

NERP

Torres Strait / GBR environmental conditions report:

Recent status and predictions

21 October 2013

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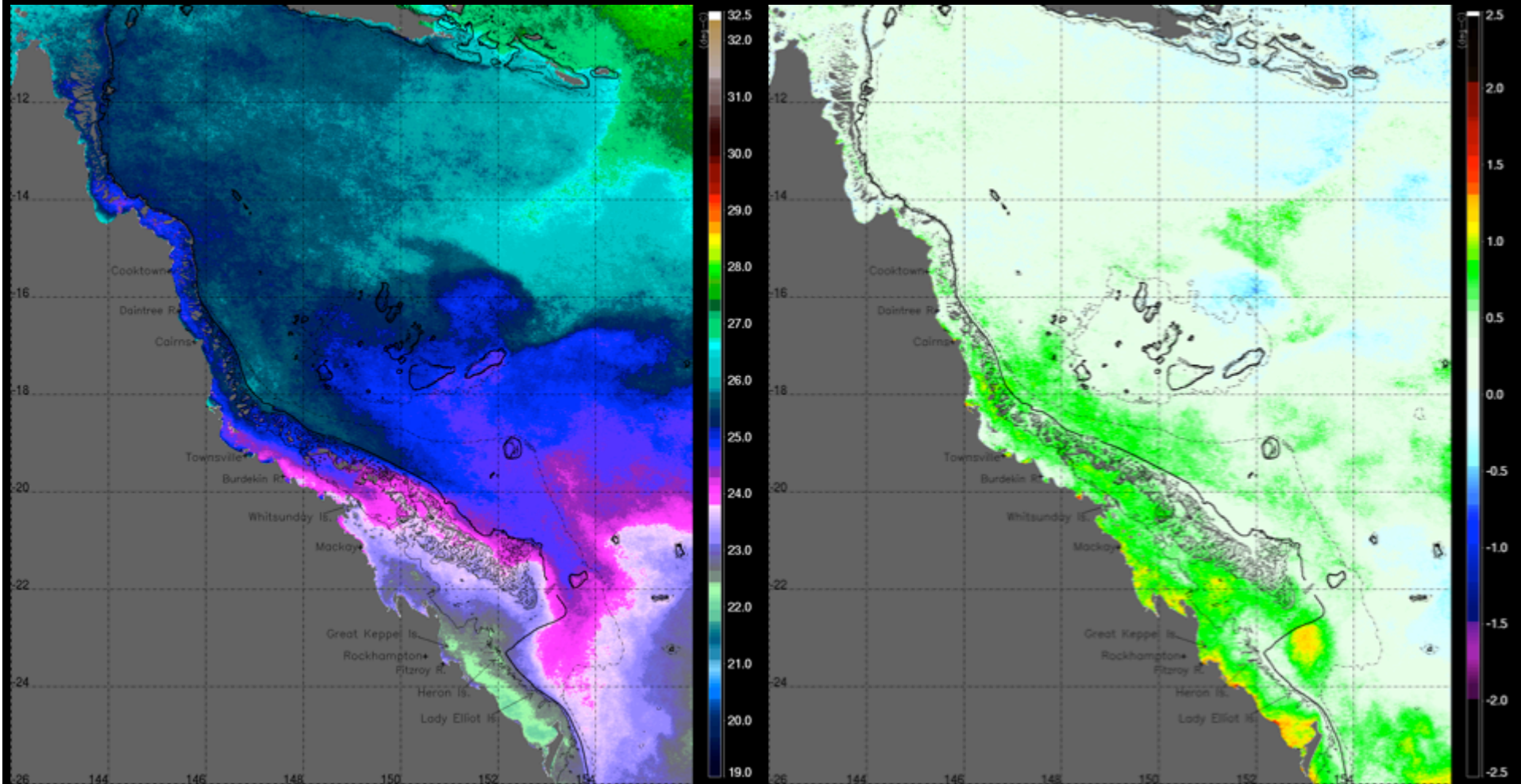
Outline

- 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

- Neutral SST conditions continued over the Torres Strait area during September, while positive SST anomalies were maintained and/or intensified south of $\sim 17^{\circ}\text{S}$.
- MODIS Chlorophyll-a concentrations and 10% Photic Depth products showing anomalies related with a trichodesmium bloom in the southern GBR.
- POAMA forecast higher temperature for October, that will approach neutral from November onwards. No bleaching alerts for the upcoming months, although the LIM-based Coral reef watch outlook has extended the level of 'Warning' to include the whole GBR and Torres Strait
- ENSO neutral conditions continued in the Pacific during September and are expected to persist in the upcoming months.

MODIS sea surface temperature (day+night) September 2013



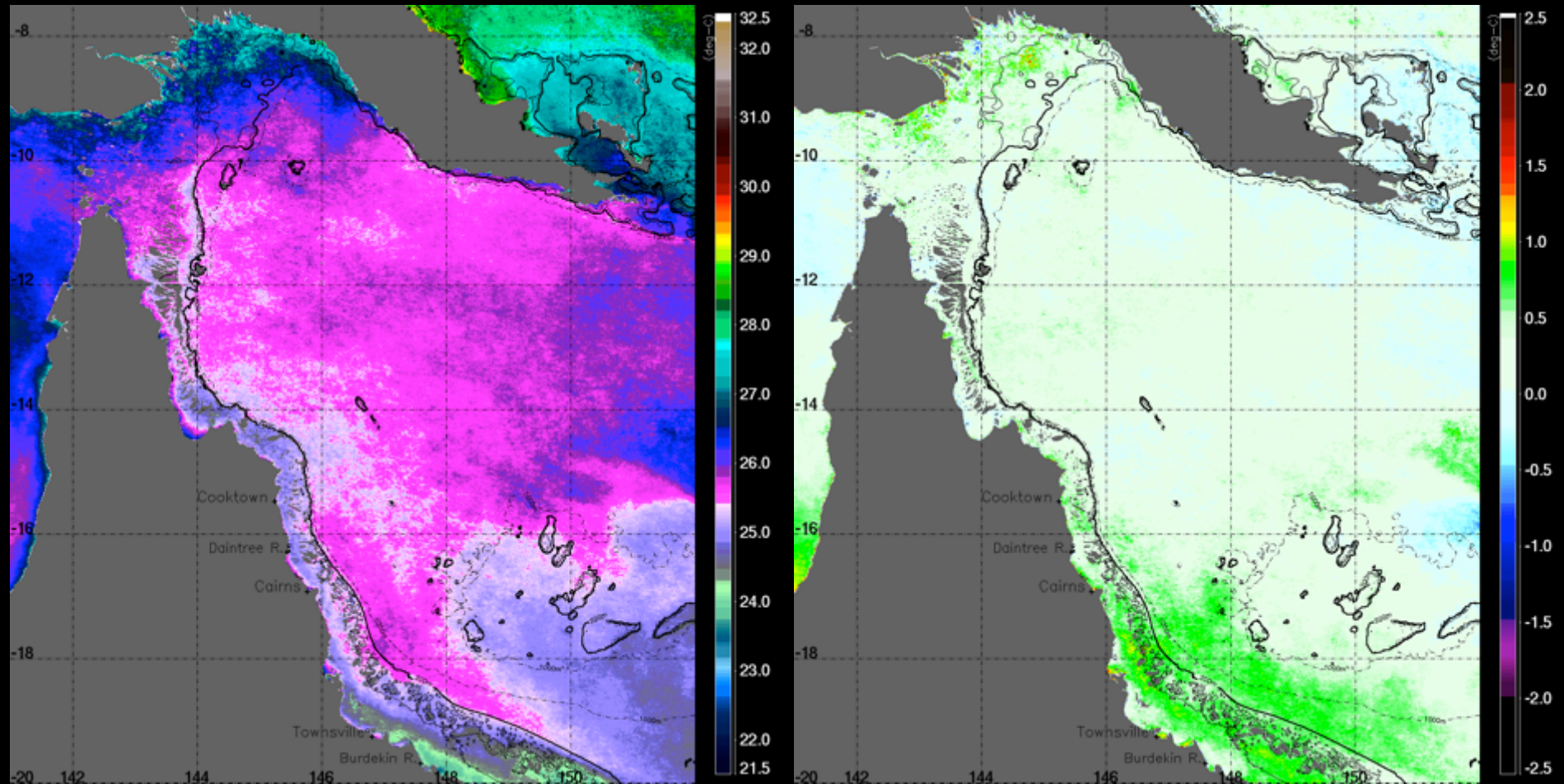
Note:

- Mostly neutral SST conditions continued over the Torres Strait area during September
- Positive SST anomalies maintained and/or intensified for most of the inner reefs south of $\sim 17^{\circ}\text{S}$

Torres Strait / far northern GBR

MODIS sea surface temperature (day+night)

September 2013



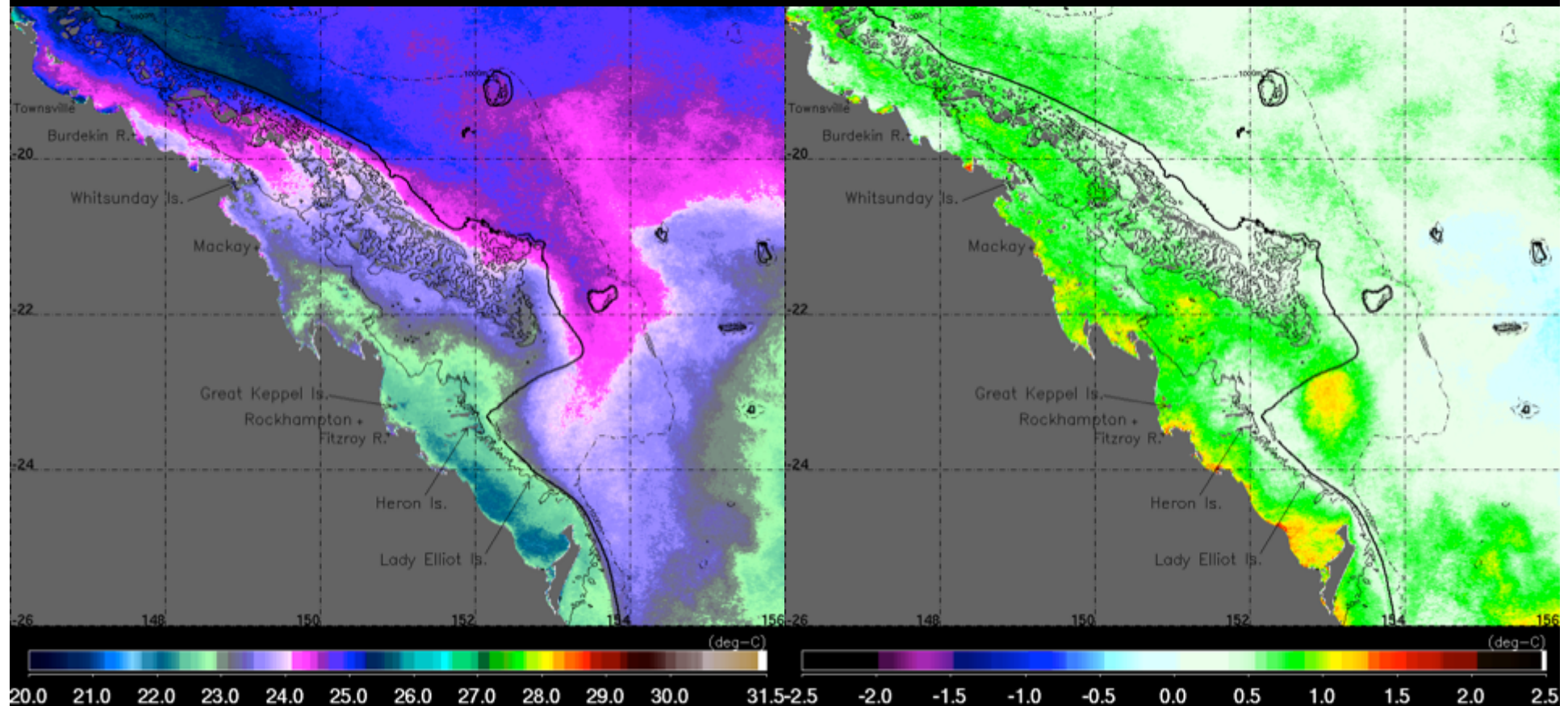
Note:

- Neutral SST conditions persisted for the Torres Strait during September
- Positive SST anomalies south of 16°S intensified during September

Southern GBR

MODIS sea surface temperature (day+night)

September 2013



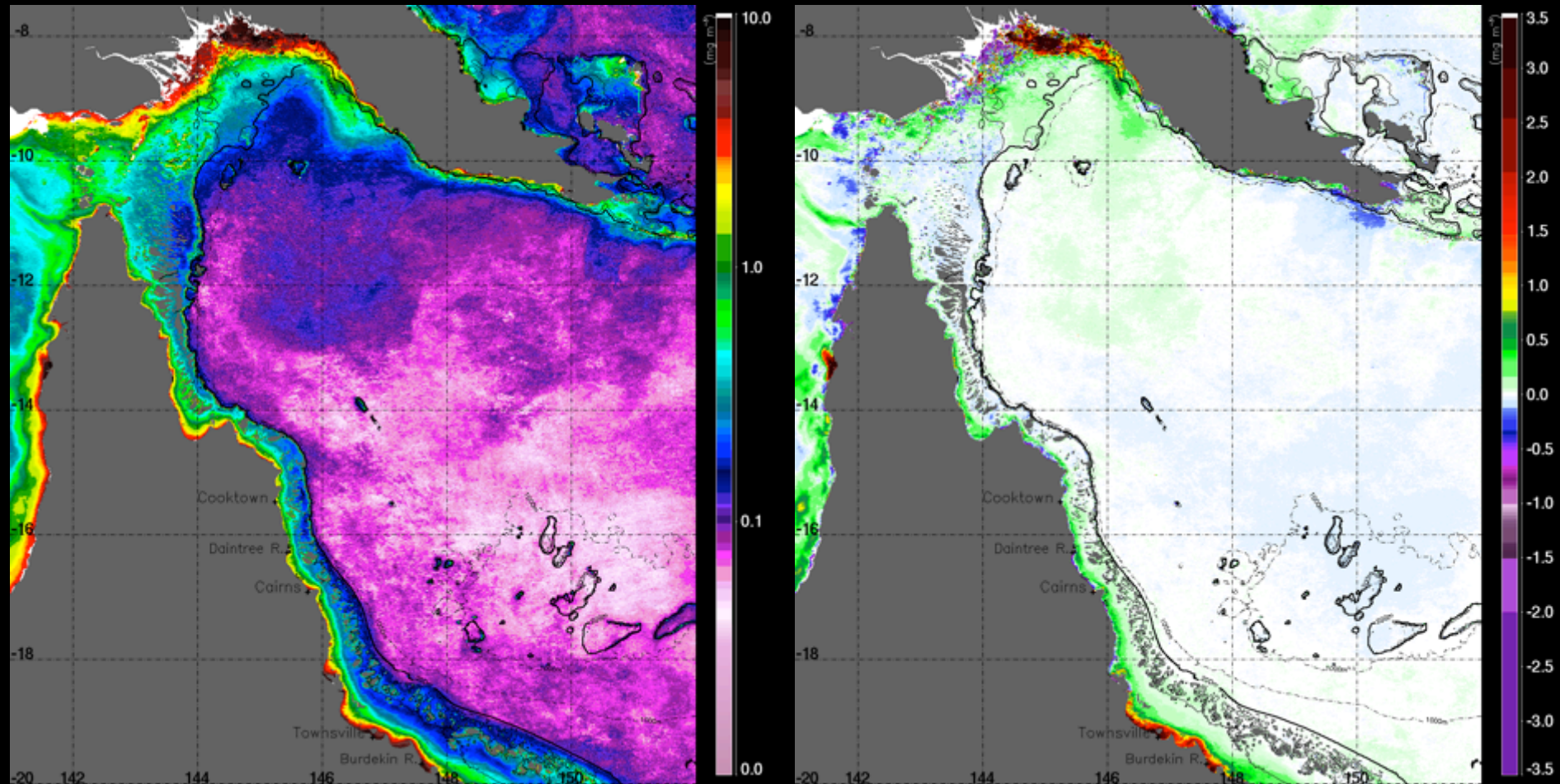
Note:

- Most of the S-GBR presented positive SST anomalies during September – these have strengthened and extended spatially since previous months

