NERP

Torres Strait / GBR environmental conditions report:

Recent status and predictions

October 2011

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UQ-GPEM Biophysical Oceanography Group

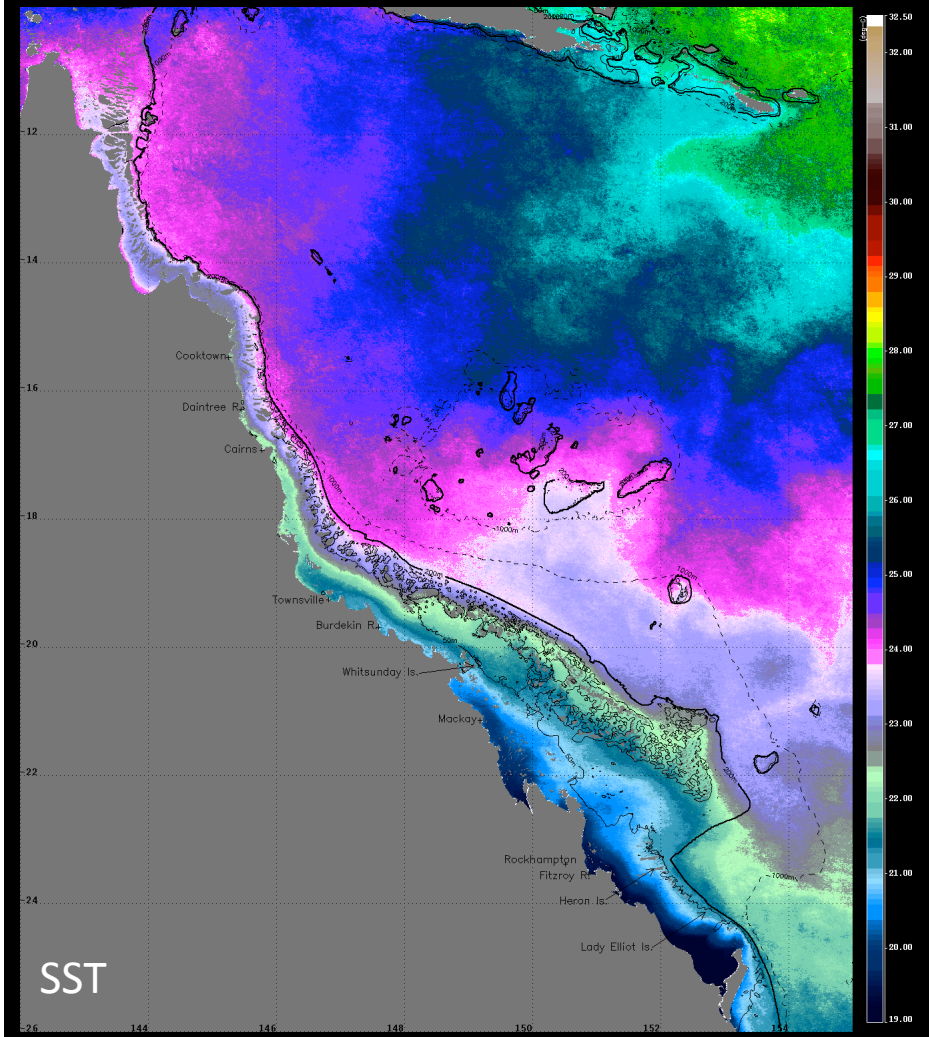
Outline

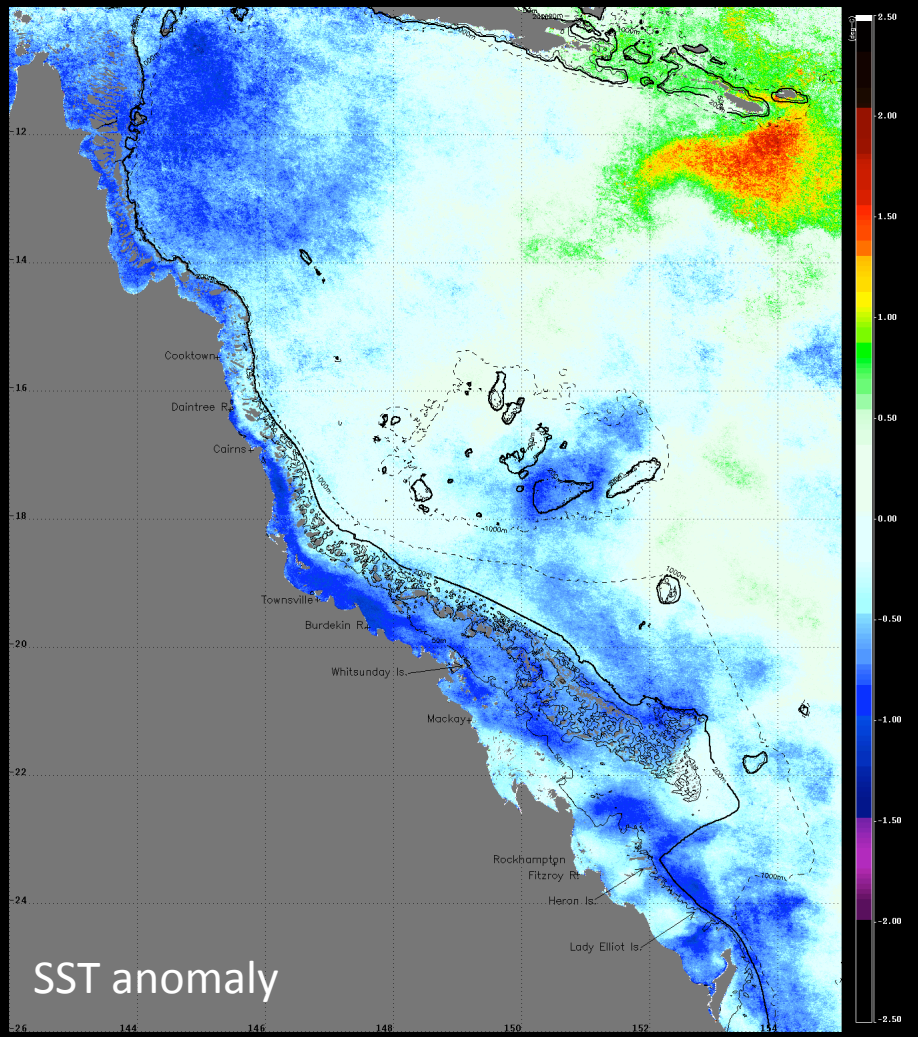
- Overview
- Recent SST and in situ Temperature evolution
- Recent Chlorophyll-*a* Concentration values
- GBR SST forecast (POAMA)
- Coral Bleaching Outlook (NOAA:CRW)
- Surface conditions in the tropical Pacific
- ENSO evolution and predictions

Overview

- Low SST (negative anomalies) for the whole Torres Strait / GBR area. Forecast of close to normal conditions in the upcoming months (no bleaching alert).
- Weak La Niña conditions in the Pacific with uncertainty about the future development of La Niña.
- Surface circulation: Strong SEC inflow into the northern GBR. Strengthening of the EAC along the shelf (warming of waters on the outer reefs).

Modis SST (day+night): August 2011

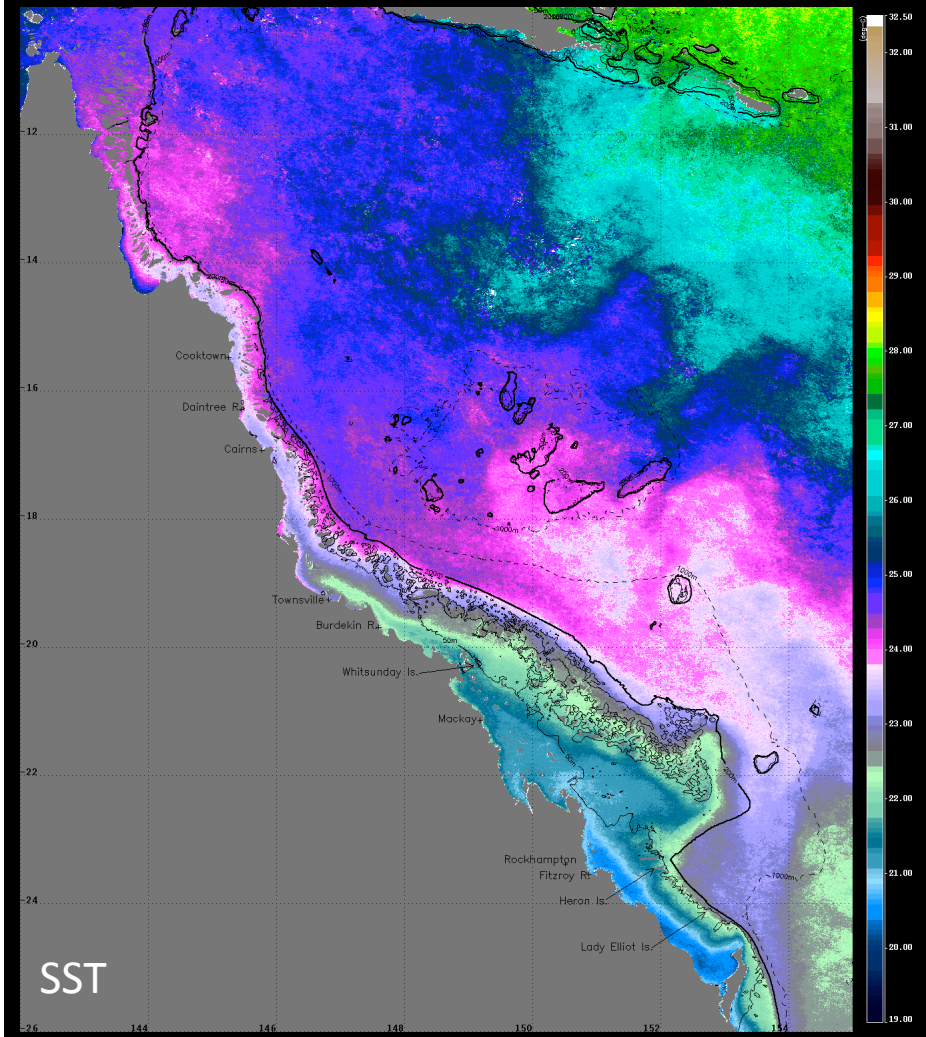


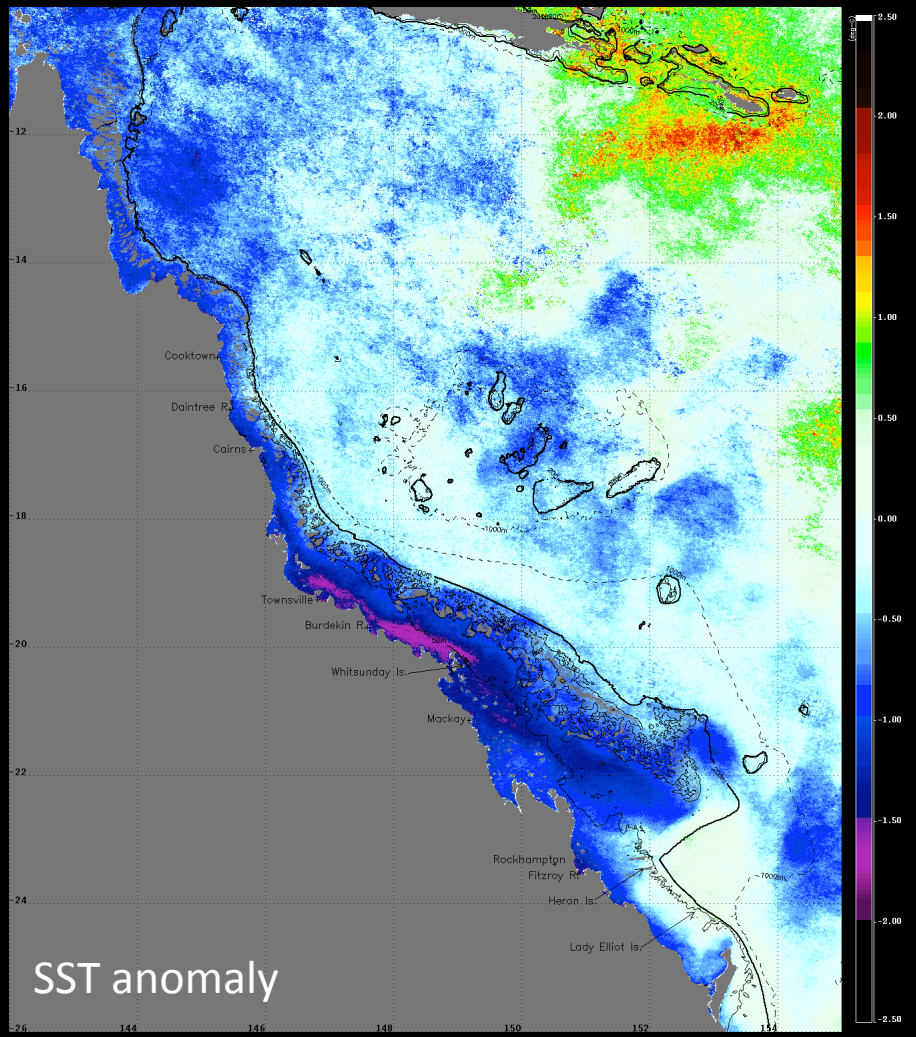


Note:

