

NERP

Torres Strait / GBR environmental conditions report:

Recent status and predictions

9 November 2011

by Ana Redondo-Rodriguez, PhD candidate – a.rodriguez@uq.edu.au
work supervised by Dr. Scarla Weeks

UQ-GPEM Biophysical Oceanography Group

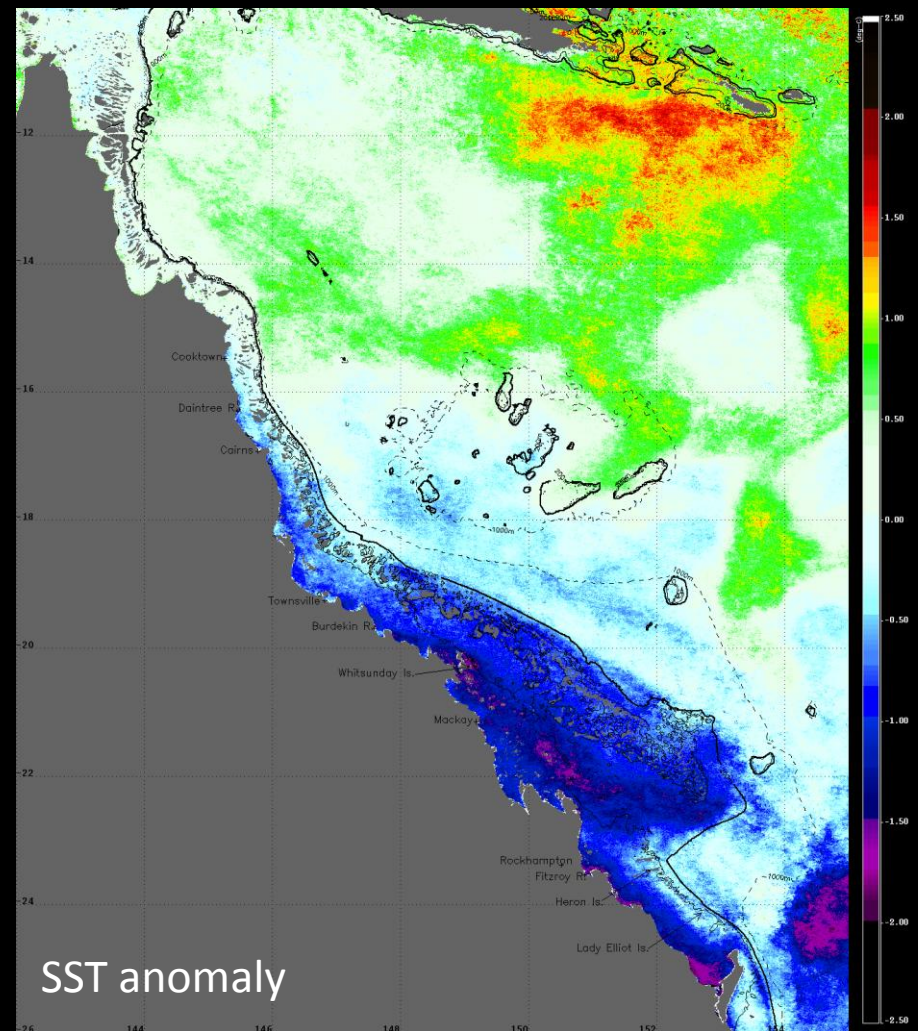
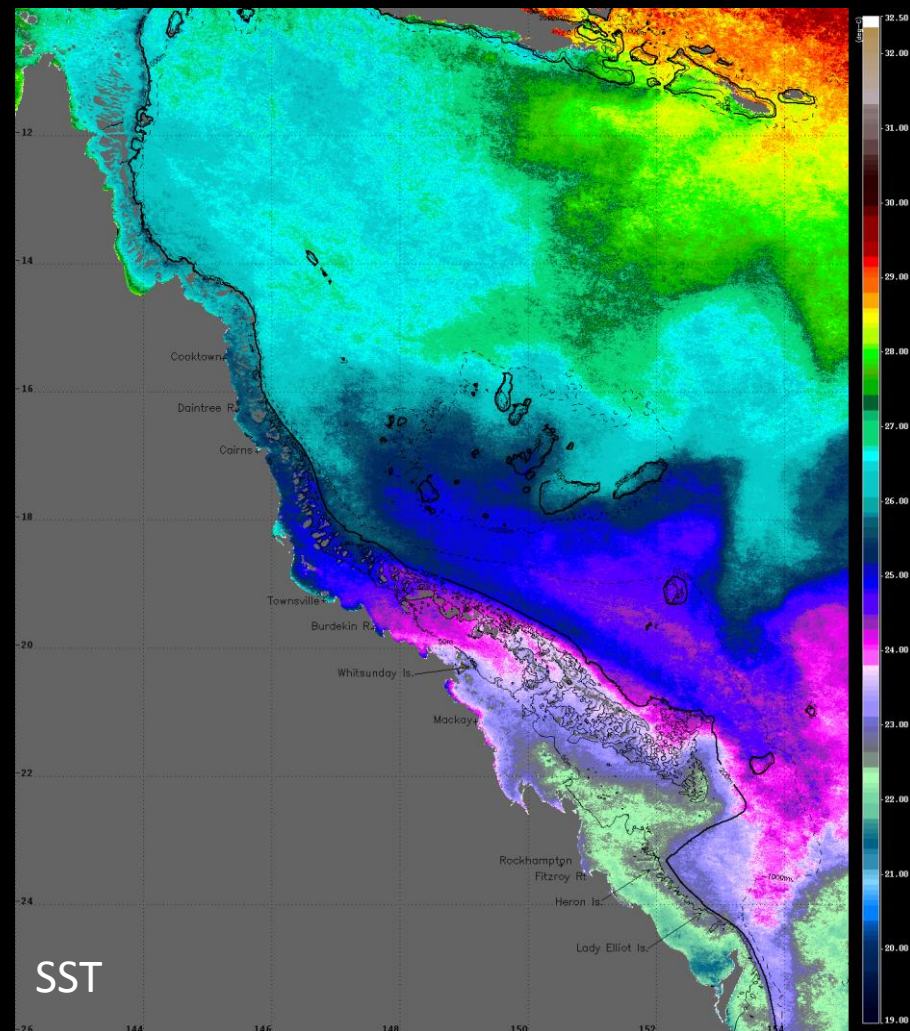
Outline

- Overview
- Recent SST and in situ Temperature evolution
- Recent Chlorophyll-*a* Concentration values
- GBR SST forecast (POAMA)
- Coral Bleaching Outlook (NOAA:CRW)
- Surface conditions in the tropical Pacific
- ENSO evolution and predictions

Overview

- Close to average SST for the Torres Strait / northern GBR area during October but strong negative SST anomalies south of $\sim 17^{\circ}\text{S}$ on the inner GBR reefs.
- Forecast of close to normal SST conditions in the upcoming months (no bleaching alert).
- La Niña conditions established in the Pacific and are expected to strengthen and continue through the summer.