Torres Strait / far northern GBR

MODIS chlorophyll- a concentration

September 2013



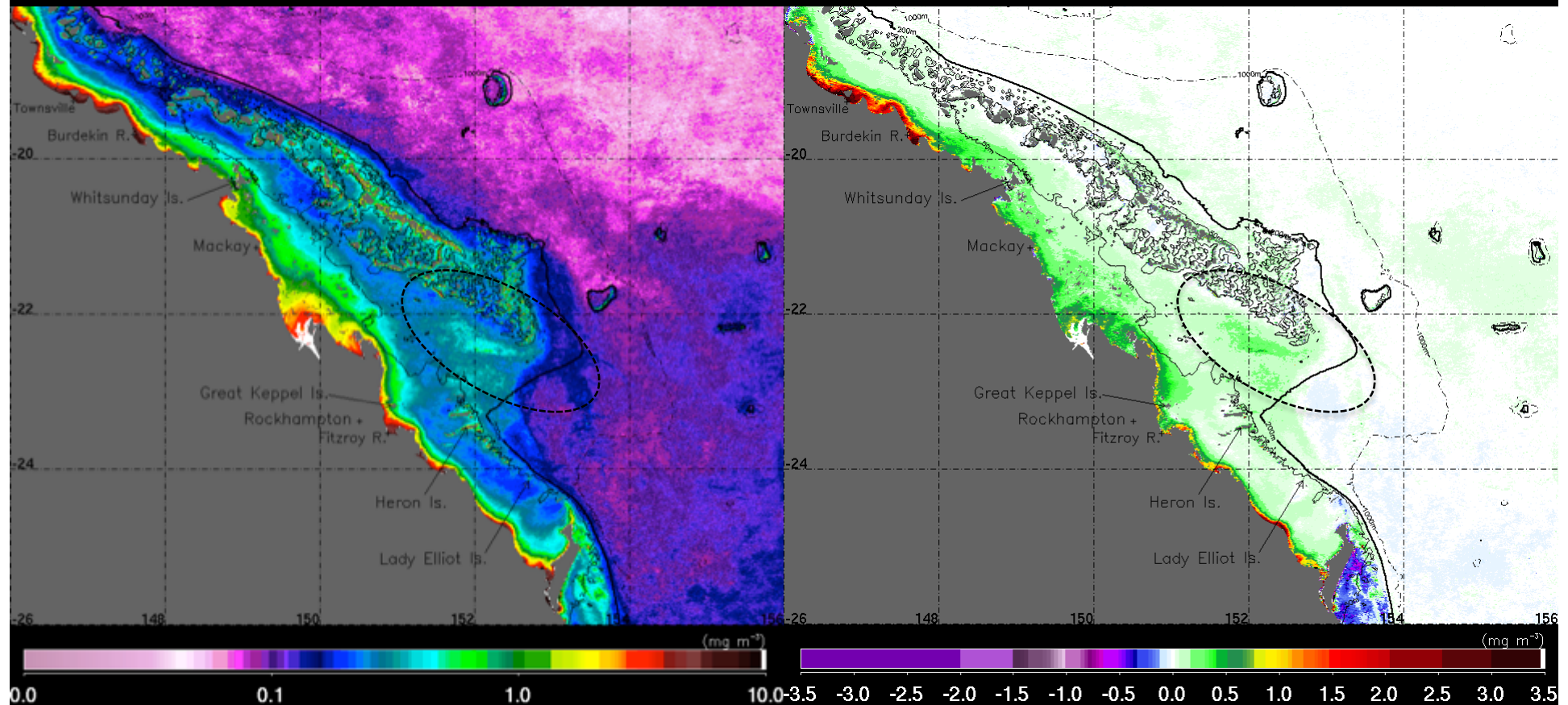
Note:

- Caution to be applied in interpretation of chlorophyll data for the Gulf of Papua and Fly River areas where data not representative of a true monthly mean due to considerable cloud cover during September.
- N-GBR: positive chlorophyll anomalies along the coast during September, especially marked around the Burdekin River and Townsville

Southern GBR

MODIS chlorophyll-*a* concentration

September 2013



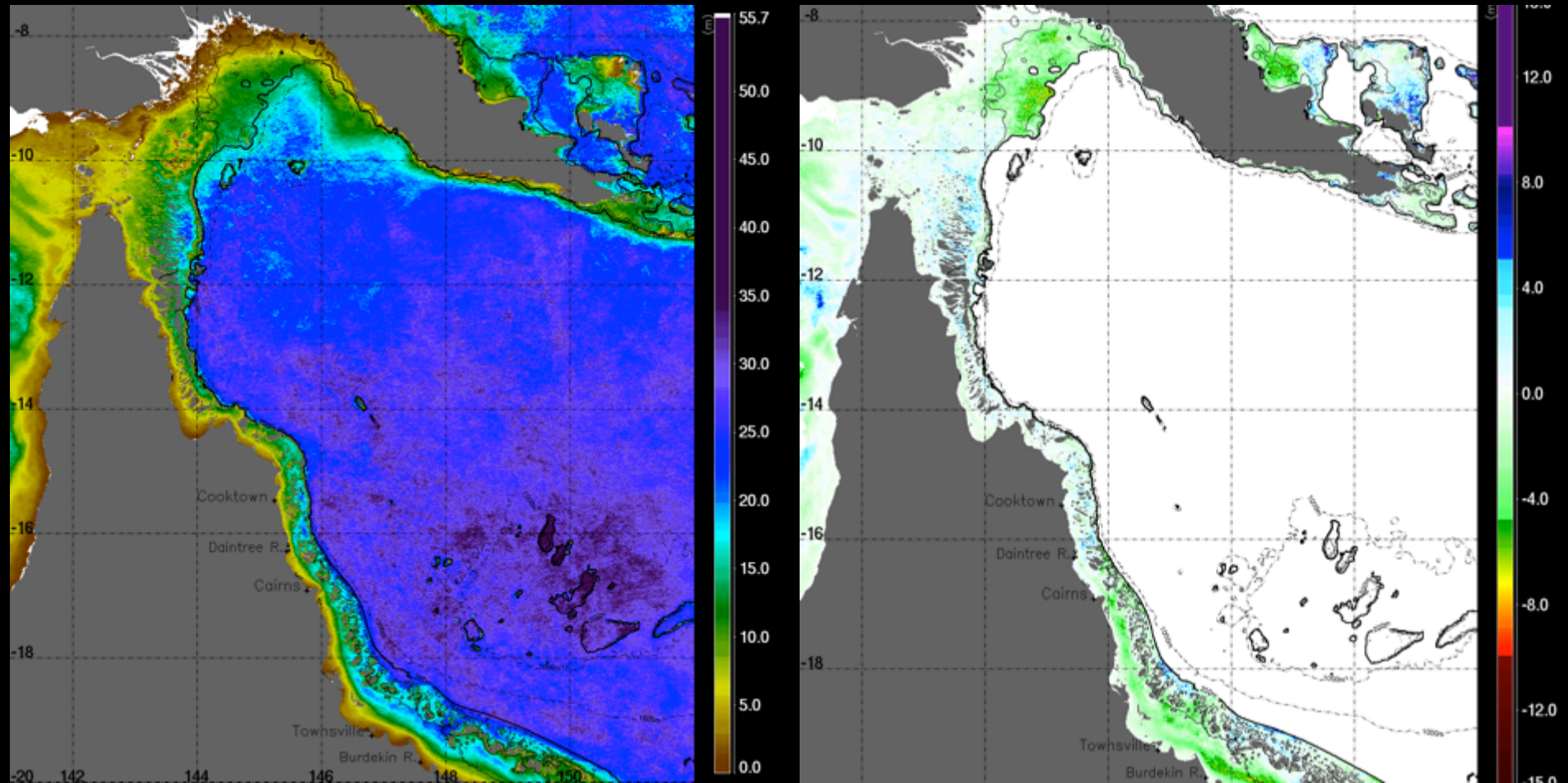
Note:

- Strengthening of the previously moderate positive chlorophyll-*a* anomalies along inshore S-GBR reefs during September
- Intrusions of oligotrophic surface EAC waters less apparent through the Capricorn Channel, where a *Trichodesmium* bloom signal is apparent. (see slides 10 & 11)

