East Australian Current Region
Oceanographic conditions report

December 2013

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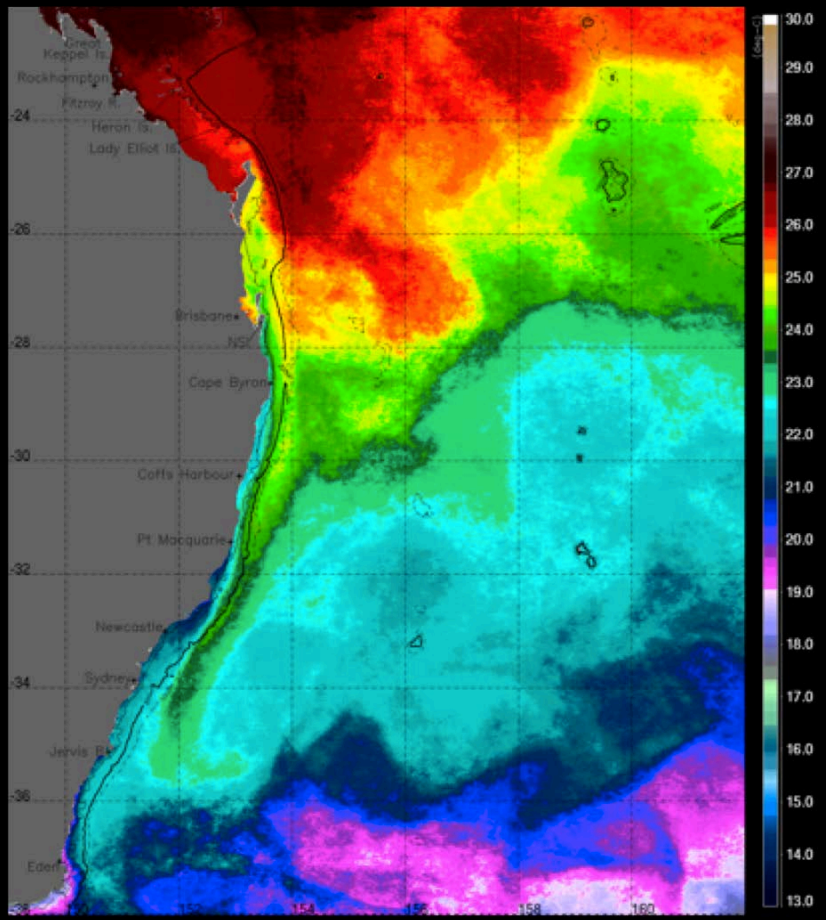
Overview: December 2013

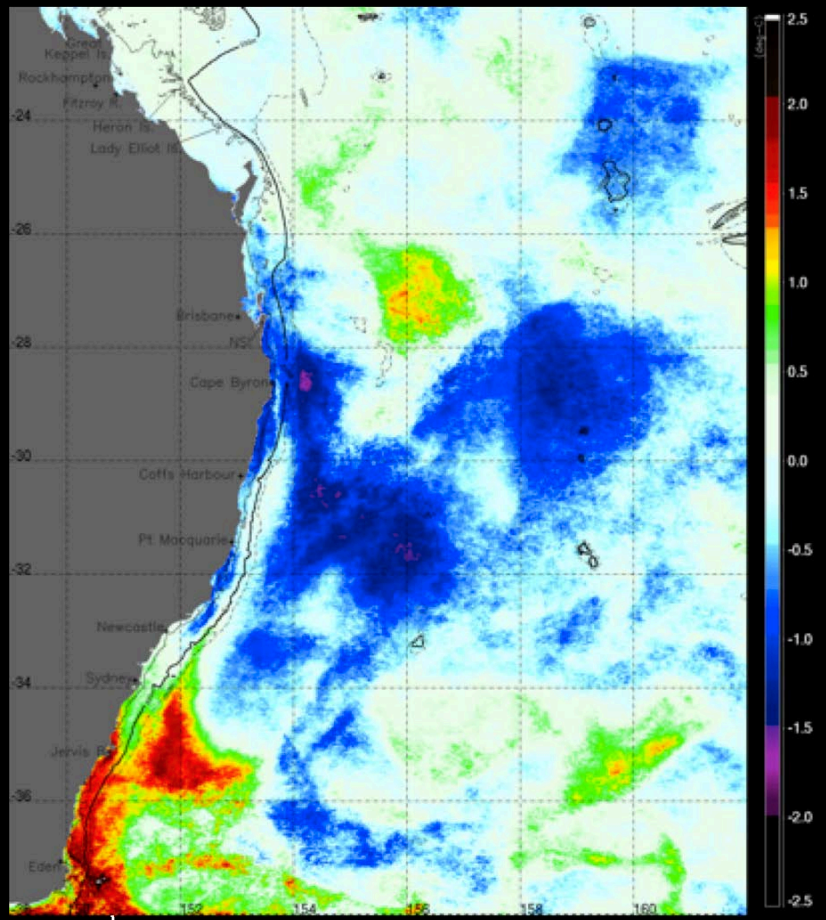
- MODIS weekly sea surface temperature (SST) means & anomalies showing a large cyclonic eddy partially impacting the southward flow of EAC
- Weekly MODIS chlorophyll means show strong surface signal corresponding to the cyclonic eddy spun-off south Fraser coast
- Weekly maps of sea level anomalies showing the ocean topography consistent with MODIS images
- Monthly mean surface oceanic currents (OceanMAPS) show maximum current (1.12 m/s) coincident with the strengthening of the EAC along 30°S
- Manta sightings related to enhanced food availability along LEI due to fronts resulting from oceanic intrusions into the Curtis Channel