- Lower than average SST along the GBR and in Torres Strait

Modis SST (day+night): September 2011

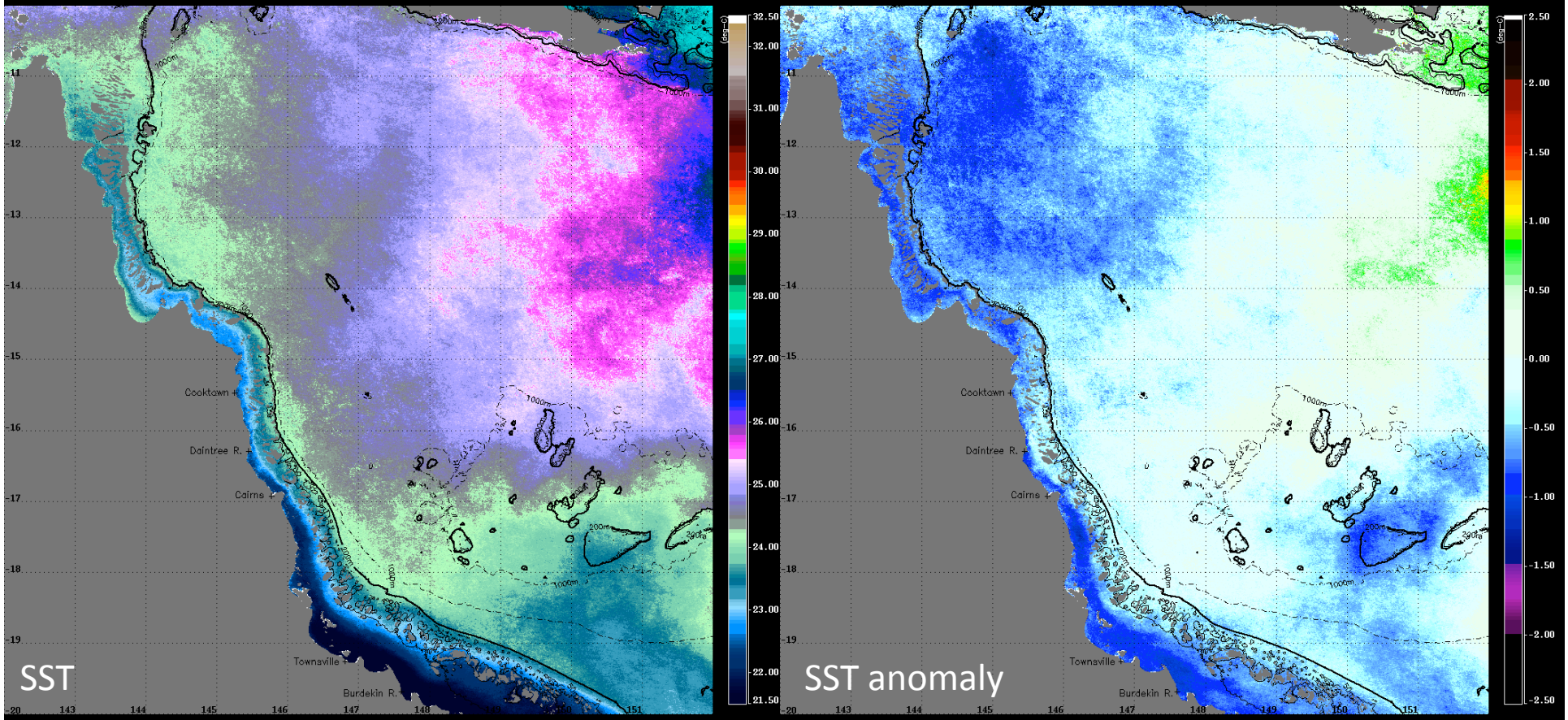




Note:

- Strong negative SST anomalies along the GBR and in Torres Strait, but especially on the inner reefs south of ~18^{o}S.
- Strong EAC flowing southward adjacent to the shelf
- Intensified SST positive anomalies in the Coral Sea

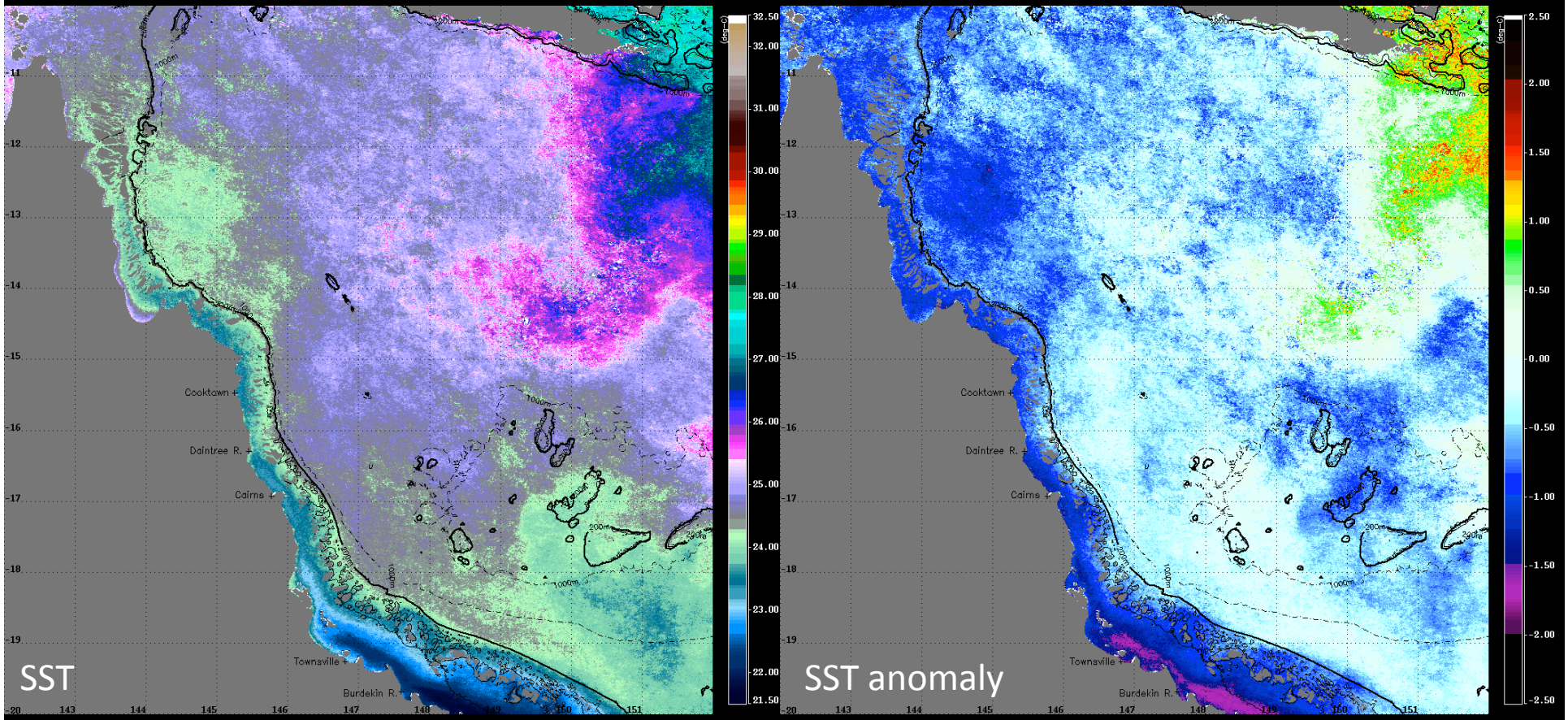
Torres Strait / northern GBR MODIS SST: August 2011



Note:

- Lower than average SST across the whole Torres Strait / northern GBR area and especially on the inner shelf

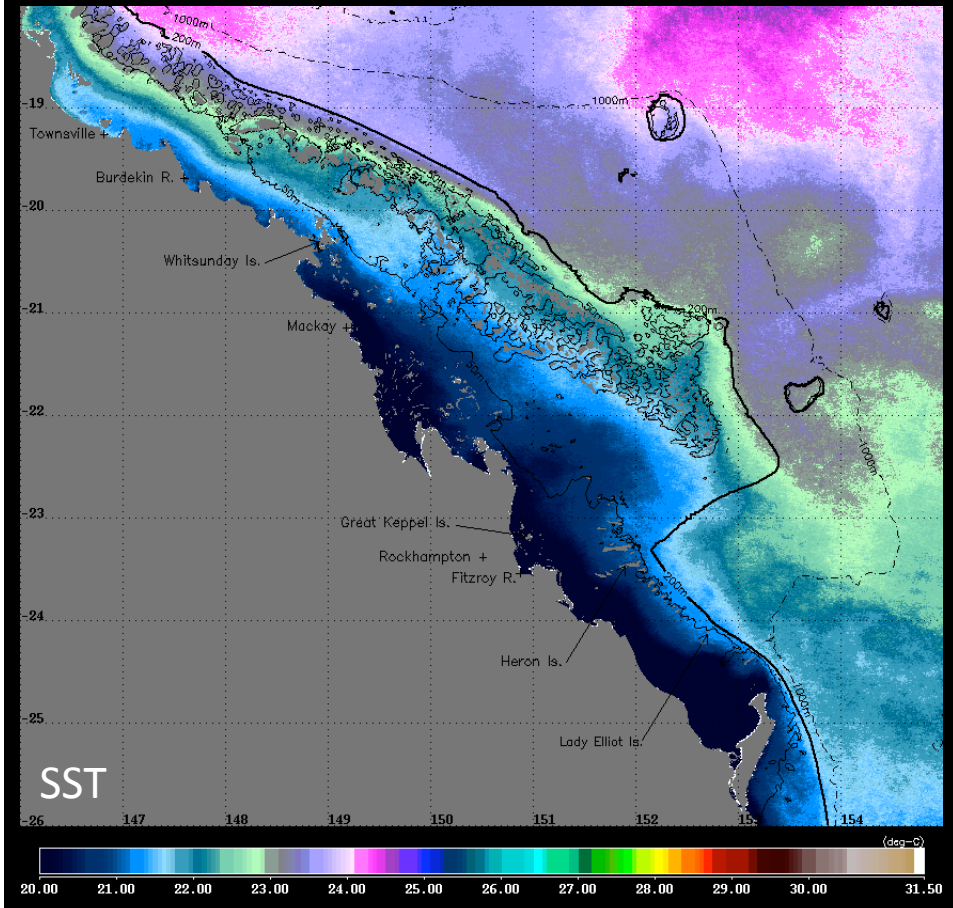
Torres Strait / northern GBR MODIS SST: September 2011