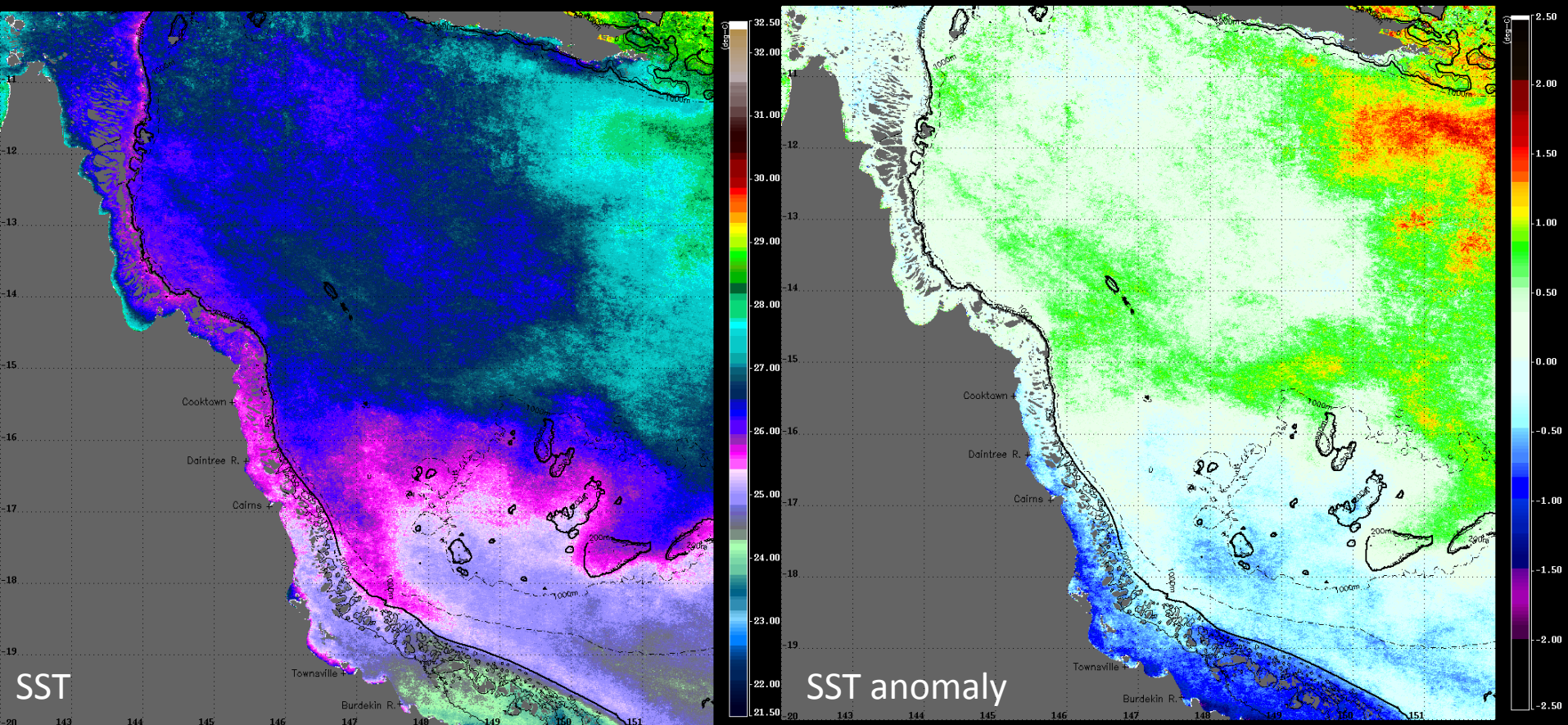
Modis SST (day+night): October 2011



Note:

- Strong negative SST anomalies persist on the GBR reefs south of $\sim 17^{\circ}\text{S}$
- Strong EAC flow southward adjacent to the continental shelf
- Intensified SST positive anomalies in the Coral Sea

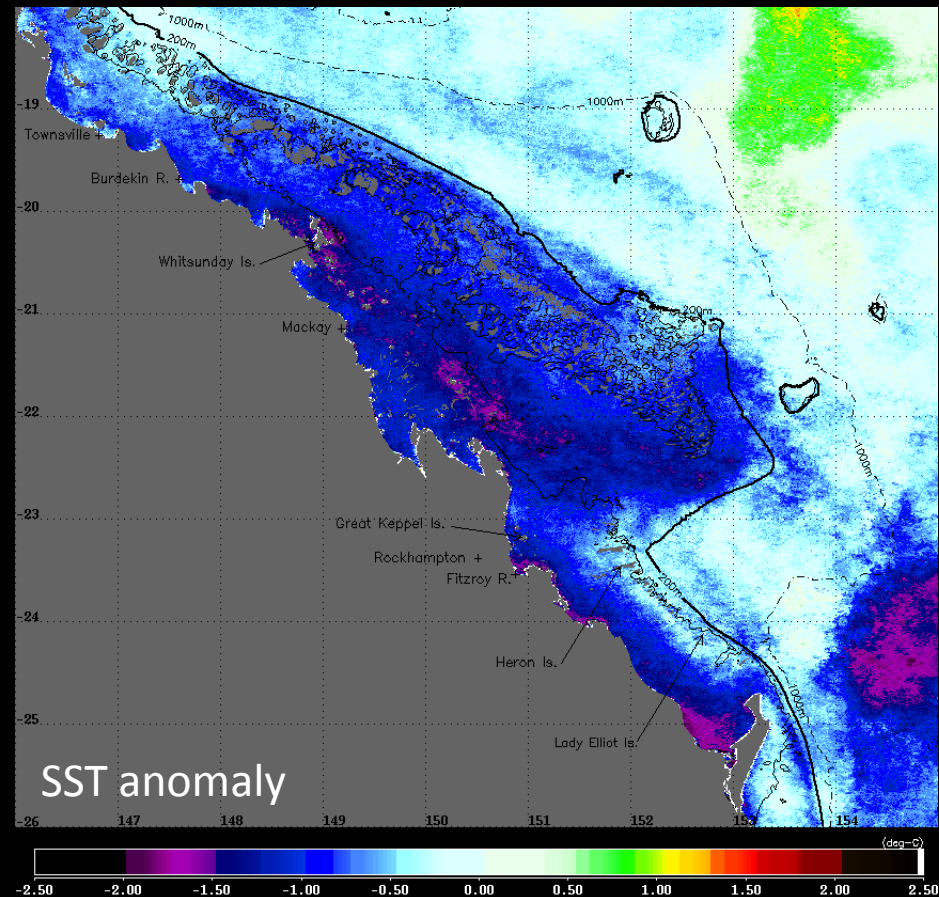
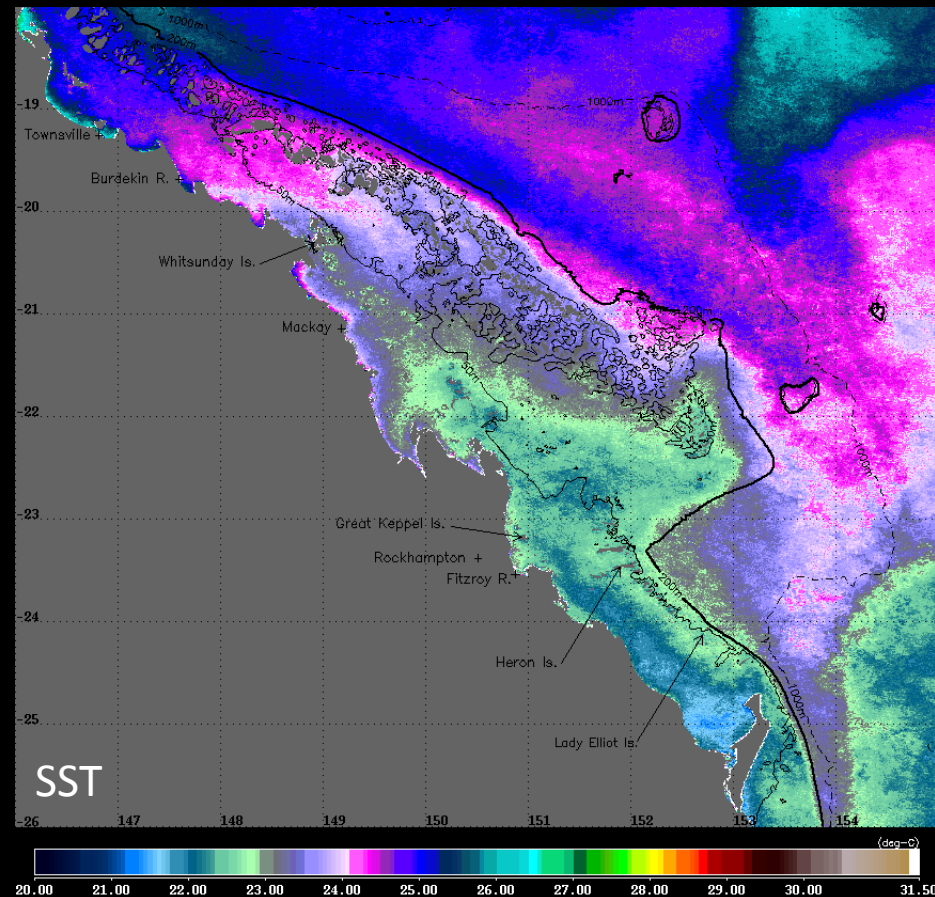
Torres Strait / northern GBR MODIS SST: October 2011



