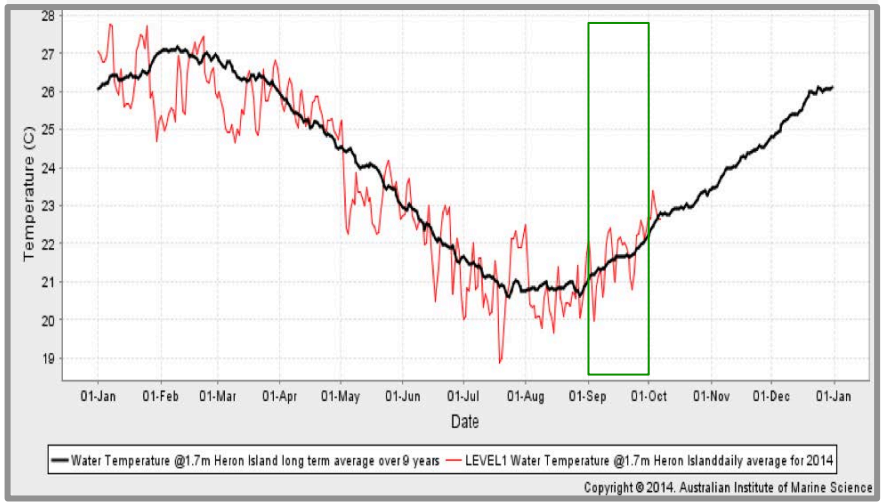
- Similar to August, Lizard Island and Davies Reef sensors show below average temperatures for September
- Myrmidon Reef weather station sensor shows temperatures close to long term mean during the first half of the month and above average towards the end of September. This is likely related to strong intrusions of relatively warmer EAC waters (in the upper ocean layer) through this passage, as seen in MODIS images

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

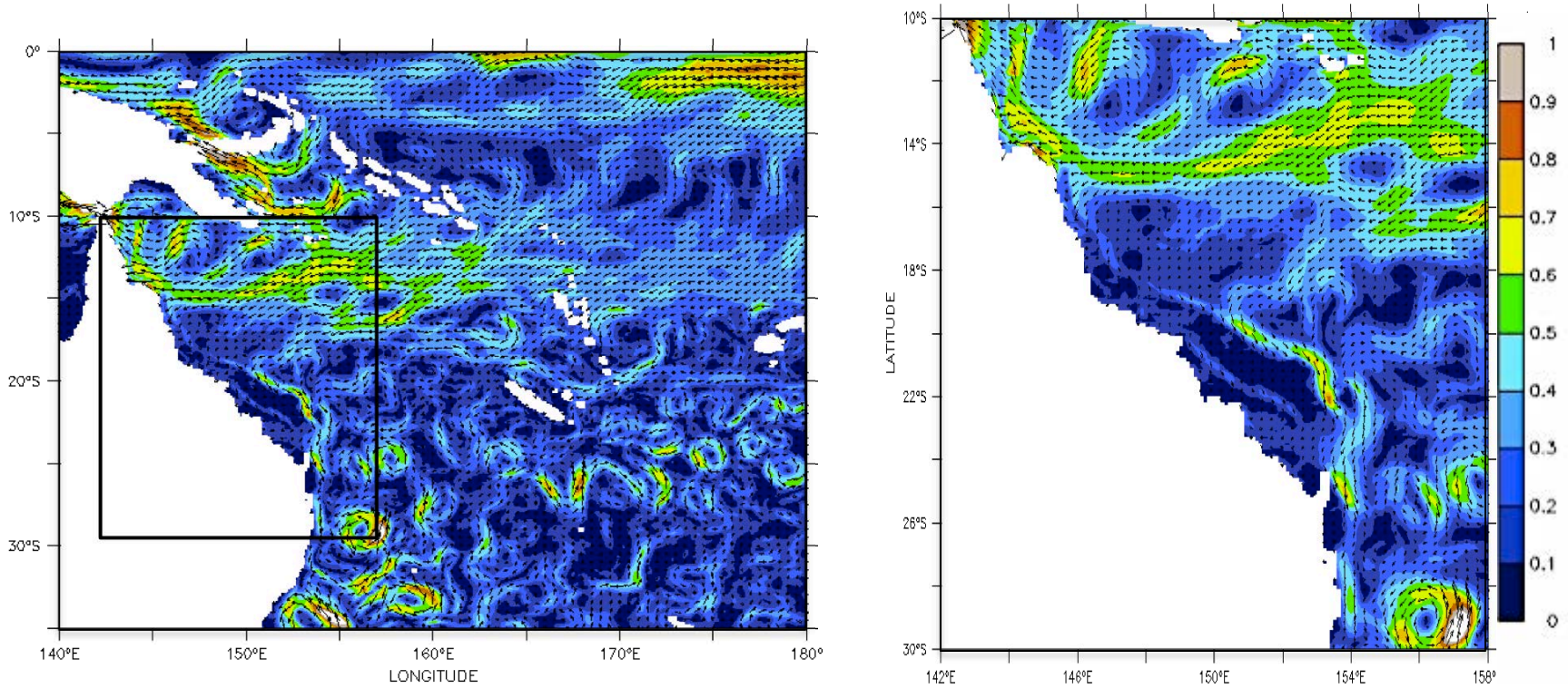


Note:

- AIMS weather station data from Hardy Reef show *in situ* sea water temperature mostly below the longterm average for September, while Heron Is. data continue to show fairly strong fluctuations relative to the longterm mean

OceanMAPS 15m Depth-Average Currents
September 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.