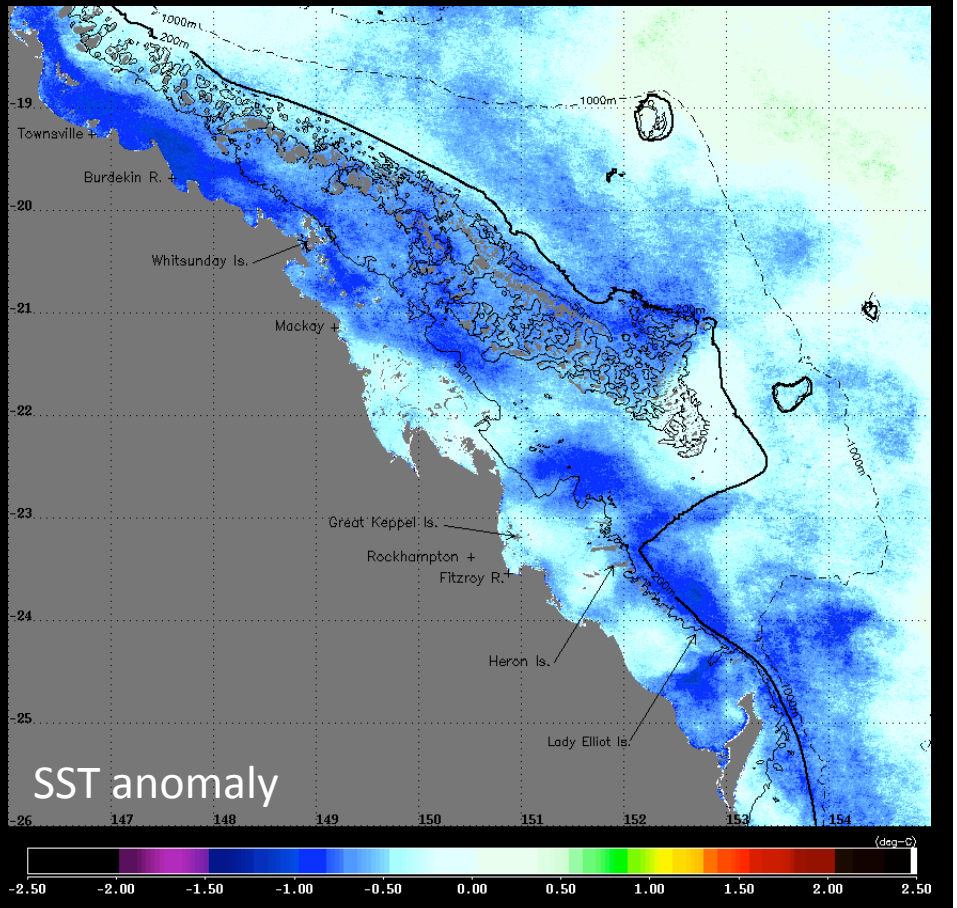


Note:

- SST negative anomalies strengthened in September, especially on the inner shelf south of Townsville.

Southern GBR MODIS SST: August 2011

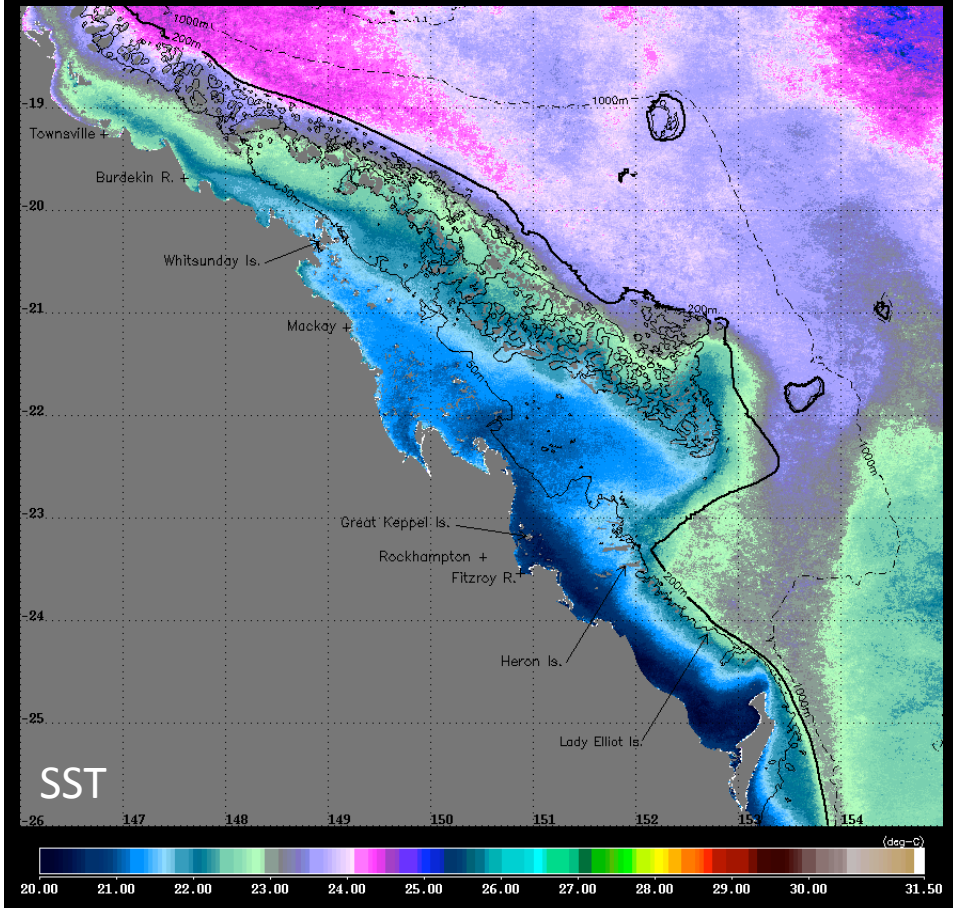


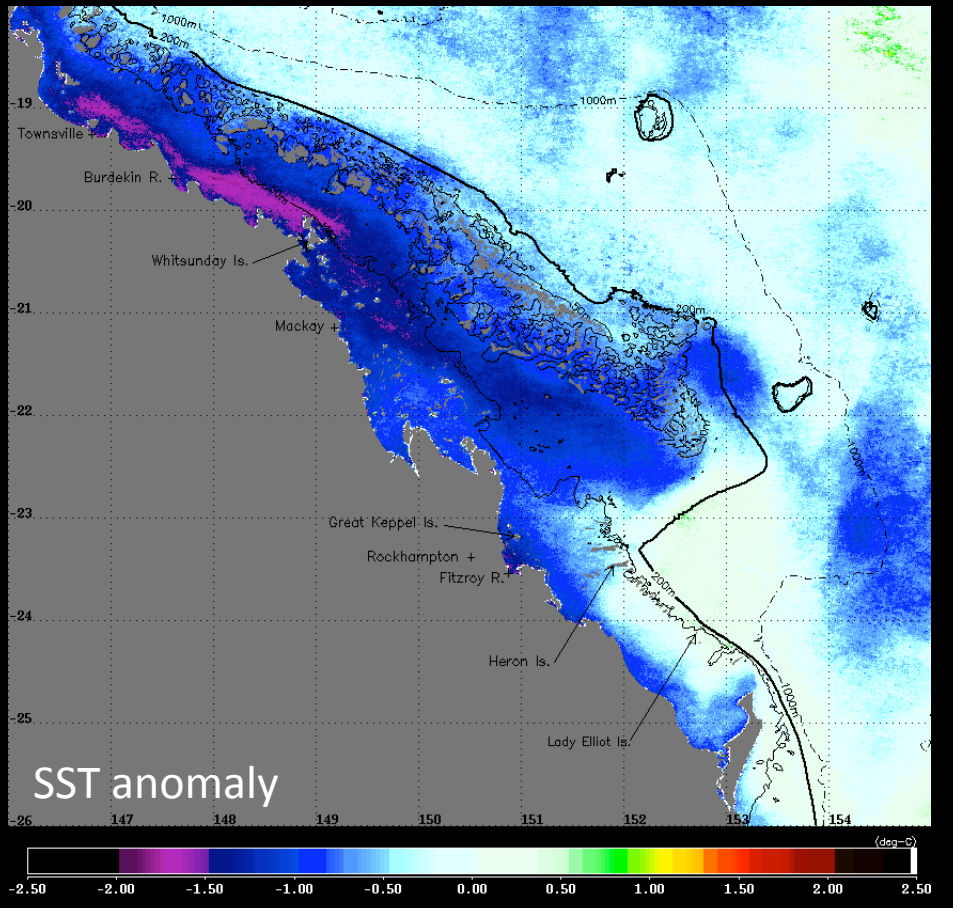


Note:

- Primarily negative SST anomalies along much of the southern GBR.

Southern GBR MODIS SST: September 2011

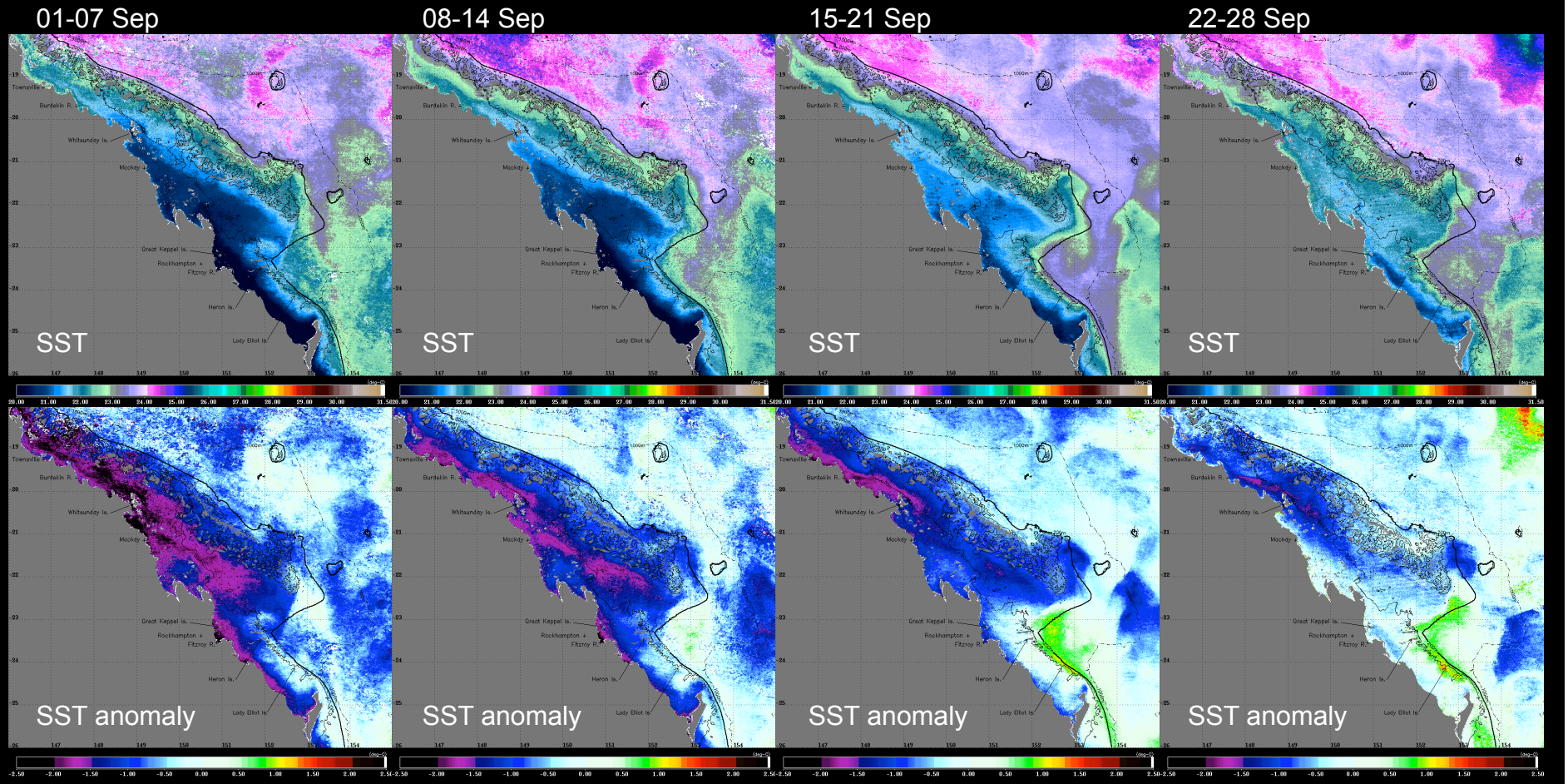




Note:

- SST anomalies strengthened during September, especially on the inner reefs.
- Intensified EAC flow limiting southern extent of negative SST anomalies

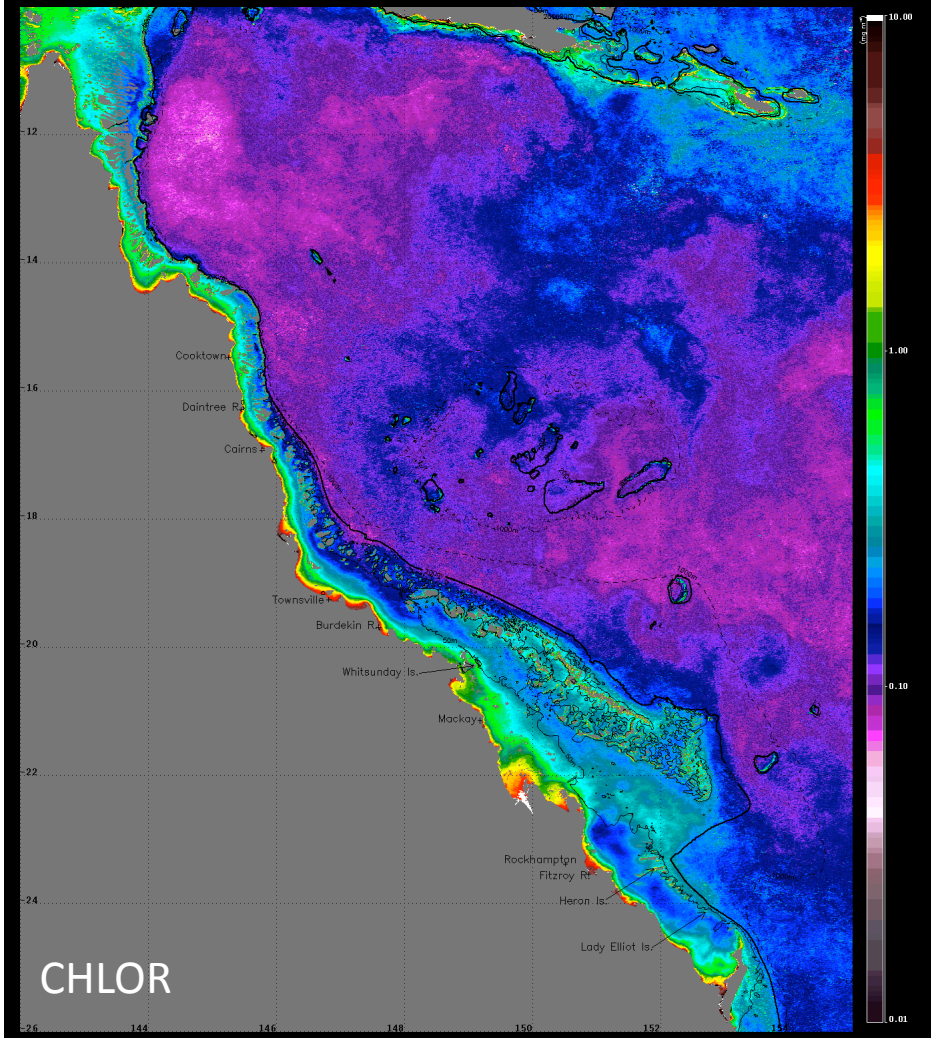
Southern GBR MODIS SST: Weekly means September 2011

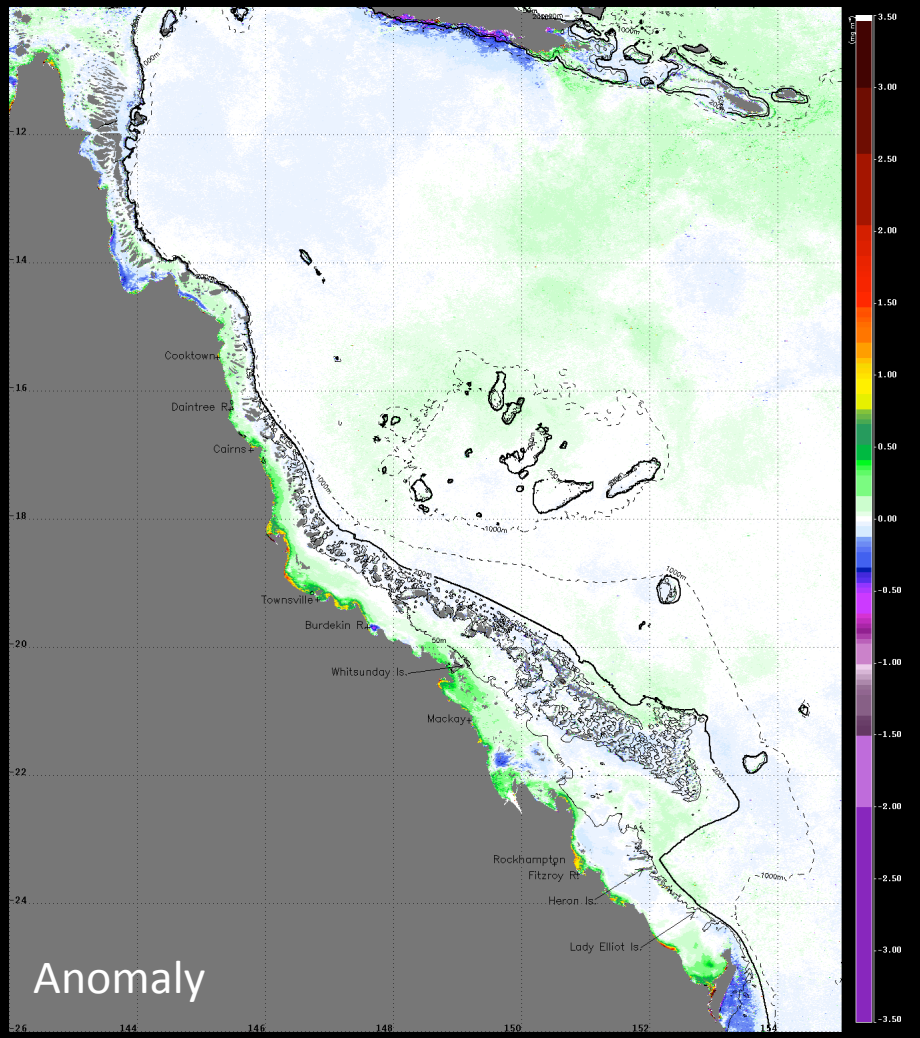


Note:

- SST anomalies strengthened at the beginning of September, but dissipated towards positive anomalies south of ~23ºS as the EAC intensified, spinning up the Capricorn Eddy in the lee of the bathymetry and limiting the southern extent of negative SST anomalies.