Note: SST scale adjusted for N-GBR

- Mostly average conditions for the Torres Strait and N-GBR area, with the exception of the inner reefs south of ~17deg S
- Intensified SST positive anomalies in the Coral Sea, particularly in the region SE of Papua New Guinea

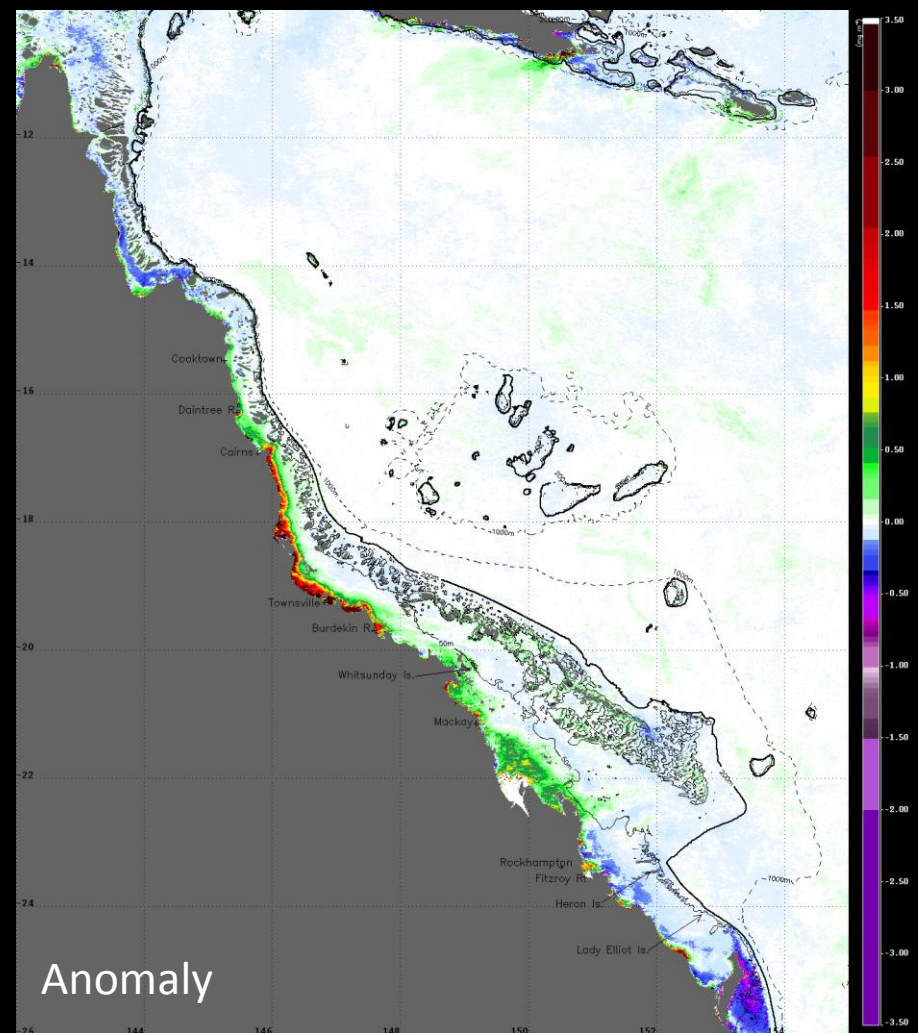
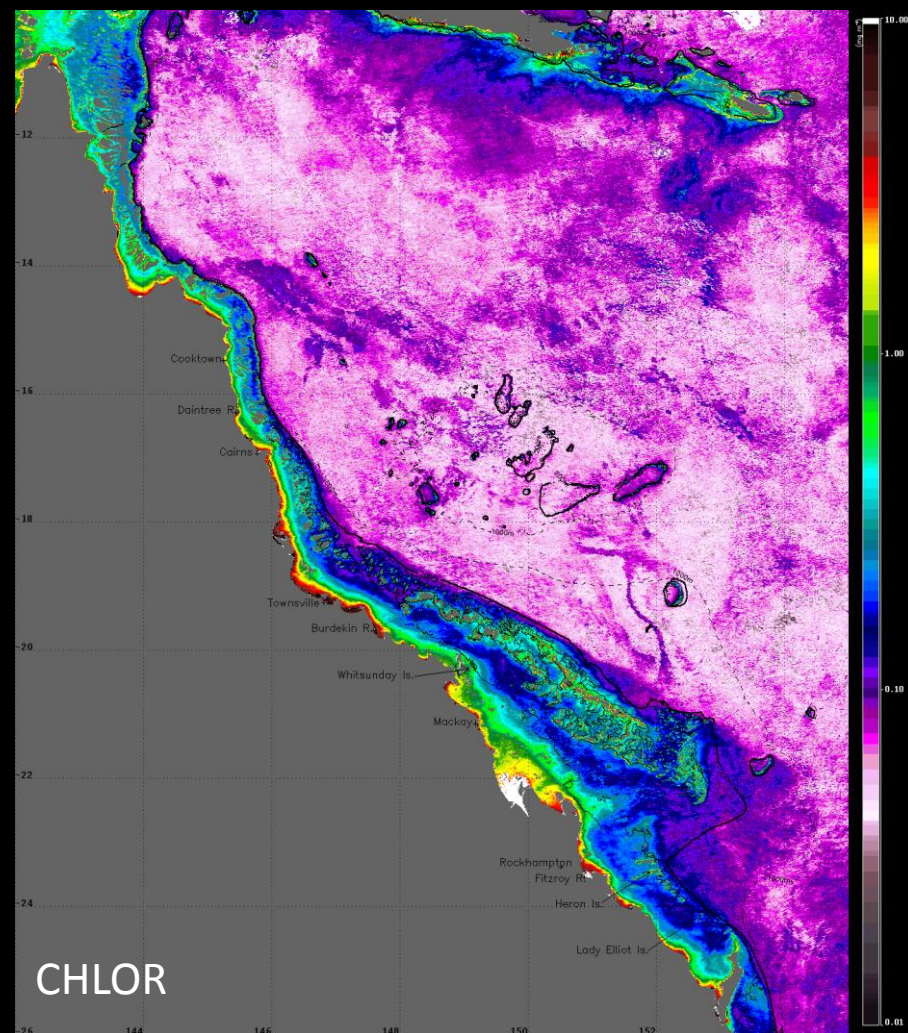
Southern GBR MODIS SST: October 2011