Torres Strait / far northern GBR

MODIS 10% photic depth

September 2013



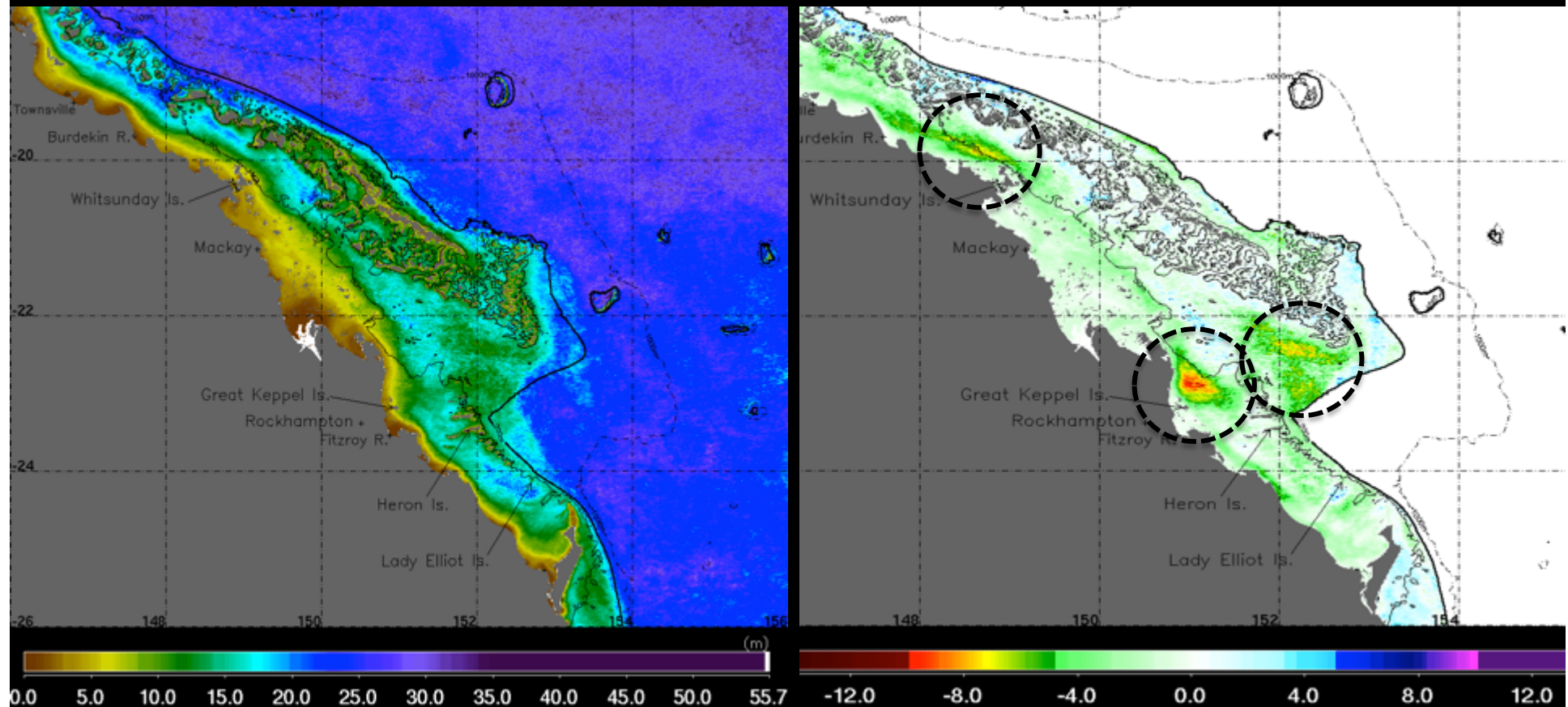
Note:

- MODIS photic depth showed generally turbid (low clarity) waters in the Torres Strait & coastal areas, & clear waters offshore during September
- no apparent anomalies in the far N-GBR / Torres Strait region, except for negative anomalies (decreased water clarity) on the shelf offshore of the Fly River and, in the N-GBR, moderate negative anomalies south of ~16°S

Southern GBR

MODIS 10% photic depth

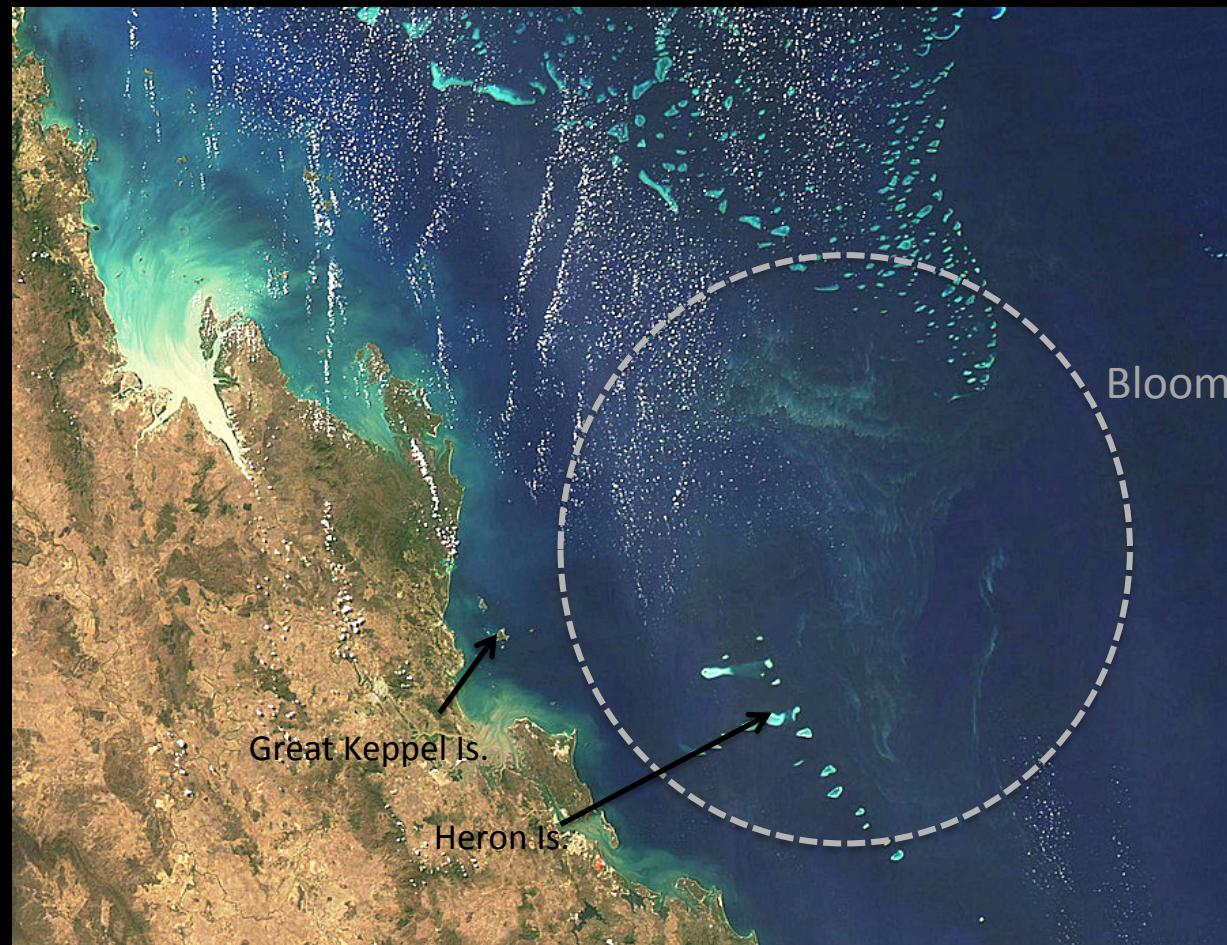
September 2013



Note:

- MODIS photic depth showing patches of negative anomalies (decreased water clarity) along the S-GBR. Those anomalies are especially marked: on the central GBR midshelf, in the Capricorn Channel, and north of the Keppel Islands, due to (a) greater offshore extension of inshore turbid waters and /or (b) a trichodesmium bloom (see next slide)