MODIS Chlorophyll-*a* concentration: August 2011

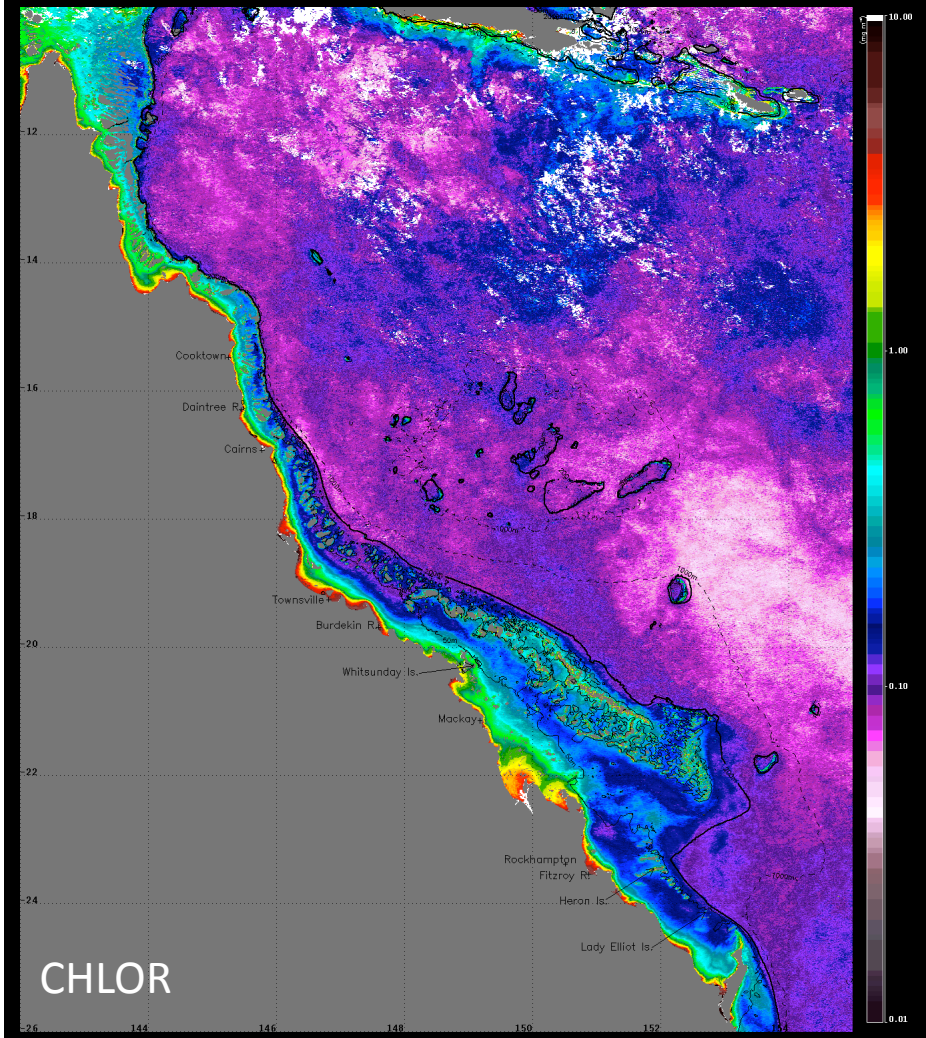


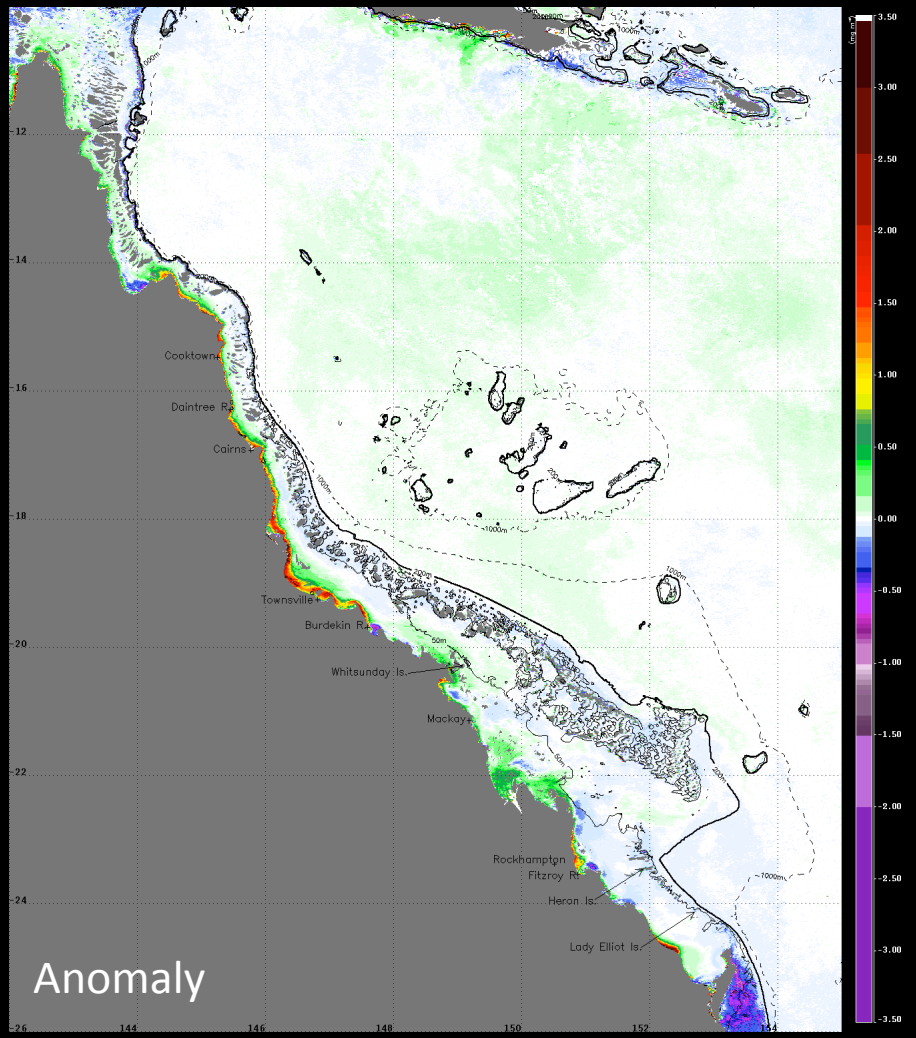


Note:

- Close to average chlorophyll concentration levels for August across the Torres Strait & length of the GBR.

MODIS Chlorophyll-*a* concentration: September 2011

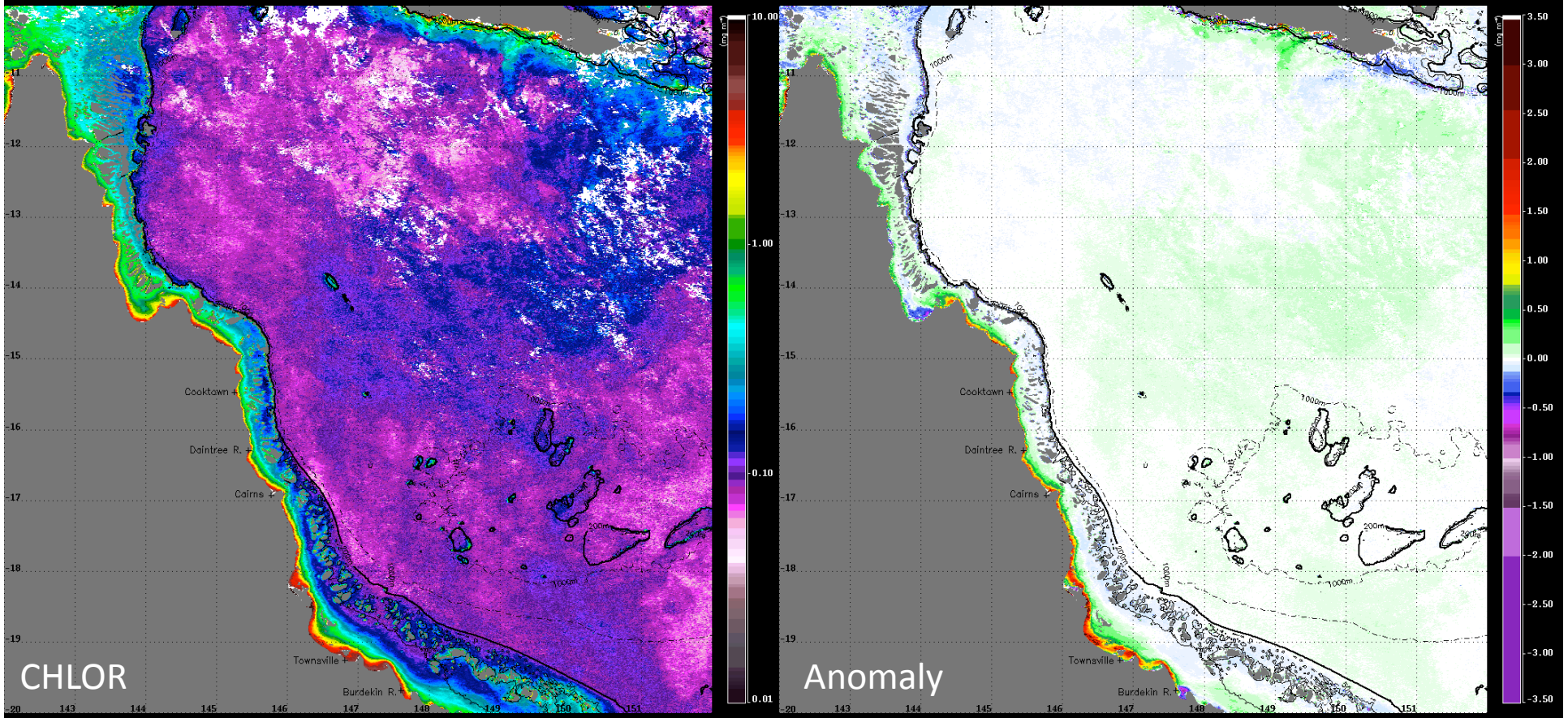




Note:

- Increase in chlorophyll concentrations in the coastal waters from Burdekin River northward towards Townsville, likely due to increased river discharge / vertical mixing.

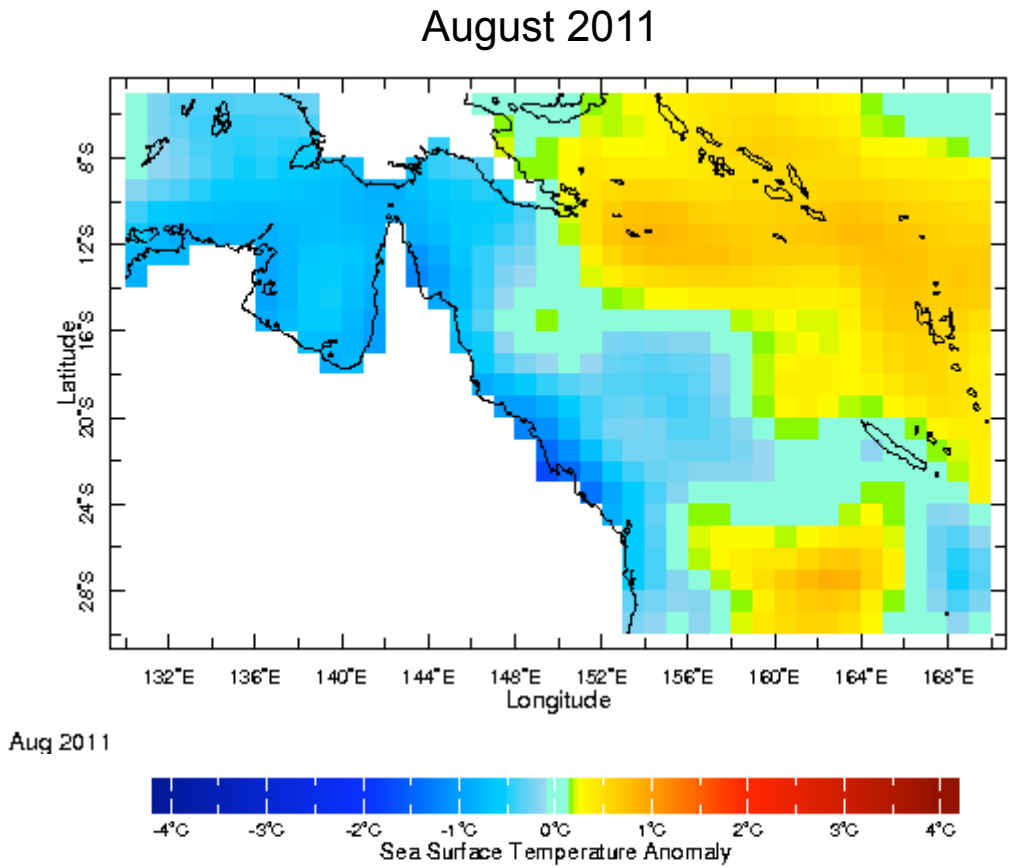
Torres Strait / northern GBR
MODIS Chlorophyll-*a* concentration
September 2011



Note:

- Close to average chlorophyll concentrations in the Torres Strait region, high chlorophyll in inshore coastal waters south of 14°S
- Intrusions of EAC waters into the GBR lagoon clearly apparent through the Myrmidon channel

NOAA NCEP EMC CMB GLOBAL Reyn_SmithOIv2 monthly SSTA: Sea Surface Temperature Anomaly data



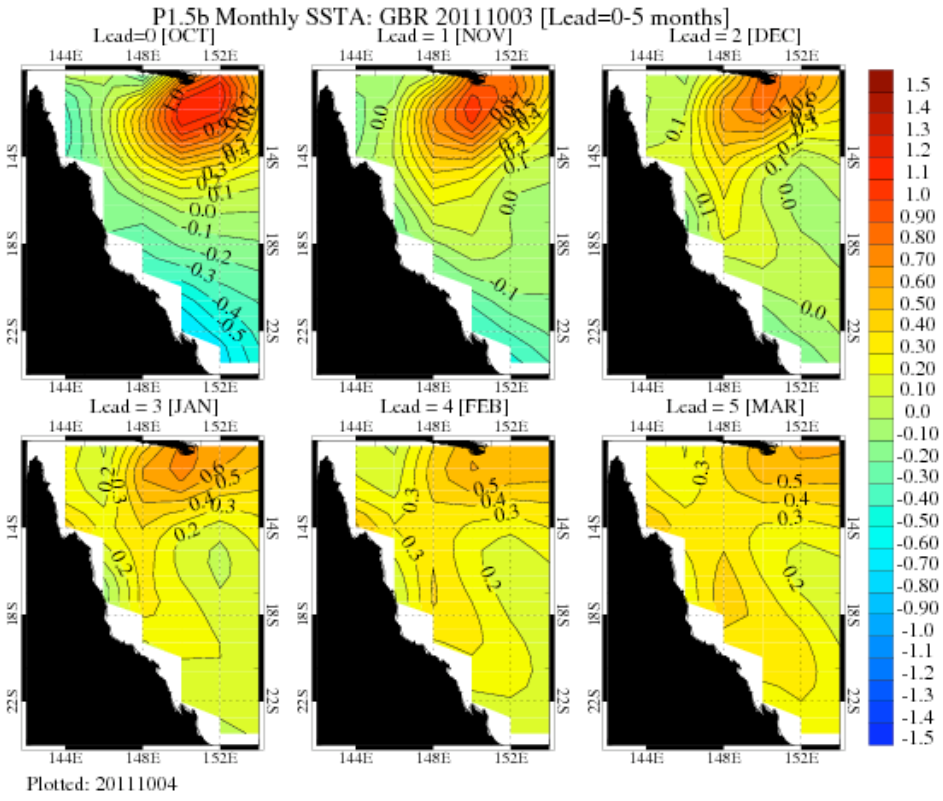
Note:

- Coincident with the MODIS SST data, Reynolds SST anomaly data shows a pattern of lower than average temperatures along the east and northern coast of Australia, including the Torres Strait
- Also, intensified SST positive anomalies are apparent in the Coral Sea

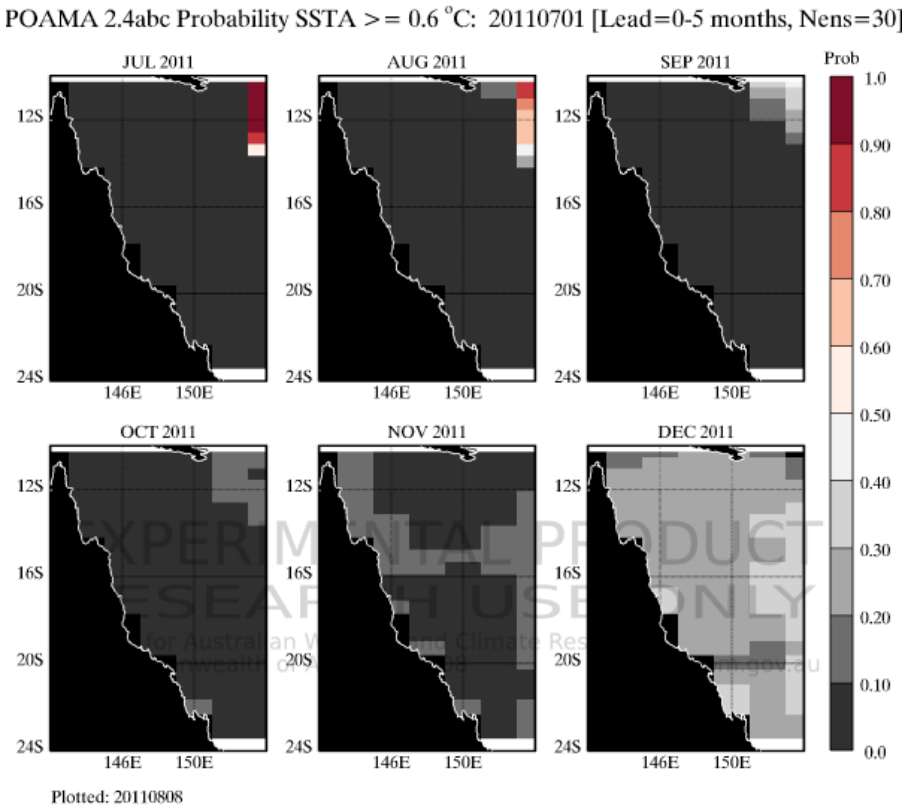
http://iridl.ldeo.columbia.edu/SOURCES/.NOAA/.NCEP/.EMC/.CMB/.GLOBAL/.Reyn_SmithOIv2/

Experimental Great Barrier Reef SST Anomaly Forecasts (POAMA)

POAMA SST anomalies forecast for the following 6 months.



Probability of SST anomalies greater than 0.6°C for the following 6 months.



Note:

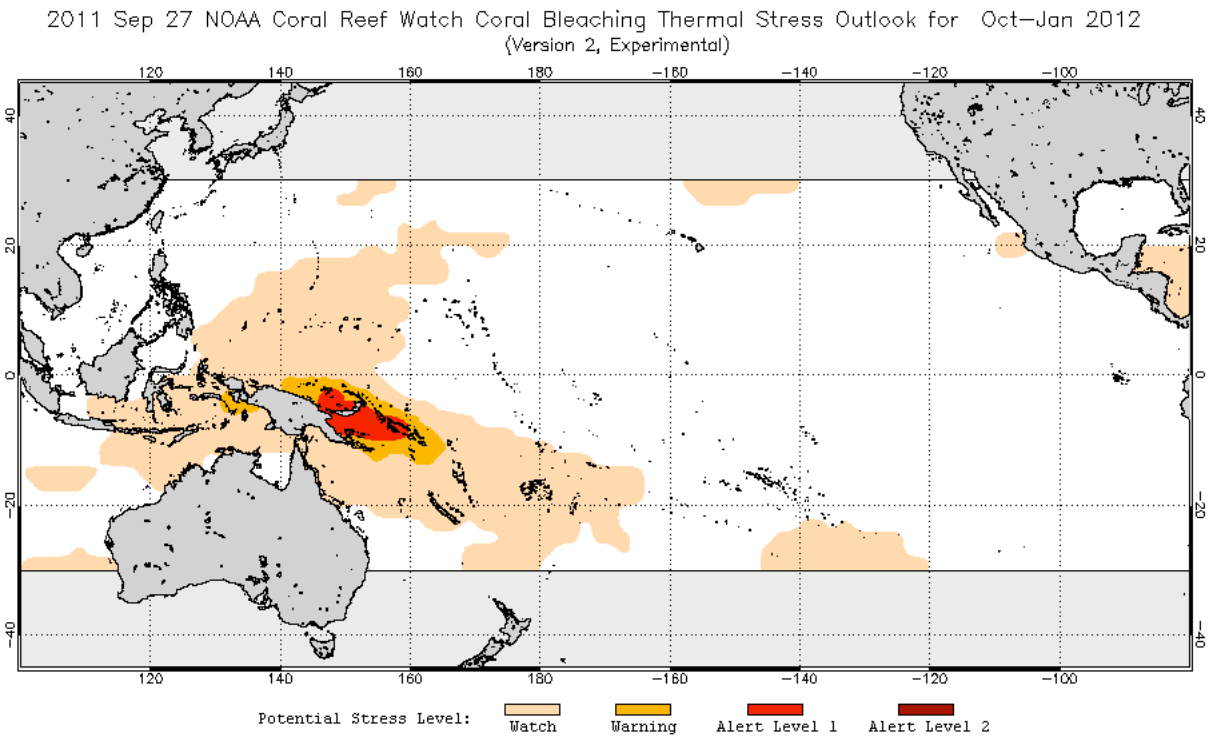
- POAMA forecast negative anomalies for October that will sequentially dissipate towards positive anomalies as we head into summer.
- SST anomalies are not expected to exceeding 0.6°C in the following 6 months.

NOAA Coral Reef Watch

Coral Bleaching Thermal Stress Outlook

(Version 2, experimental)

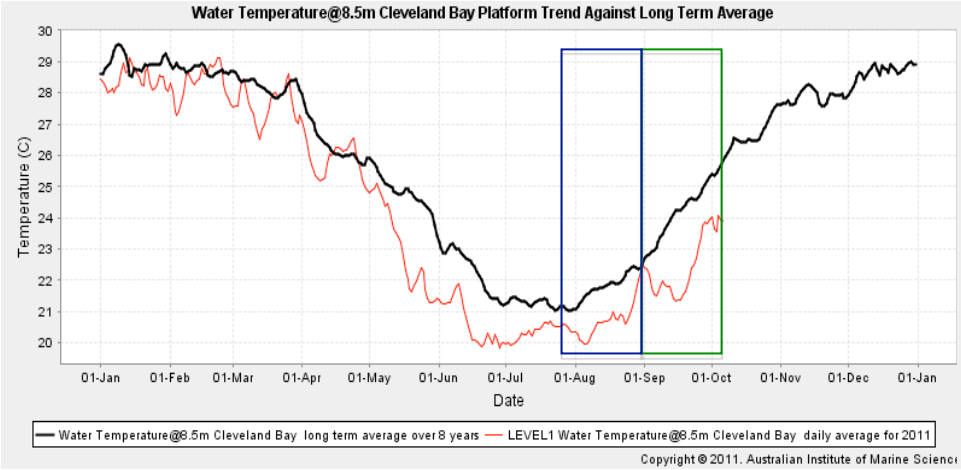
Outlook for October 2011 to January 2012

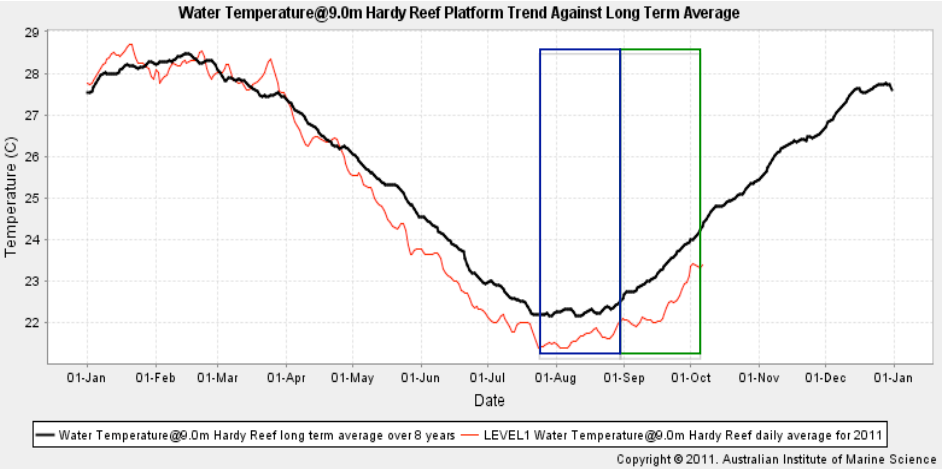


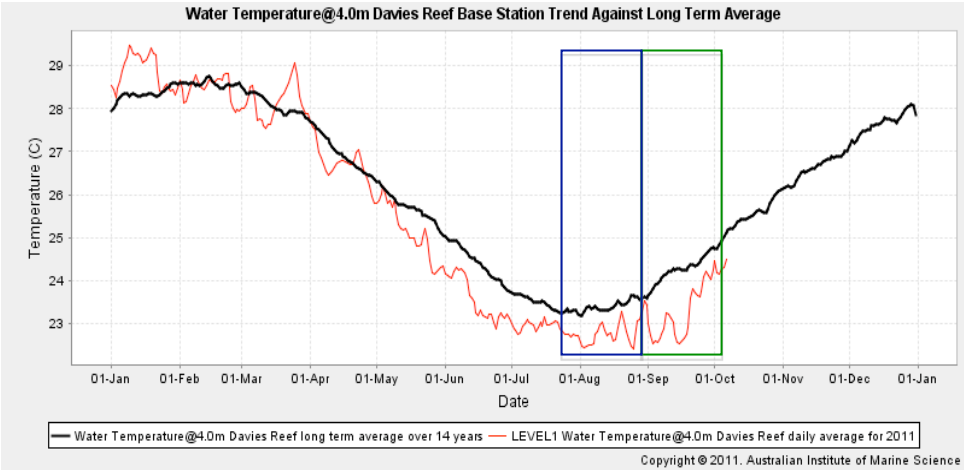
Note:

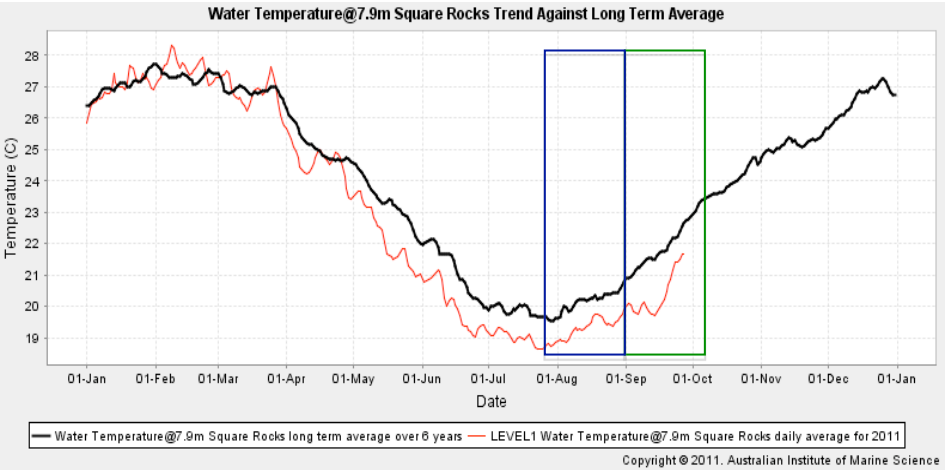
- NOAA thermal Stress Outlook suggest 'Watch' for potential thermal stress outlook till January 2012.