Note: SST scale adjusted for S-GBR

- Strong negative SST anomalies persist on the southern GBR during October
- Intensified EAC flow confining negative SST anomalies, leading to close to average conditions for the Capricorn Bunker Reefs

MODIS Chlorophyll-*a* concentration: October 2011



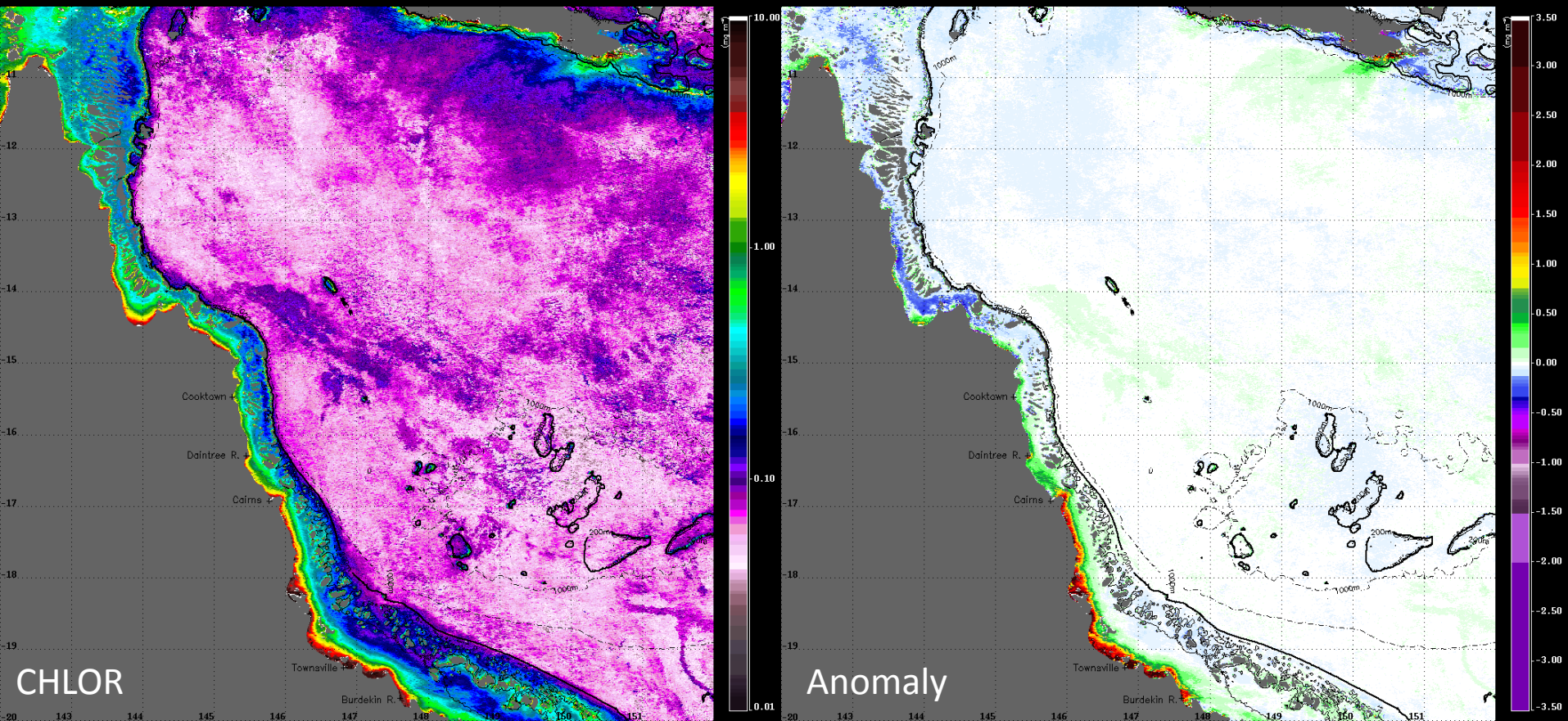
Note:

- For October, close to average chlorophyll concentration levels across the Torres Strait and the length of the GBR, except for:
- increased concentrations in the coastal waters from Burdekin River northward towards Cairns, likely due to river discharge & mixing of the water column

Torres Strait / northern GBR

MODIS Chlorophyll-*a* concentration

October 2011

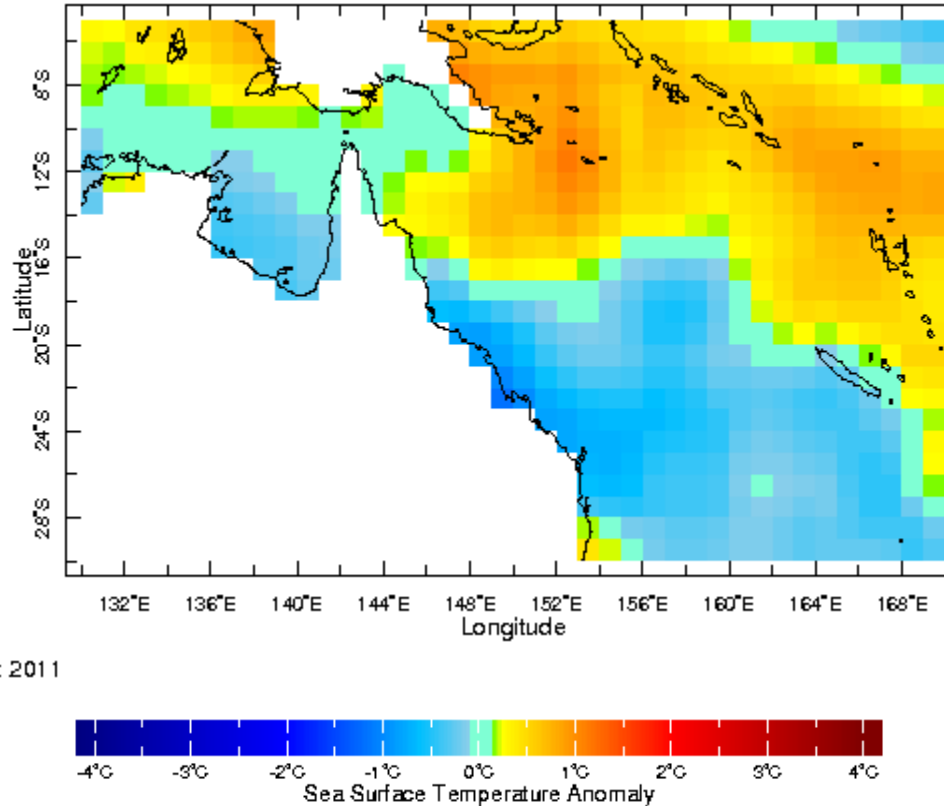


Note:

- Close to average chlorophyll concentrations in the Torres Strait region, high concentrations on inshore GBR reefs south of ~17°S
- Intrusions of low chlorophyll EAC waters into the GBR lagoon clearly apparent through the Myrmidon channel