MODIS Aqua: True Color Trichodesmium bloom as seen on 24 September 2013

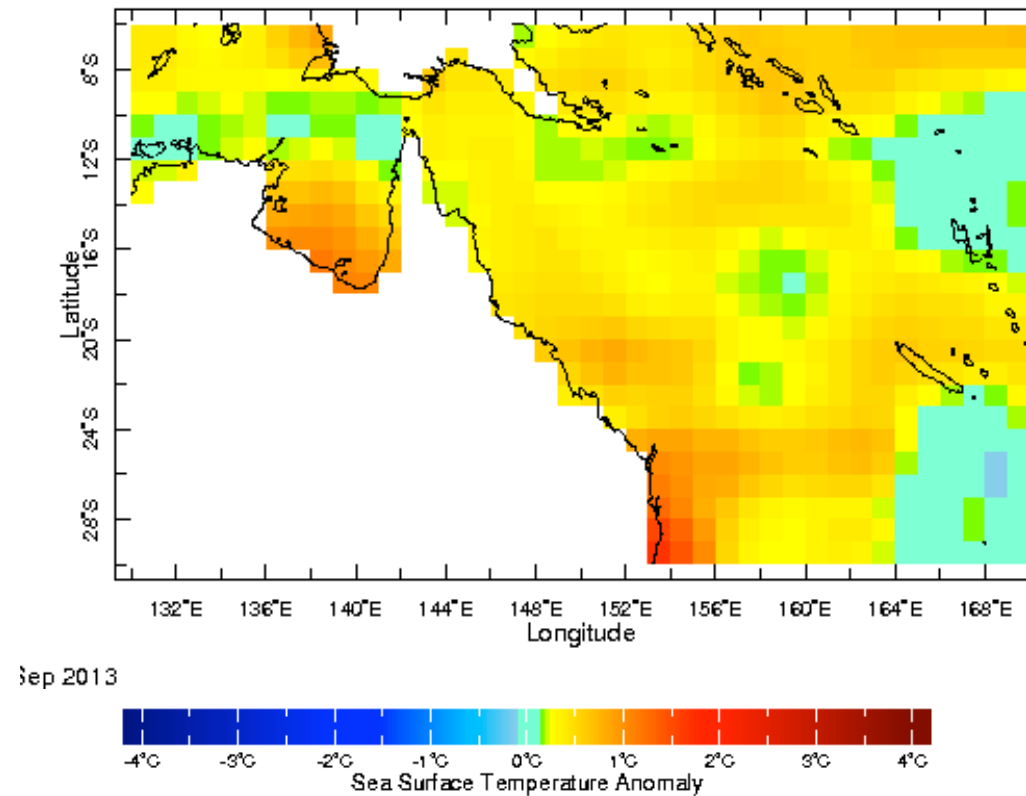


Source: NASA

Sea Surface Temperature Anomaly

from NOAA NCEP EMC CMB GLOBAL Reyn_SmithOlv2

SEPTEMBER 2013



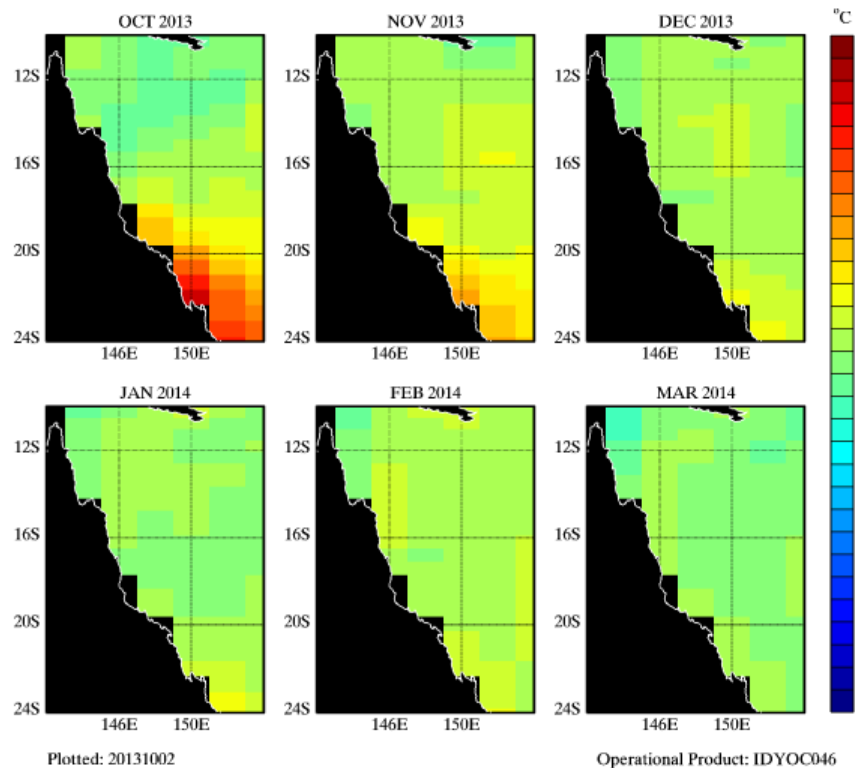
Note:

- Coincident with the MODIS SST anomalies, the Reynolds SST anomaly data for September shows very low positive anomalies along the GBR that intensify southwards.

Sea surface temperature anomaly forecast (POAMA-2)

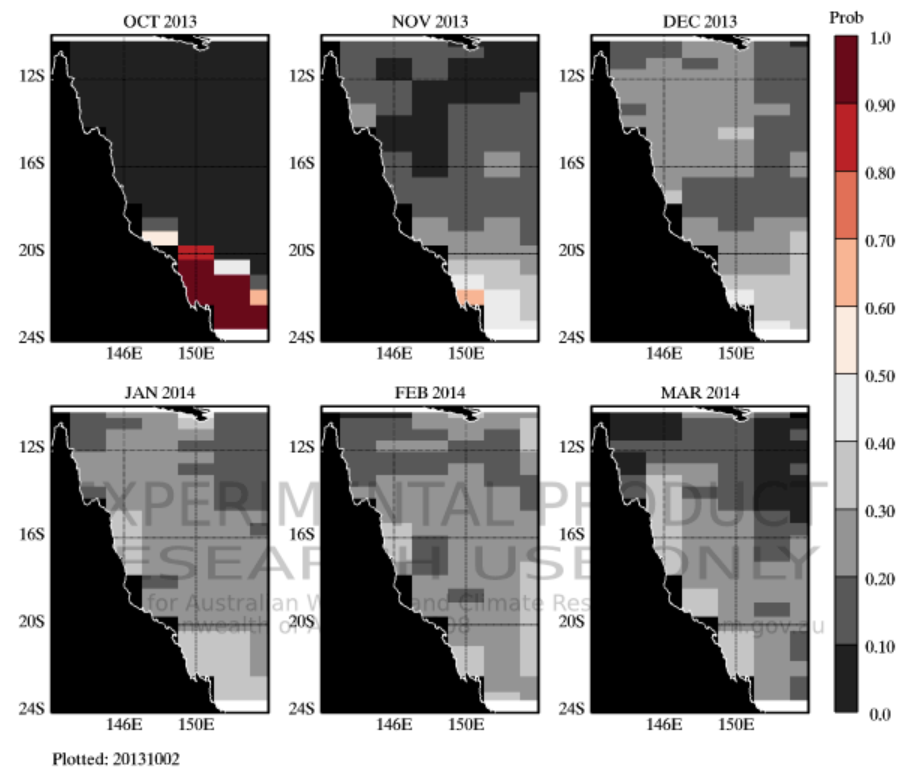
POAMA SST anomaly forecast for the next 6 months (operational)

P2.4abc Monthly SSTA: GBR 20131001 [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 $\geq 0.6^\circ\text{C}$: 20131001 [Lead=0-5 months, Nens=30]



Note:

- POAMA forecast higher temperature anomalies for October than previous months, that will approach neutral from November onwards.
- The probabilities of temperature anomalies exceeding 0.6°C are high for the S-GBR during October, but remain low in the subsequent months.