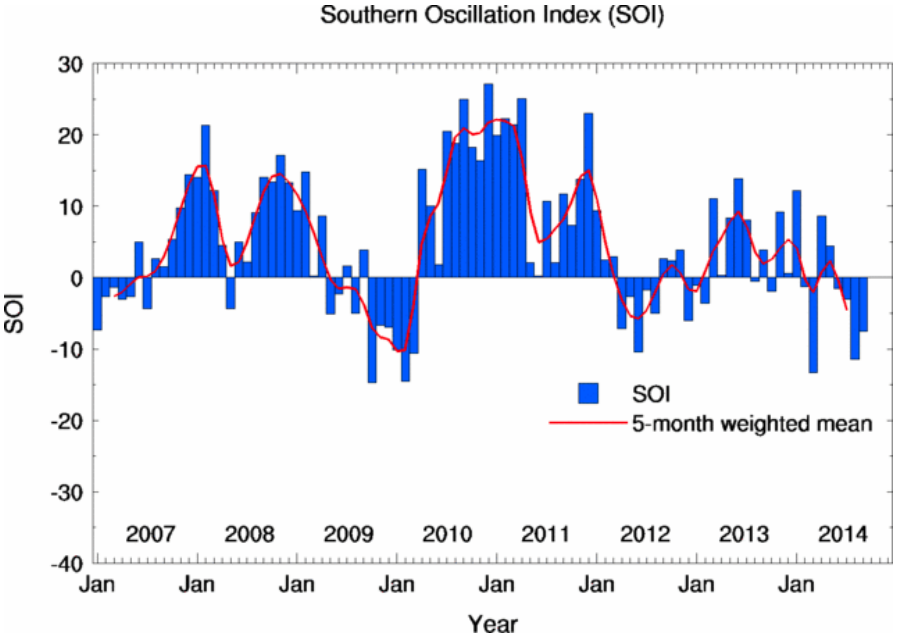


Behind Real Time analysis 15 m Depth-Averaged Currents (m/s)

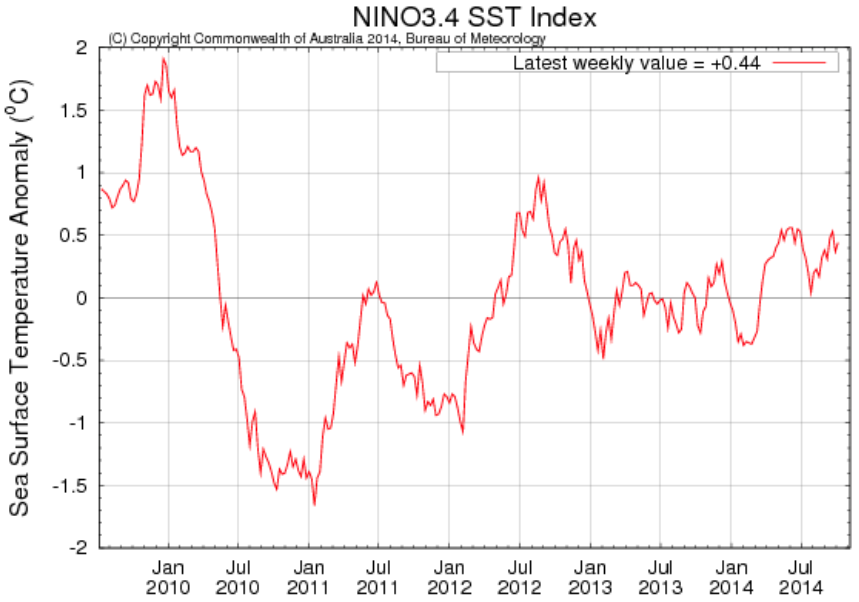
Note:

- Markedly weaker South Equatorial Current (SEC) inflow into the northern GBR, compared to August
- East Australia Current (EAC) visible as a narrow southward flow adjacent to the central & southern GBR, and less defined south of Fraser Island than in August

ENSO Index



Negative SOI = El Niño



Positive Nino 3.4 index= El Niño

Note:

- ENSO neutral conditions continued during September:
- The SOI remains negative as it has for most of austral winter, while the El Niño 3.4 SST index continues to show overall warming, reaching +0.5°C. However, these ENSO indicators have failed to maintain sustained values typical of El Niño.
- With persistent warmth in the tropical Pacific Ocean, models continue to suggest El Niño remains possible during 2014, indicating 50% chance of an El Niño over the coming months.

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