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

October 2011



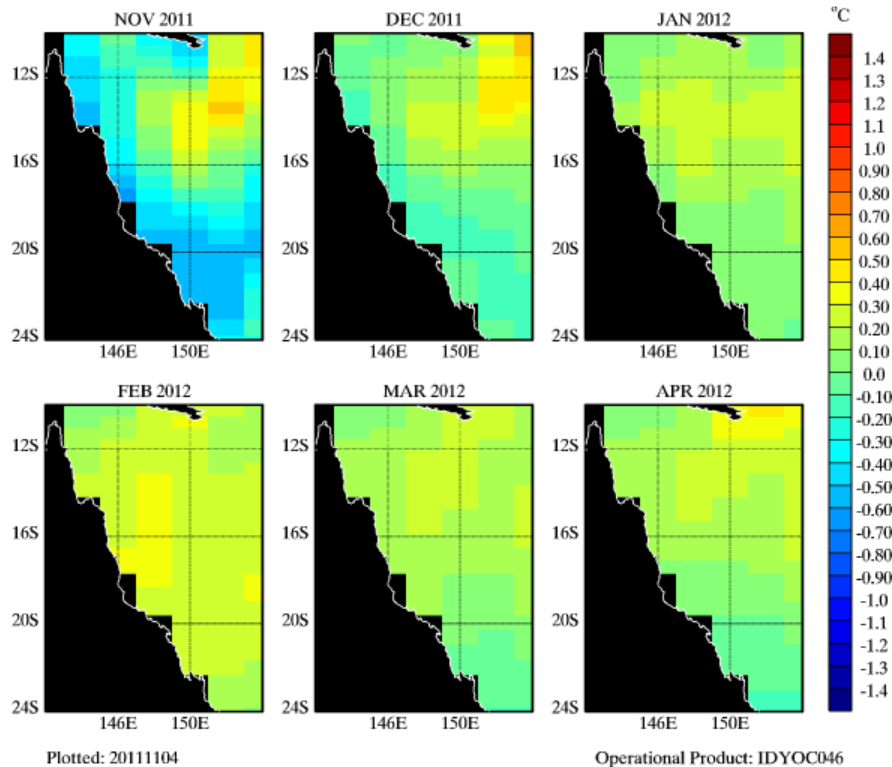
Note:

- Coincident with the MODIS SST data, Reynolds SST anomaly data shows a pattern of lower than average temperatures along the east coast of Australia south of ~17deg S and positive SST anomalies in the Coral Sea during October.
- Close to average conditions for the Torres Strait area.

Great Barrier Reef SST Anomaly Forecasts (POAMA-2)

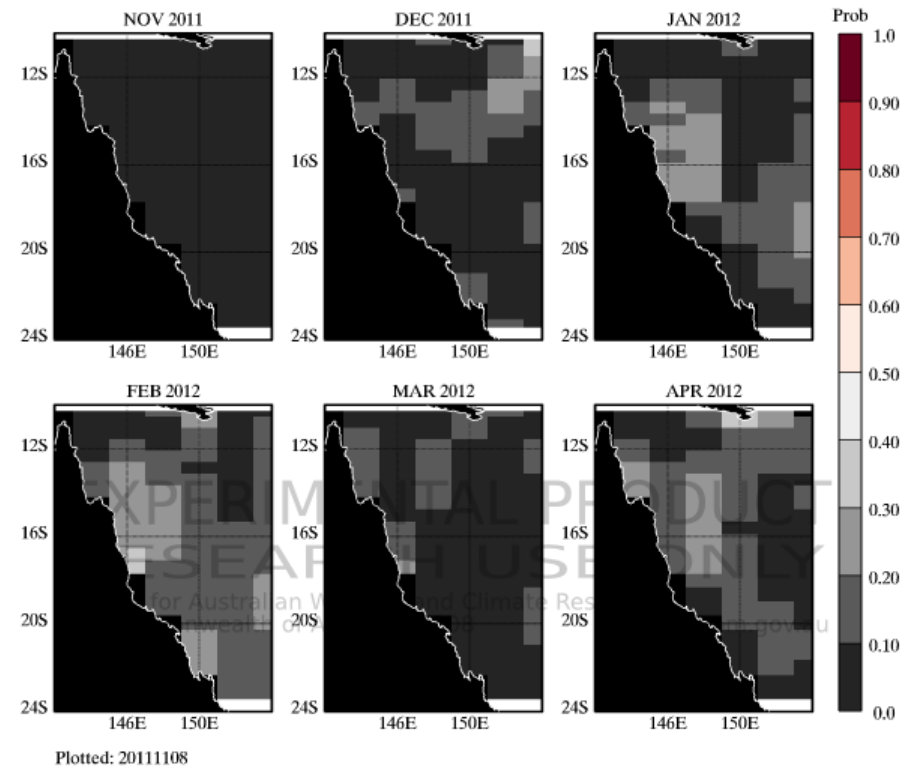
POAMA SST anomaly forecast for the next 6 months (Operational)

P2.4abc Monthly SSTA: GBR 20111101 [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 $\geq 0.6^\circ\text{C}$: 20111101 [Lead=0-5 months, Nens=30]



Note:

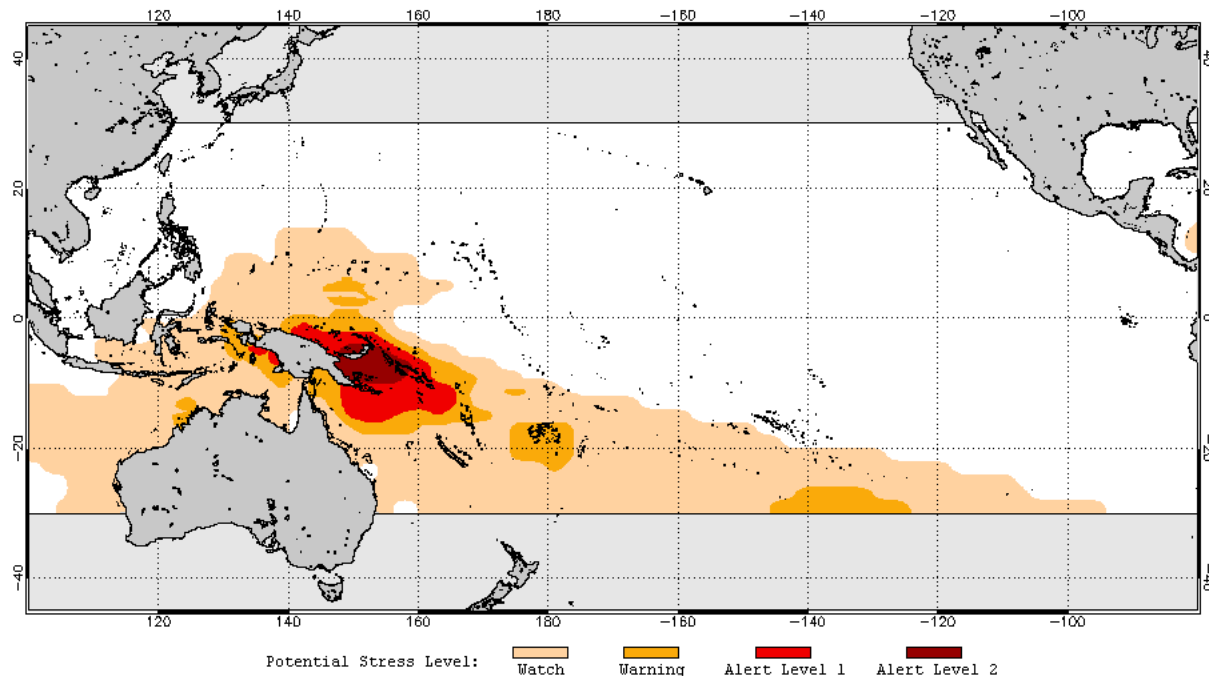
- From 3 November 2011, the POAMA model has been upgraded to POAMA-2.
- POAMA forecasts negative anomalies for November that will sequentially dissipate towards positive anomalies as we head into summer.
- SST anomalies are not expected to exceed 0.6°C in the following 6 months.