NOAA Coral Reef Watch

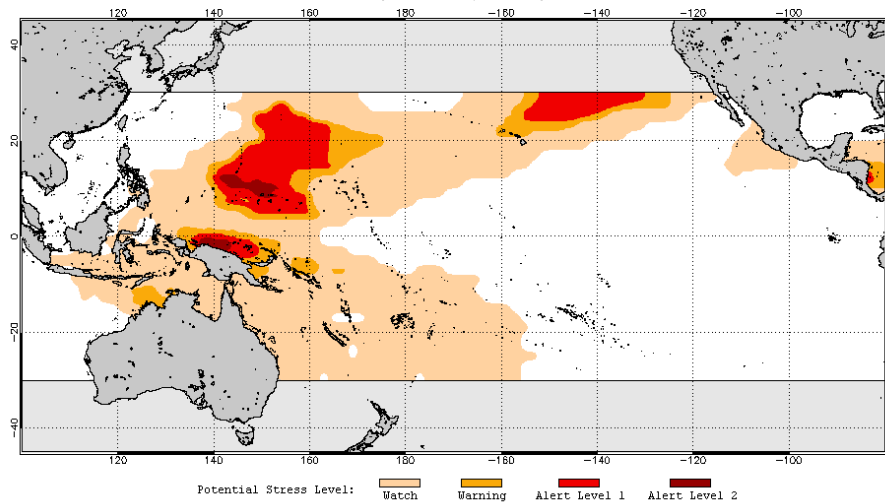
Seasonal coral bleaching thermal stress outlook

October 2013 to January 2014

LIM-based

Version 2, experimental, weekly 2x2 degree spatial resolution

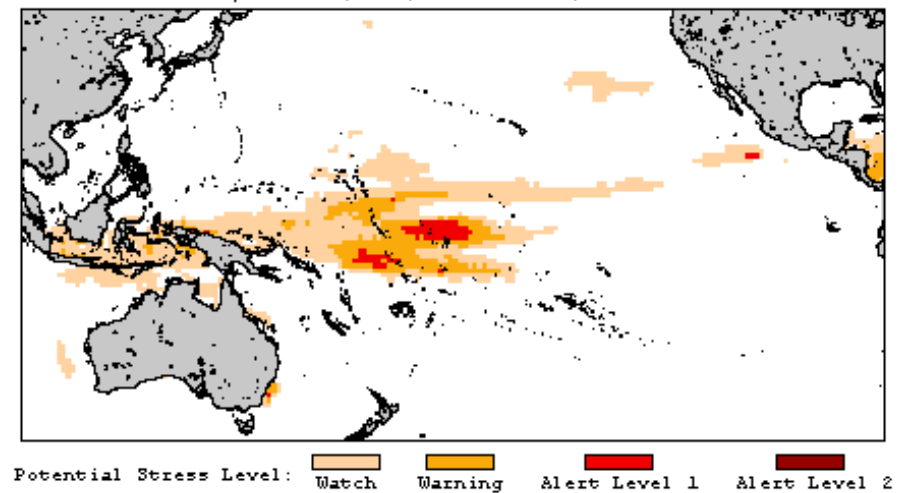
2013 Sep 24 NOAA Coral Reef Watch Coral Bleaching Thermal Stress Outlook for Oct-Jan 2014
(Version 2, Experimental)



CFS-based

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

2013 Oct 1 NOAA 90% Probability Bleaching Thermal Stress for Oct-Jan 2014
Experimental, v2.0, CFSv2-based, 28-member

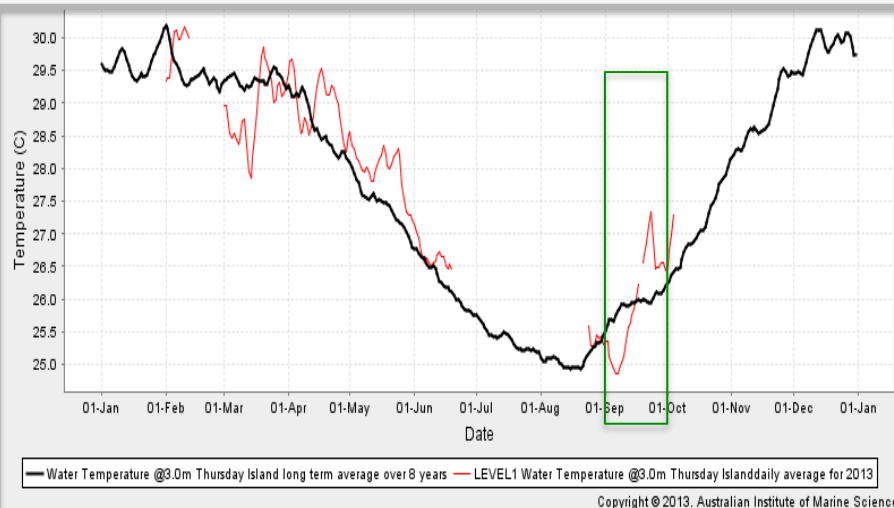


Note:

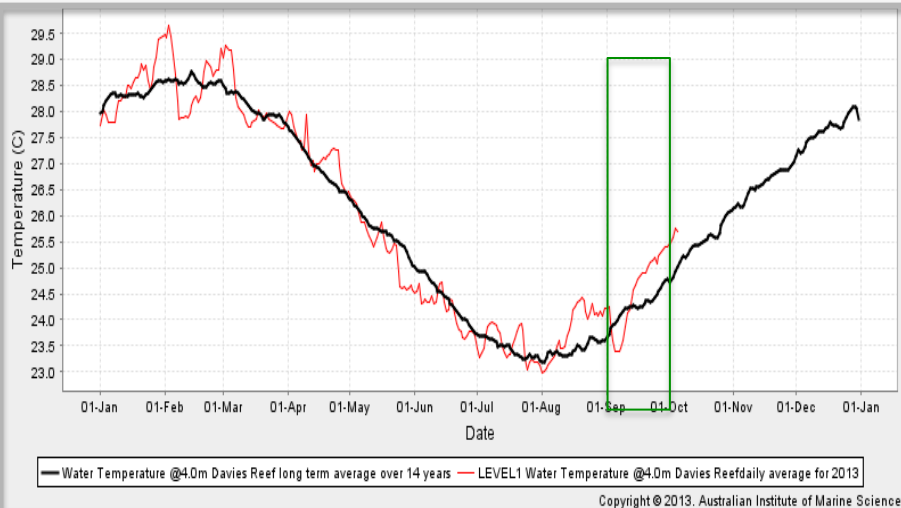
- The CFS-based NOAA CRW bleaching thermal outlook (right panel) shows no bleaching alerts for the upcoming months (September to December).
- In contrast, the LIM-based outlook (left panel) has extended the level of 'Warning' to include the whole GBR and Torres Strait areas.

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

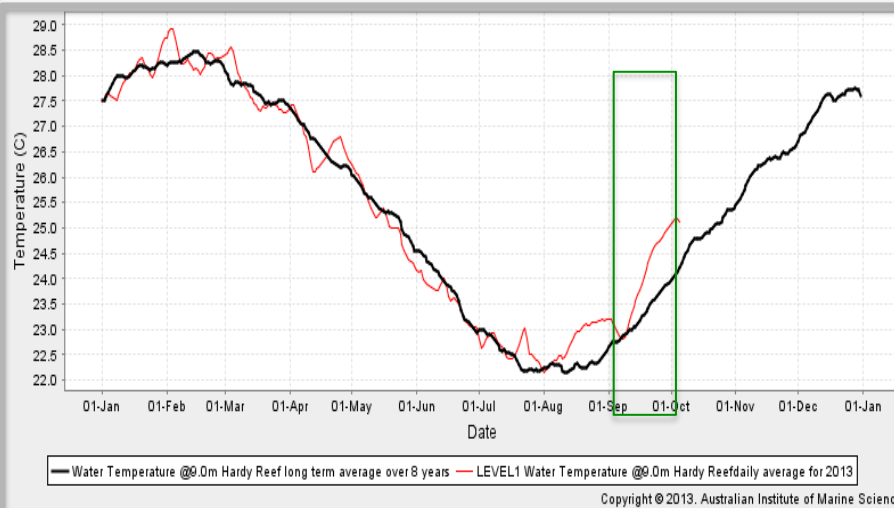
Water temperature @3.0m Thursday Island Weather Station trend against longterm average