Weather Observing System: AIMS Data Centre









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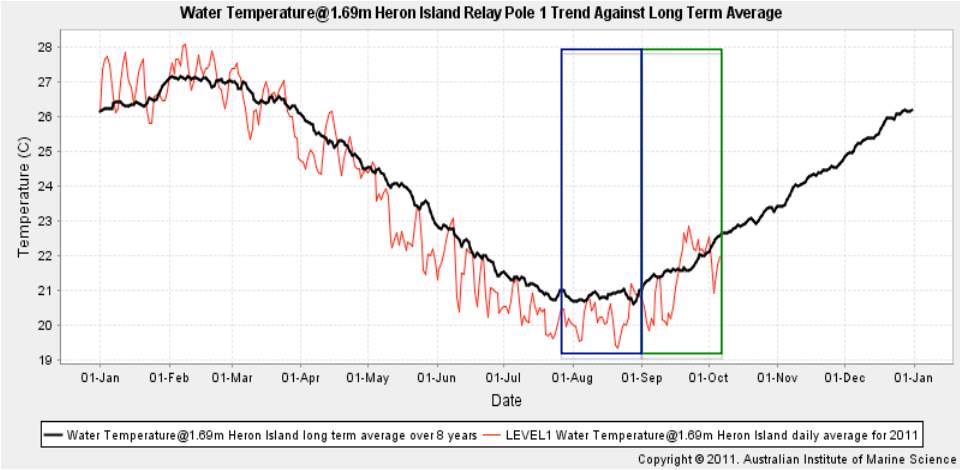
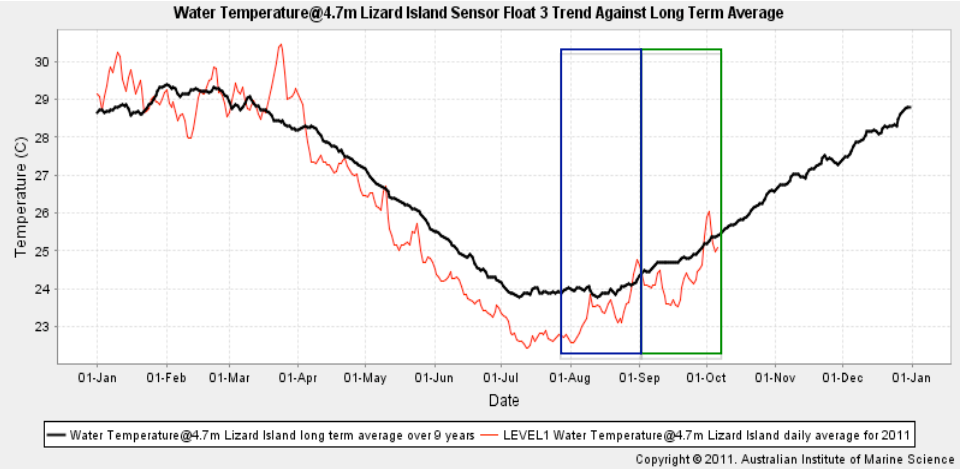


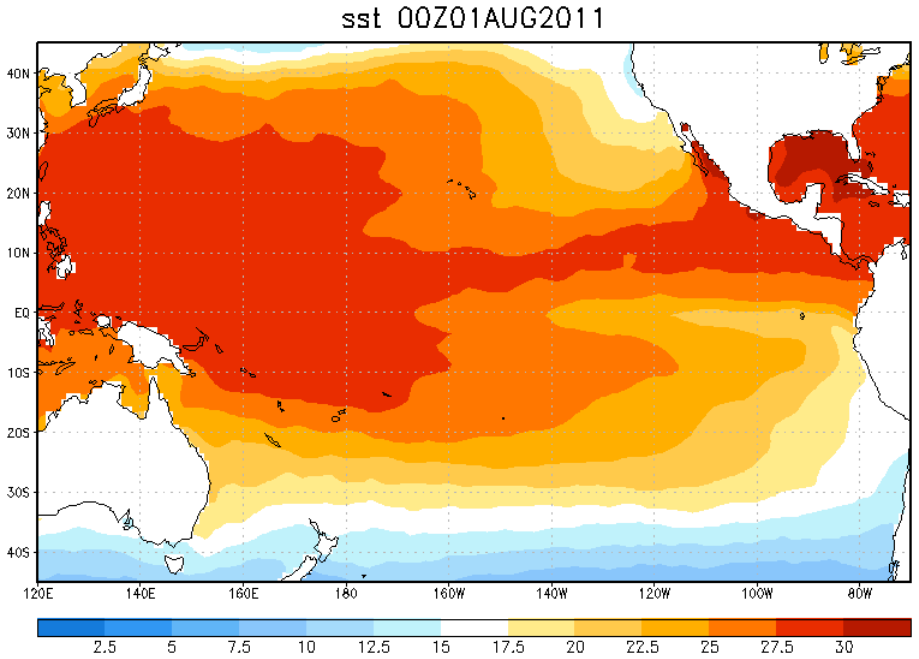


Note:

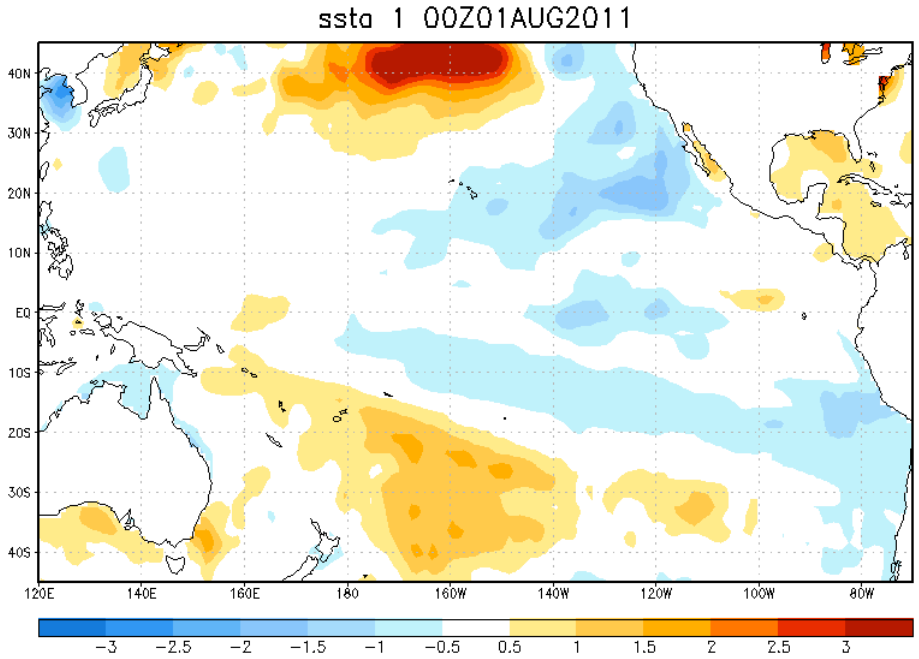
- Coincident with the SST data, in situ temperature is showing close to or lower than average temperature for August and September.
- Heron Island is also showing a change towards positive anomalies for the second half of September.

NOAA Optimum Interpolation Sea Surface Temperature Analysis:

OI SST: AUGUST 2011



OI SST ANOMALY: AUGUST 2011

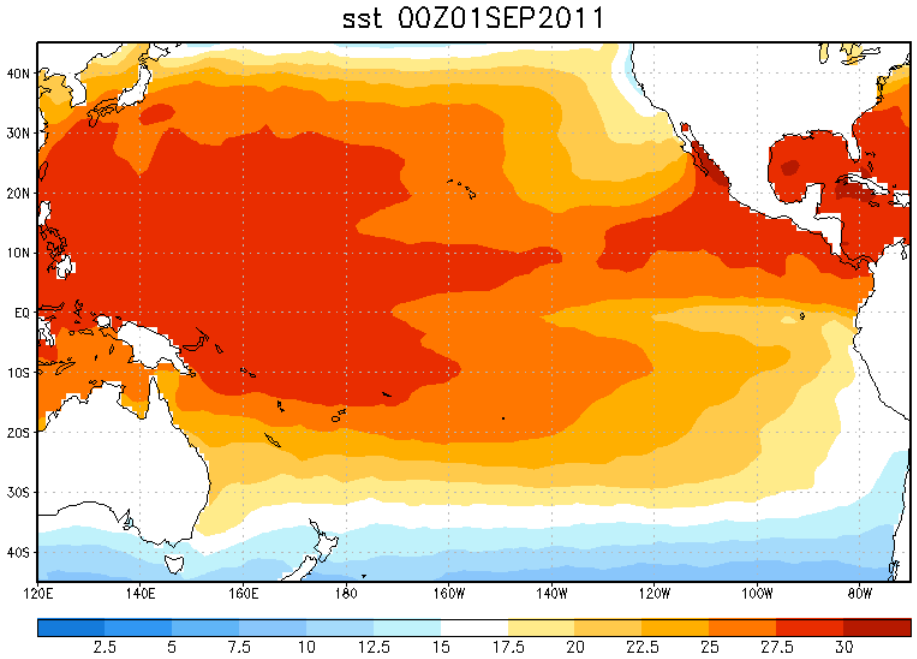


Note:

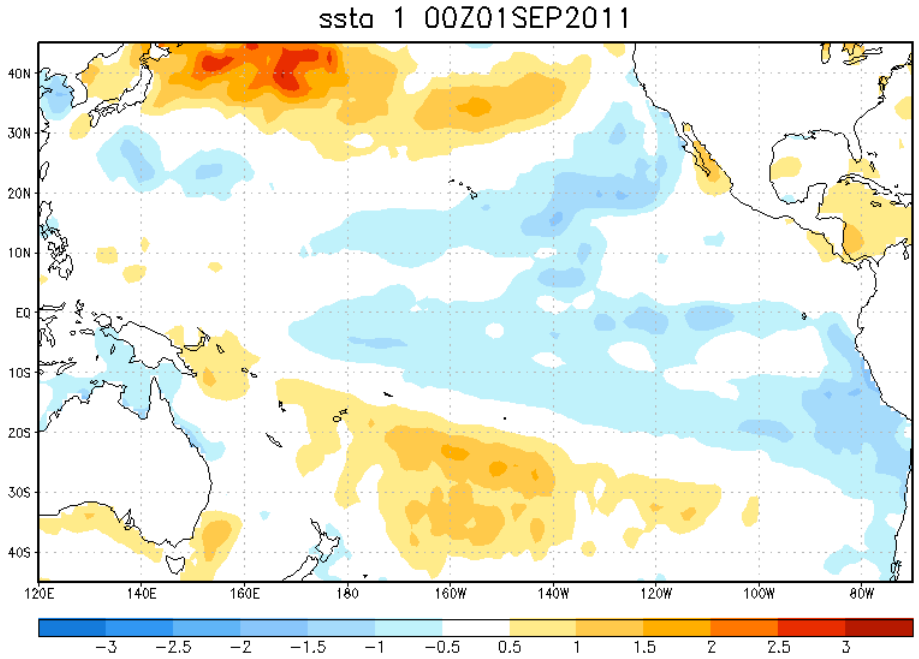
- Weak negative anomalies present on the east side of the tropical Pacific during August