NOAA Coral Reef Watch

Coral Bleaching Thermal Stress Outlook (Version 2, experimental)

Outlook for November 2011 to February 2012

2011 Nov 01 NOAA Coral Reef Watch Coral Bleaching Thermal Stress Outlook for Nov–Feb 2012
(Version 2, Experimental)



Note:

- NOAA thermal Stress Outlook suggests 'Watch' for potential thermal stress until February 2012, with increasing alert levels around PNG reefs.

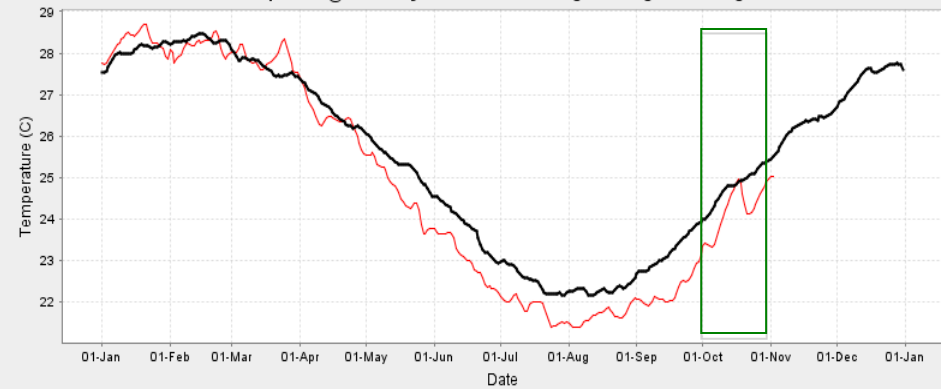
Weather Observing System: AIMS Data Centre

Water Temperature@8.5m Cleveland Bay Platform Trend Against Long Term Average



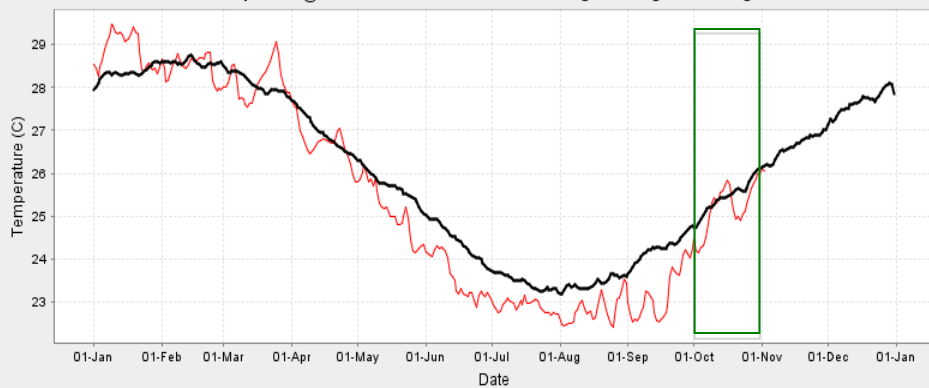
— Water Temperature@8.5m Cleveland Bay long term average over 8 years — LEVEL1 Water Temperature@8.5m Cleveland Bay daily average for 2011
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Water Temperature@9.0m Hardy Reef Platform Trend Against Long Term Average



— Water Temperature@9.0m Hardy Reef long term average over 8 years — LEVEL1 Water Temperature@9.0m Hardy Reef daily average for 2011
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Water Temperature@4.0m Davies Reef Base Station Trend Against Long Term Average



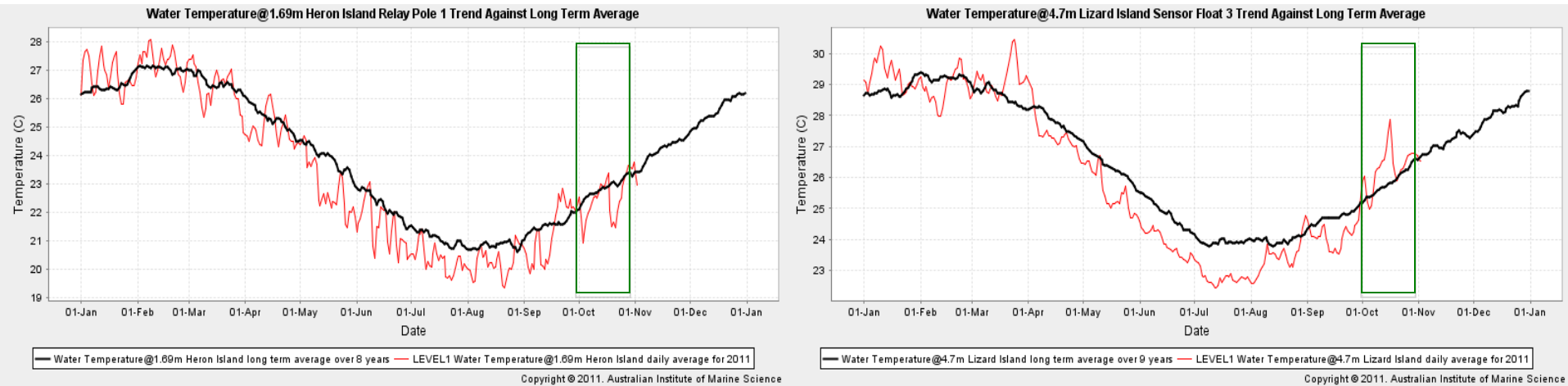
— Water Temperature@4.0m Davies Reef long term average over 14 years — LEVEL1 Water Temperature@4.0m Davies Reef daily average for 2011
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Water Temperature@7.9m Square Rocks Trend Against Long Term Average



— Water Temperature@7.9m Square Rocks long term average over 6 years — LEVEL1 Water Temperature@7.9m Square Rocks daily average for 2011
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Weather Observing System: AIMS Data Centre