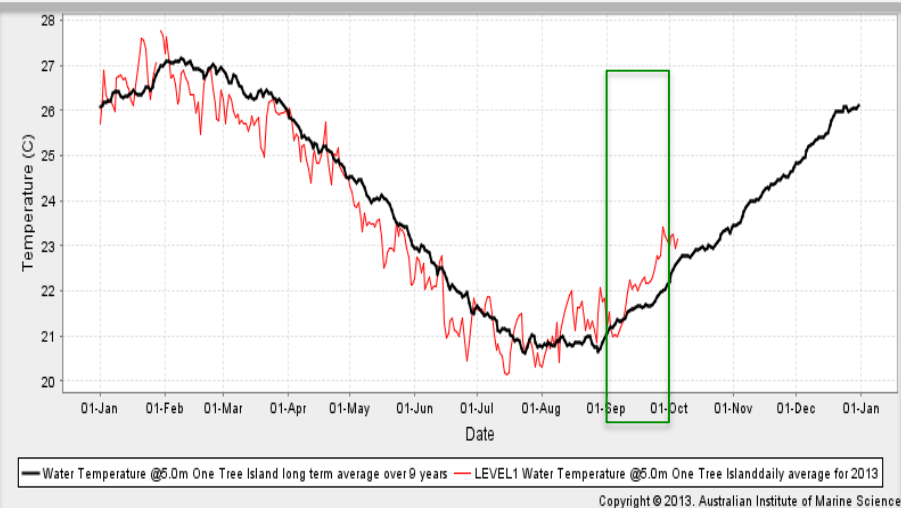
Water temperature @4.0m Davies Reef Platform trend against longterm average



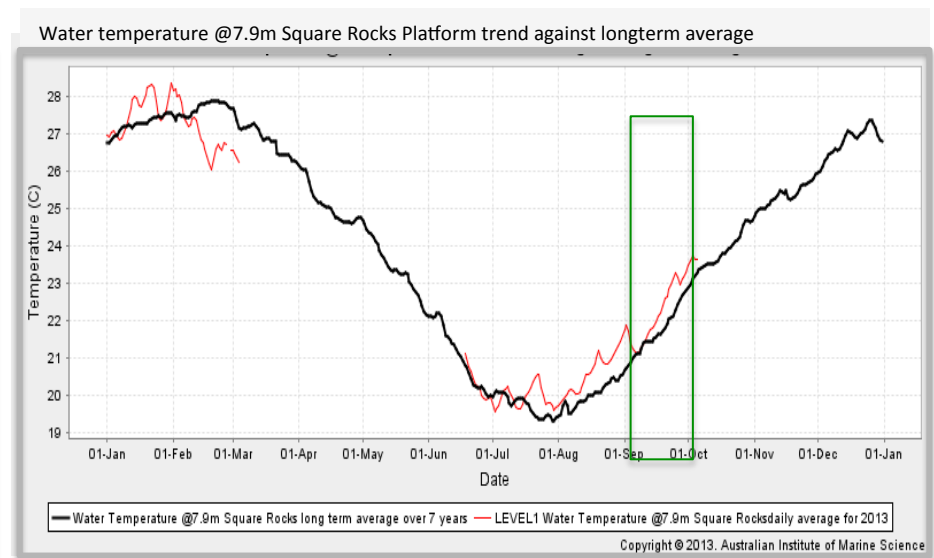
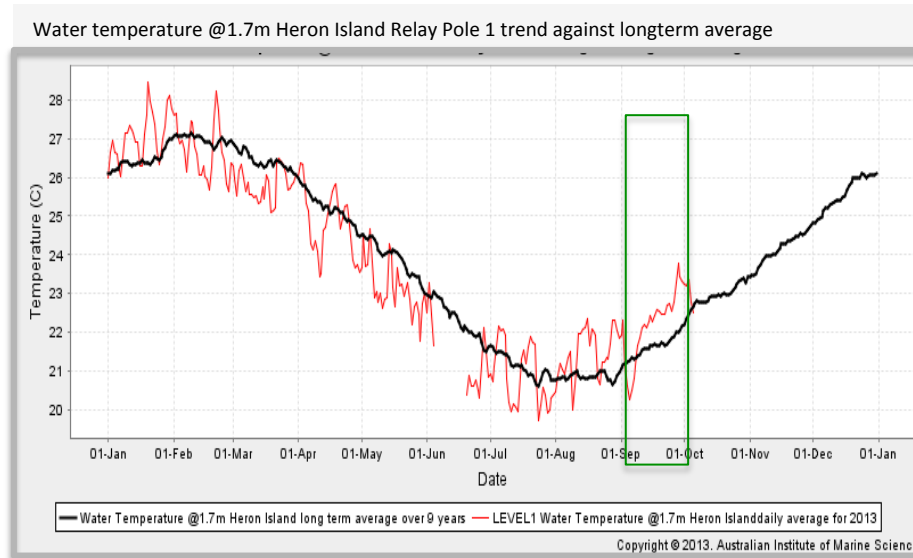
Water temperature @9.0m Hardy Reef Platform trend against longterm average



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



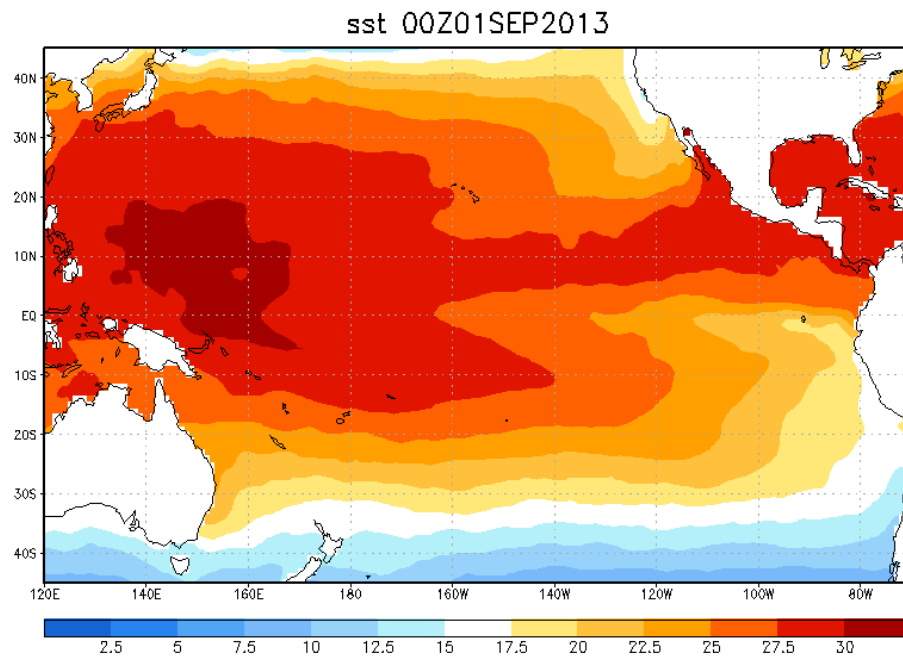
Water temperatures from IMOS Sensor Network (FAIMMS) (AIMS operated)



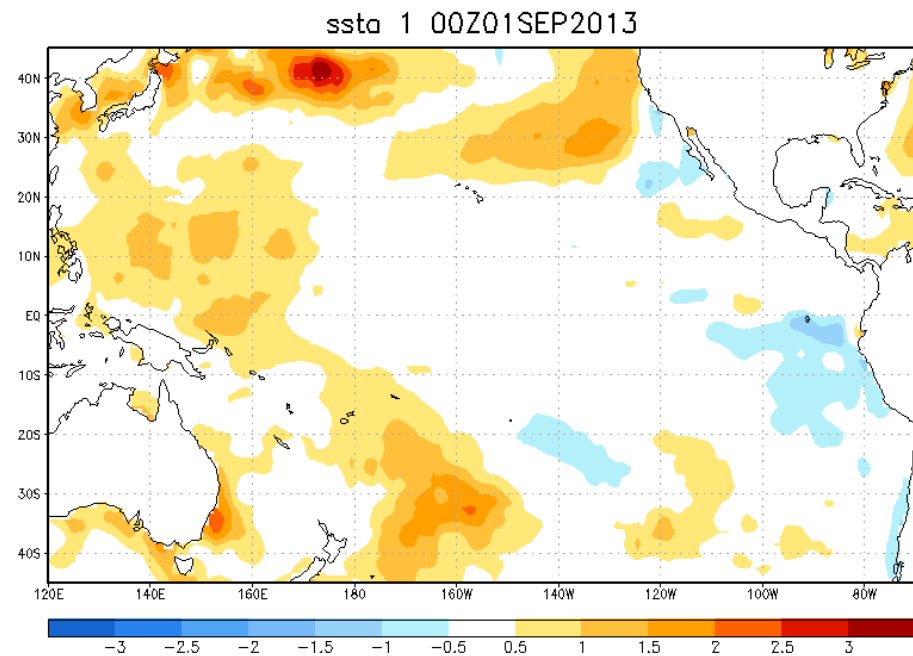
- Torres Strait (Thursday Island) in situ data showed water temperatures below and then above the long term mean for the first and second half of September, respectively.
- In situ water temperatures for the central and southern GBR steadily rose above the long term mean during the course of the month