NOAA Optimum Interpolation Sea Surface Temperature Analysis:

OI SST: SEPTEMBER 2011



OI SST ANOMALY: SEPTEMBER 2011



Note:

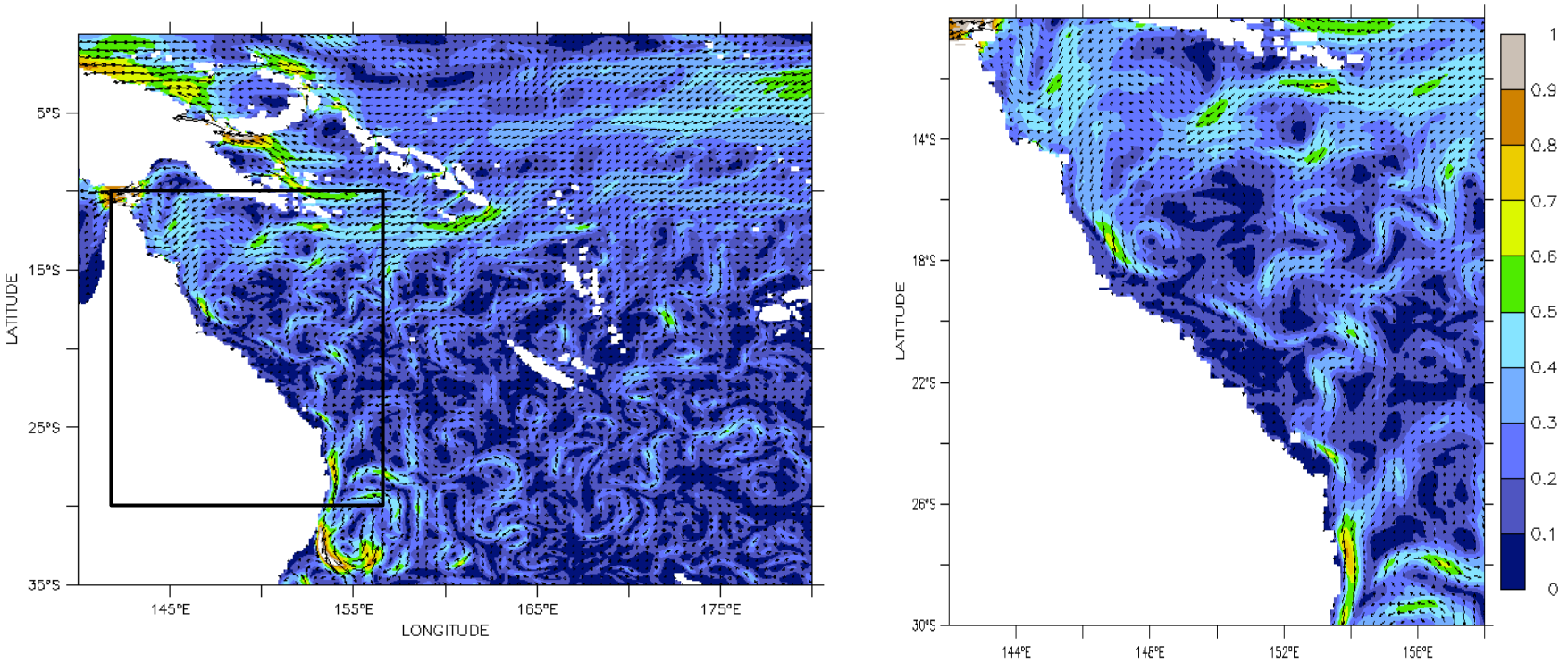
- Negative SST anomalies strengthened across the east half of the equatorial Pacific during September, a condition indicative of La Niña.

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

OceanMAPS 15m Depth-Average Currents

August 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 westward flow into the N-GBR during August

OceanMAPS 15m Depth-Average Currents

September 2011

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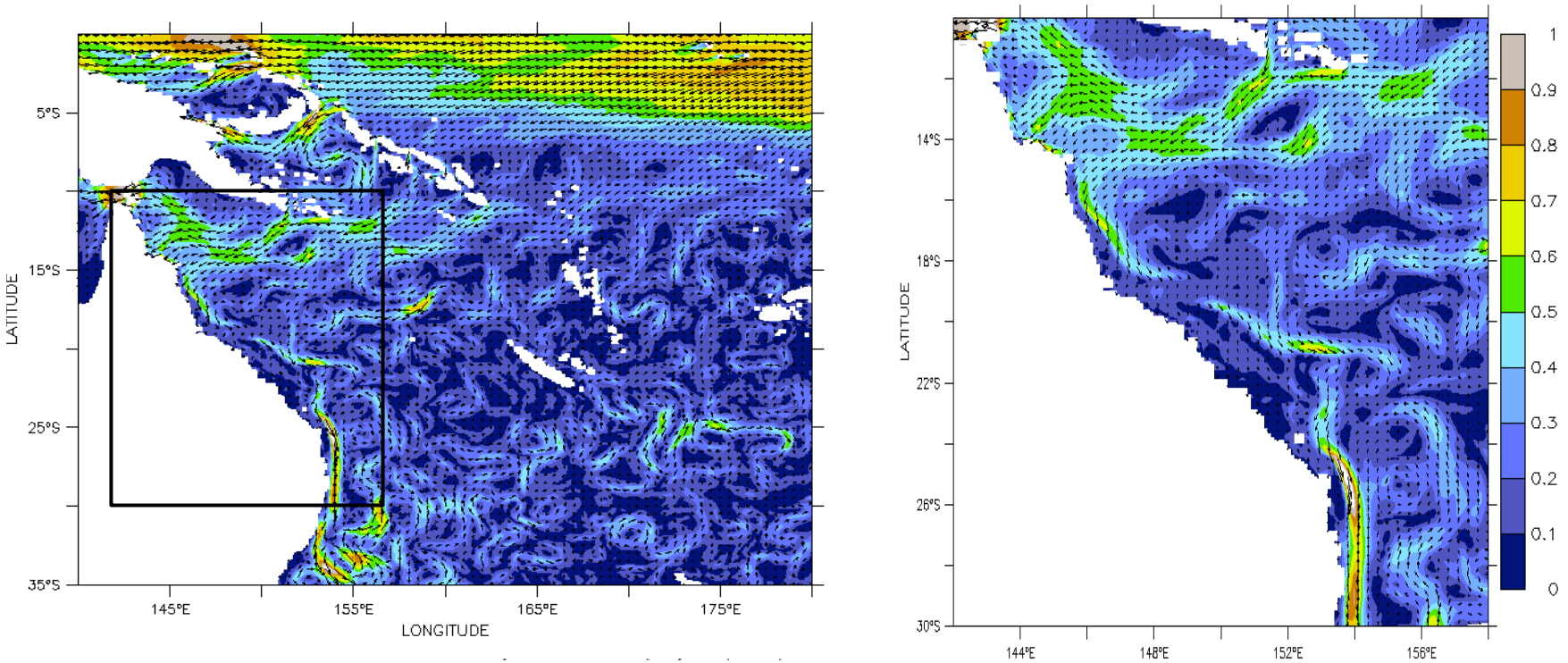
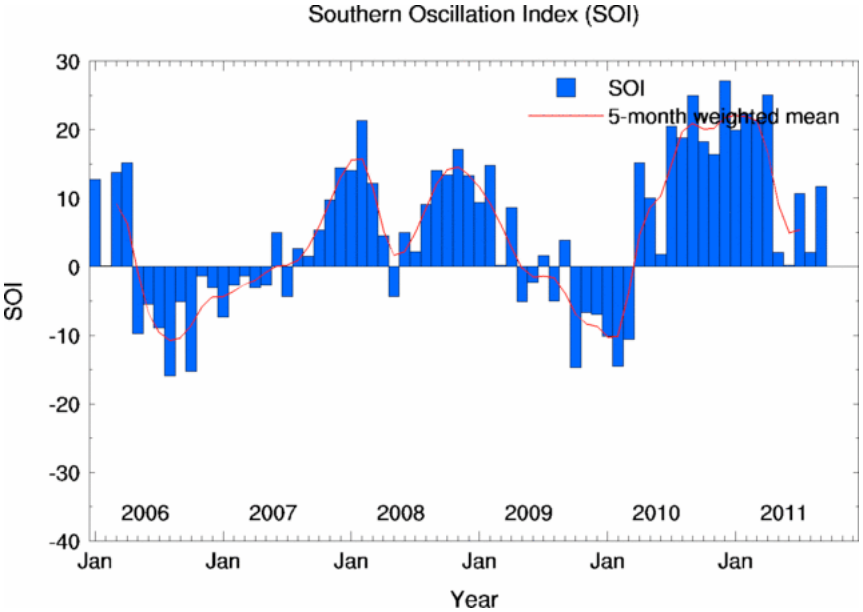


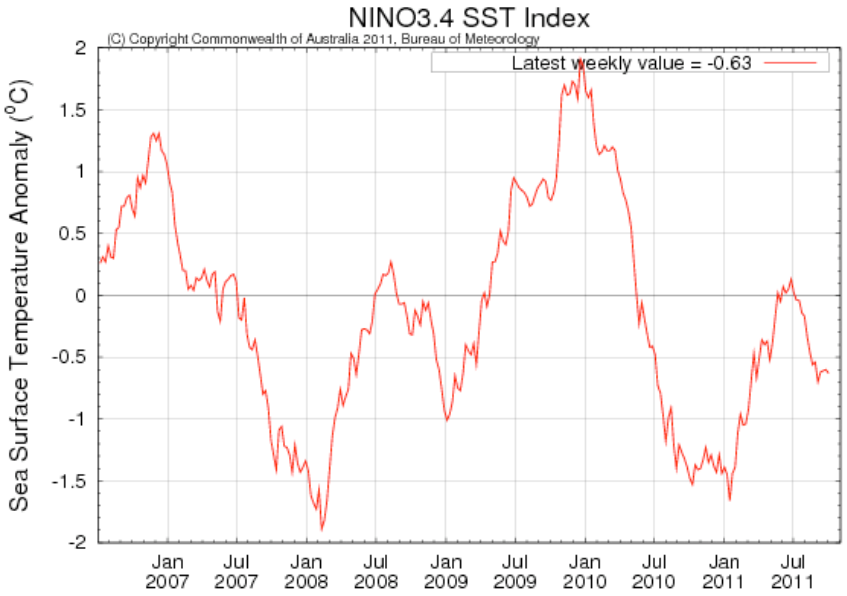
Behind Real Time analysis
15 m Depth-Averaged Currents (m/s).

Note:

- Intensified westward flow into the N-GBR during September
- Pronounced strengthening of the EAC apparent south of ~23°S

ENSO index





Positive SOI = La Niña

Negative Nino 3.4 index= La Niña

Note:

- ENSO indices indicate that La Niña conditions returned in August 2011. However, the majority of models continue to predict ENSO-neutral conditions for the upcoming summer. It is not yet clear if La Niña will fully develop and what the ultimate strength of this La Niña will be.