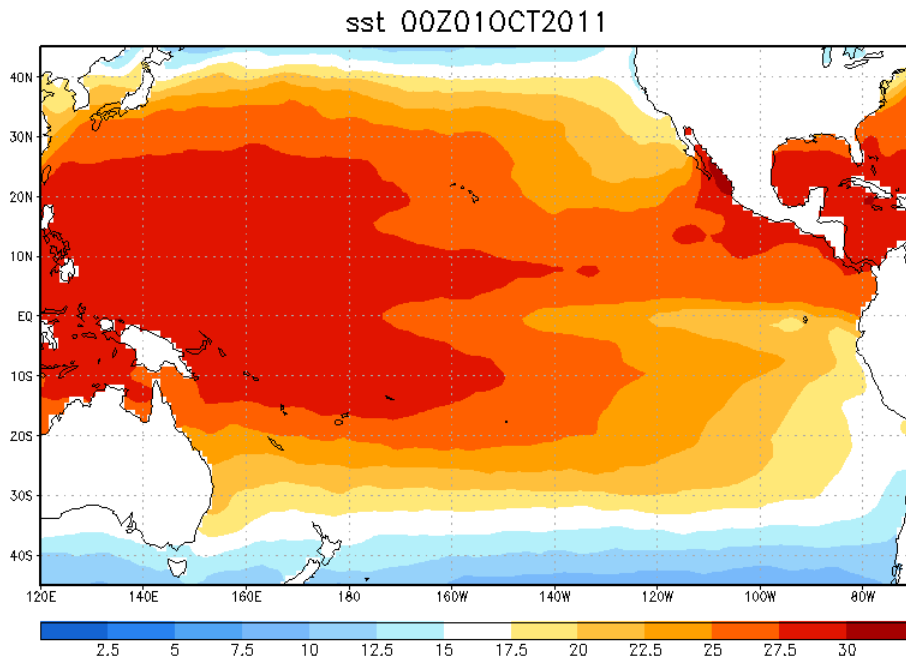


Note:

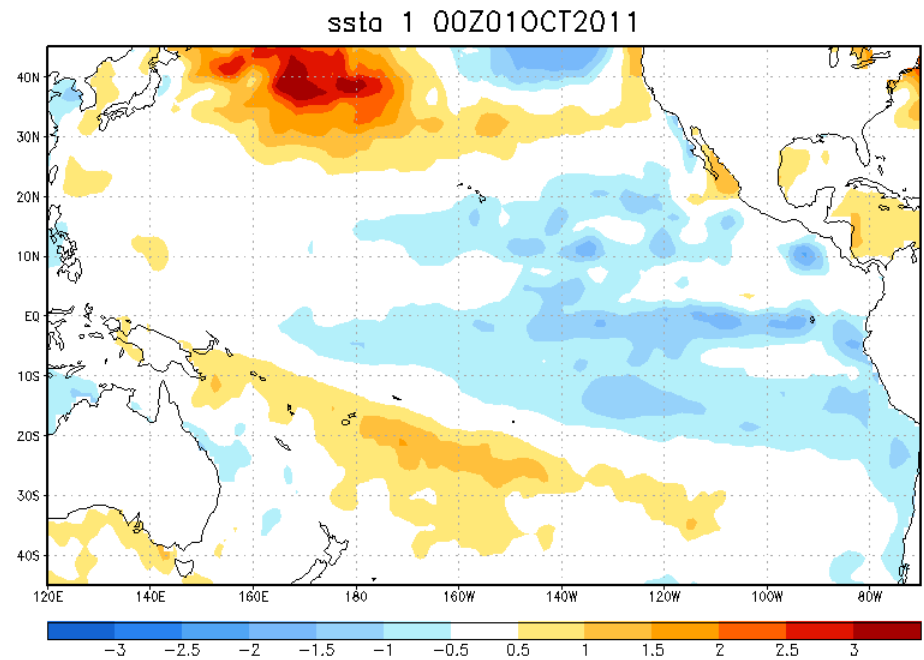
- Coincident with the SST data, in situ temperatures at all stations show close to or lower than average temperatures for October, with the exception of Lizard Island which is situated at the most northerly location

NOAA Optimum Interpolation Sea Surface Temperature Analysis:

OI SST: OCTOBER 2011



OI SST ANOMALY: OCTOBER 2011

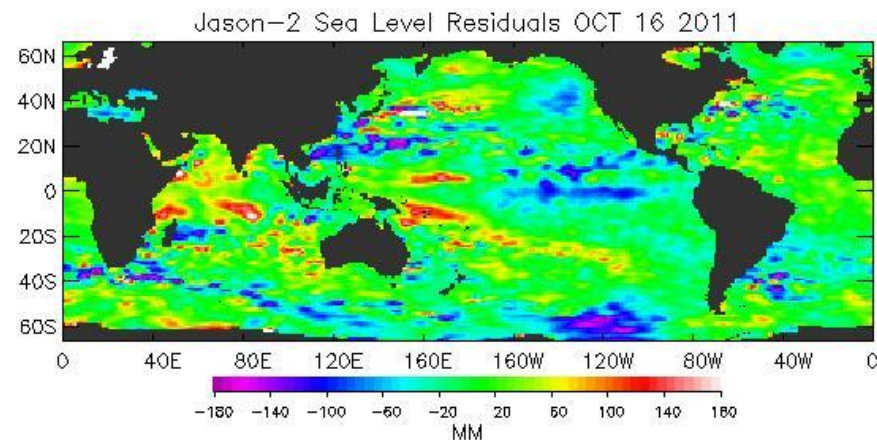
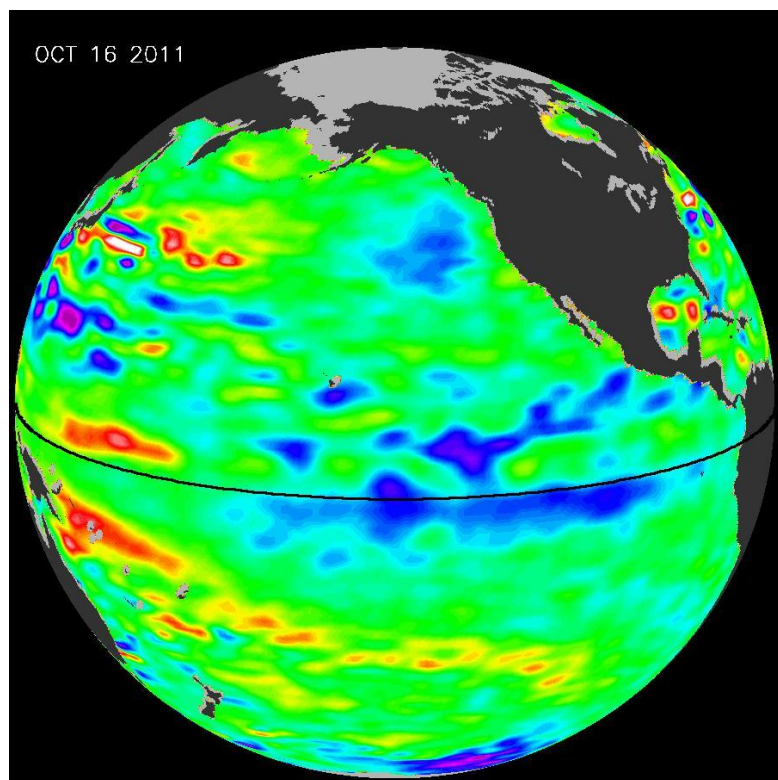


Note:

- Negative SST anomalies persisted across the east half of the equatorial Pacific during October, indicative of La Niña conditions

Sea surface height anomalies from Ocean Surface Topography: Jason-1 and Jason-22 (NASA/French)

10-day data cycle centered around 16 October, 2011.