NOAA optimum interpolation sea surface temperature

OISST September 2013



OISST anomaly September 2013

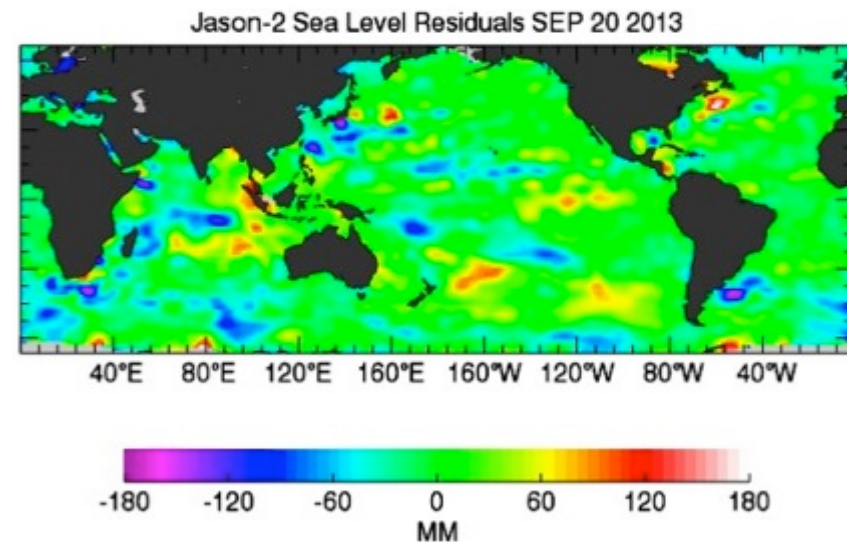
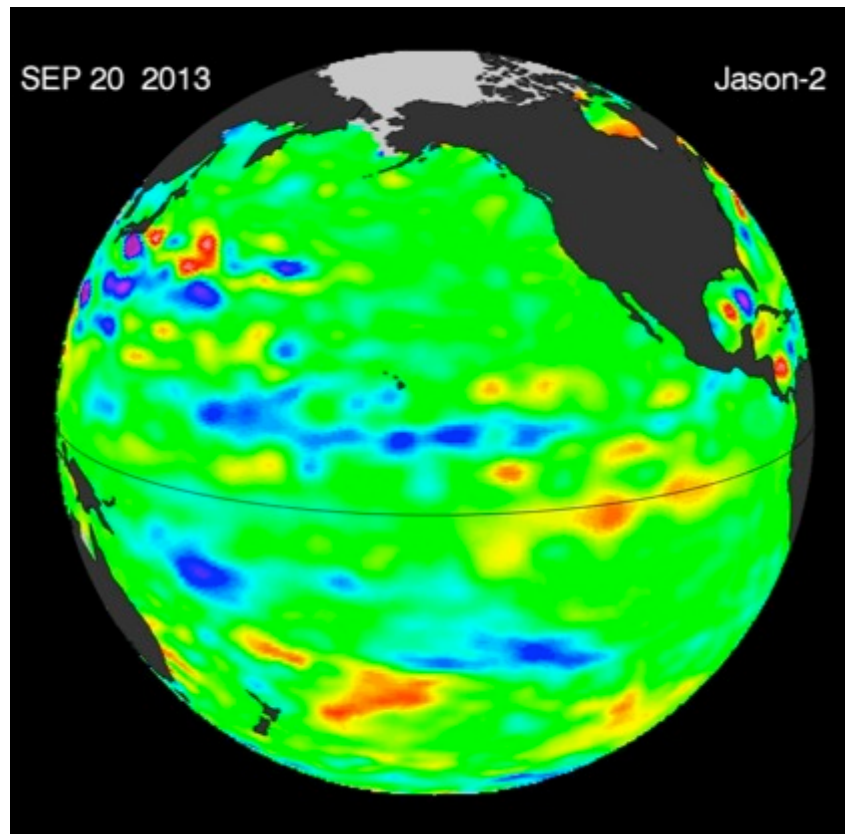


Note:

- Over the Pacific, the consistent SST anomaly pattern of the last months was maintained during September, with positive/near average SSTs in the western/central equatorial Pacific and negative/near average SST anomalies in the East.

Sea surface height anomalies from Ocean Surface topography: Jason-1 and Jason-2 (NASA/French)

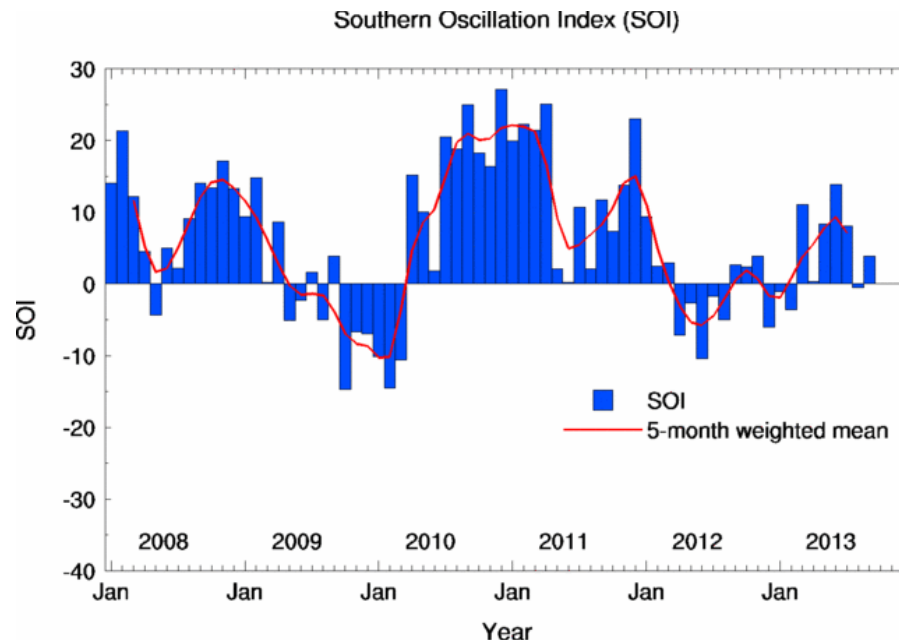
10-day data cycle centered around 20th September 2013



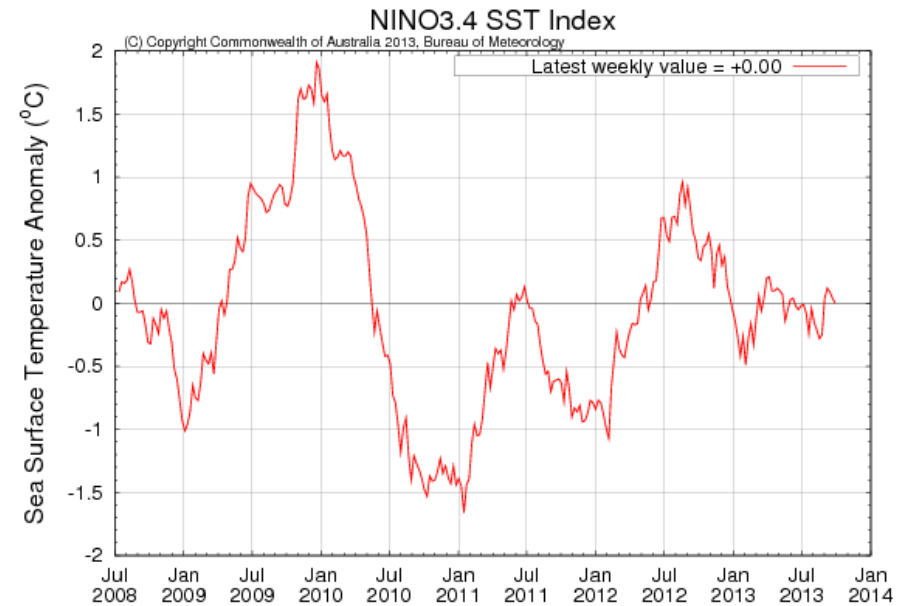
Note:

- As per the tropical SST, the sea surface height has remained in a neutral state for the past months, still indicative of a neutral ENSO state.

ENSO Index



Negative SOI = El Niño



Positive Nino 3.4 index= El Niño

Note:

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