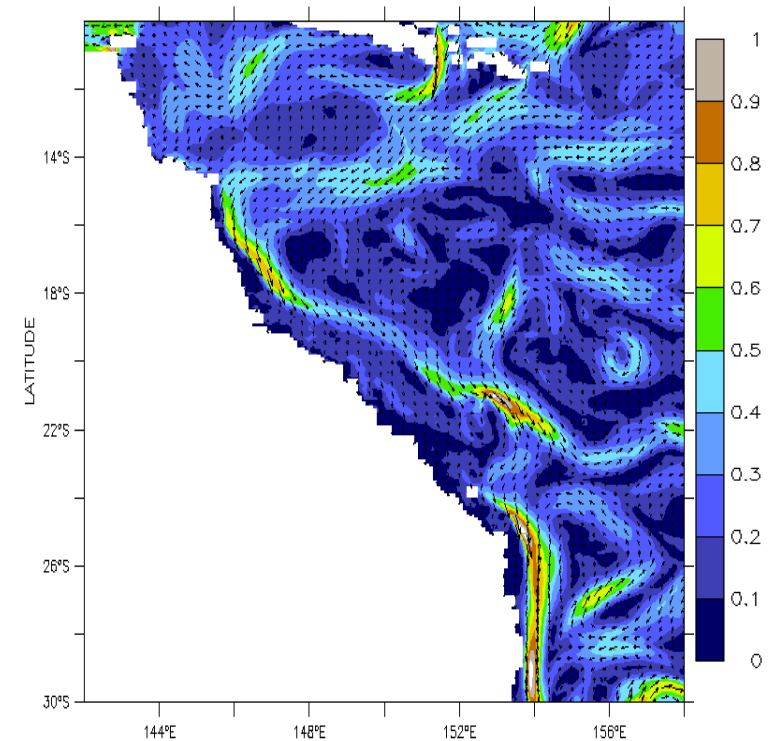
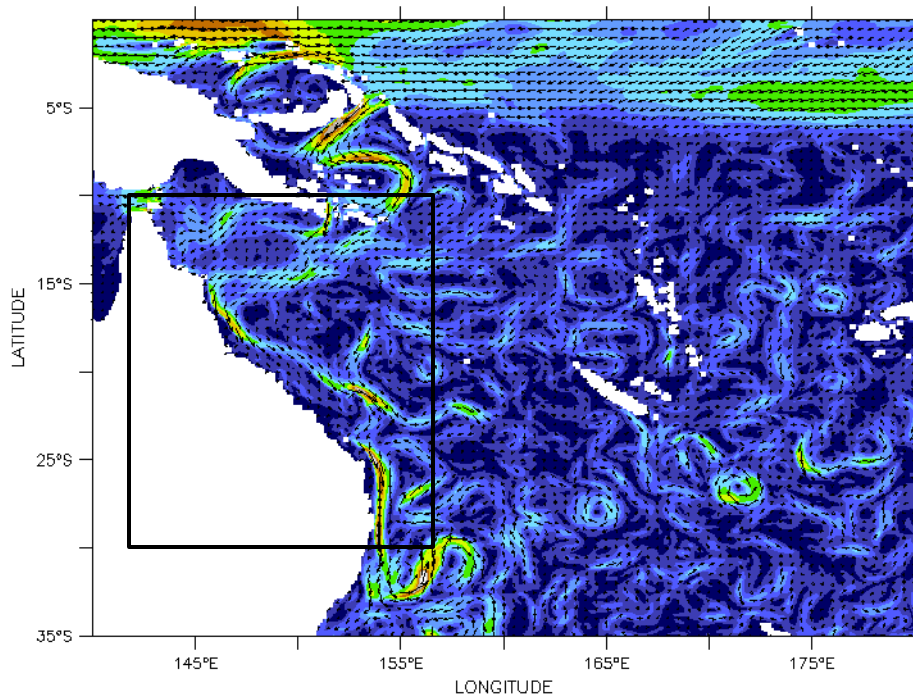
Note:

- Satellite SSH data shows negative SSH anomalies located in the eastern equatorial Pacific, related to La Niña which is characterized by lower SSH in the central and eastern equatorial Pacific and an increase in SSH over the Western Pacific Warm Pool.

OceanMAPS 15m Depth-Average Currents

October 2011

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.



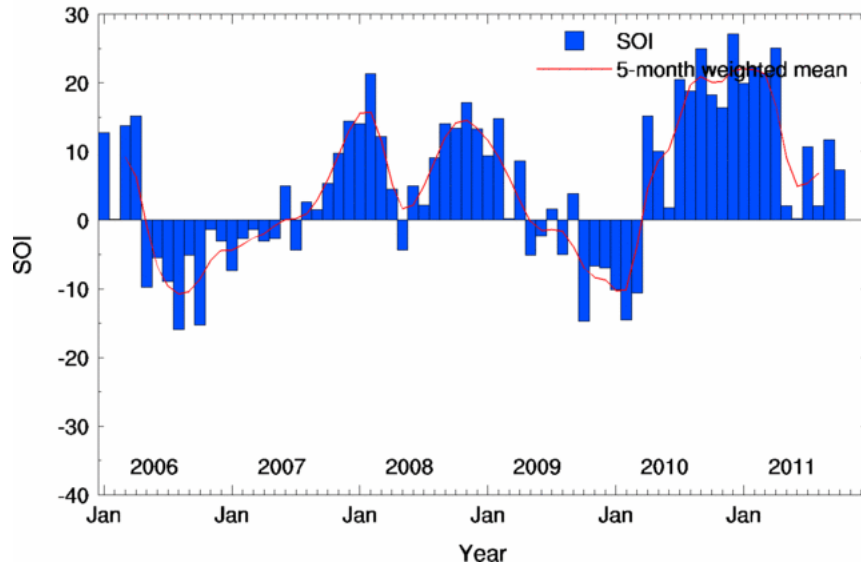
Behind Real Time analysis
15 m depth-averaged currents (m/s).

Note:

- Strong southward EAC flow adjacent to the GBR shelf from 14 deg S,
- Pronounced strengthening of the EAC around the Swains and south of ~23°S

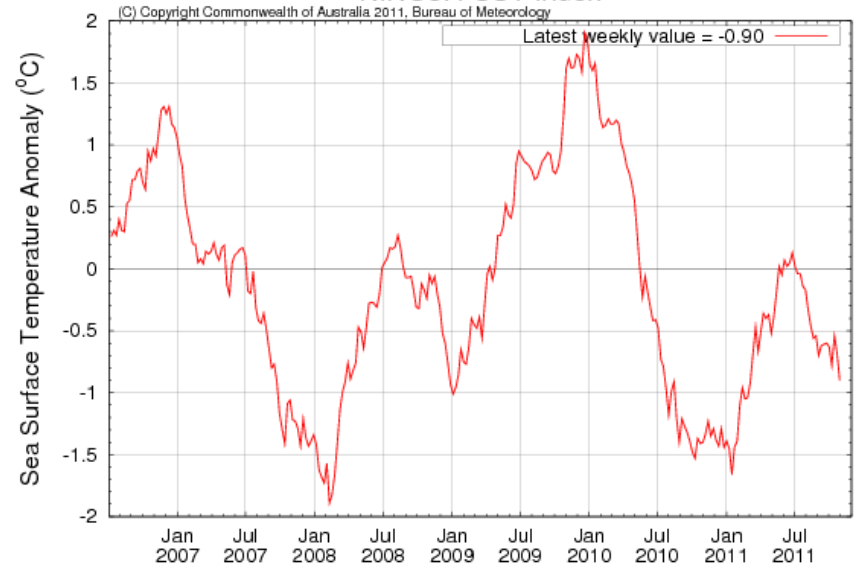
ENSO index

Southern Oscillation Index (SOI)



Positive SOI = La Niña

NINO3.4 SST Index



Negative Nino 3.4 index= La Niña

Note:

- ENSO indices indicate La Niña conditions, which are expected to strengthen and continue through the summer .