EAC monthly MODIS SST (D+N): December 2013

- Strong positive SST anomalies from 34°S; Note temperature anomalies of +2°C converged close inshore between Jervis and Eden as portion of the EAC southern limb continued to penetrate southward close to the shelf
- Intense negative SST anomalies offshore and several patches inshore mostly between 26-34°S
- Mostly neutral conditions along the Capricorn region



mean

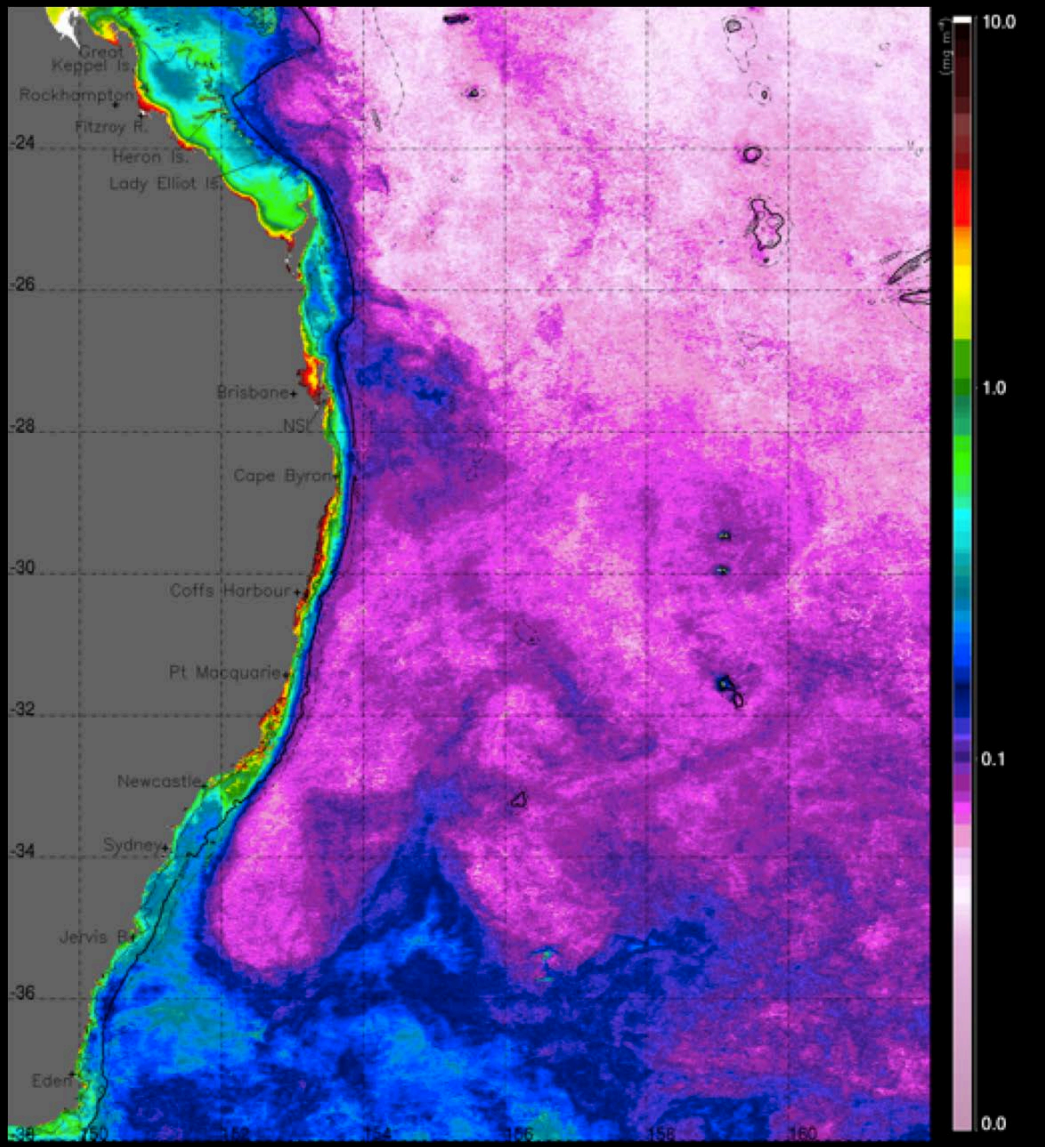


anomaly

EAC monthly MODIS Chlorophyll-*a*: December 2013

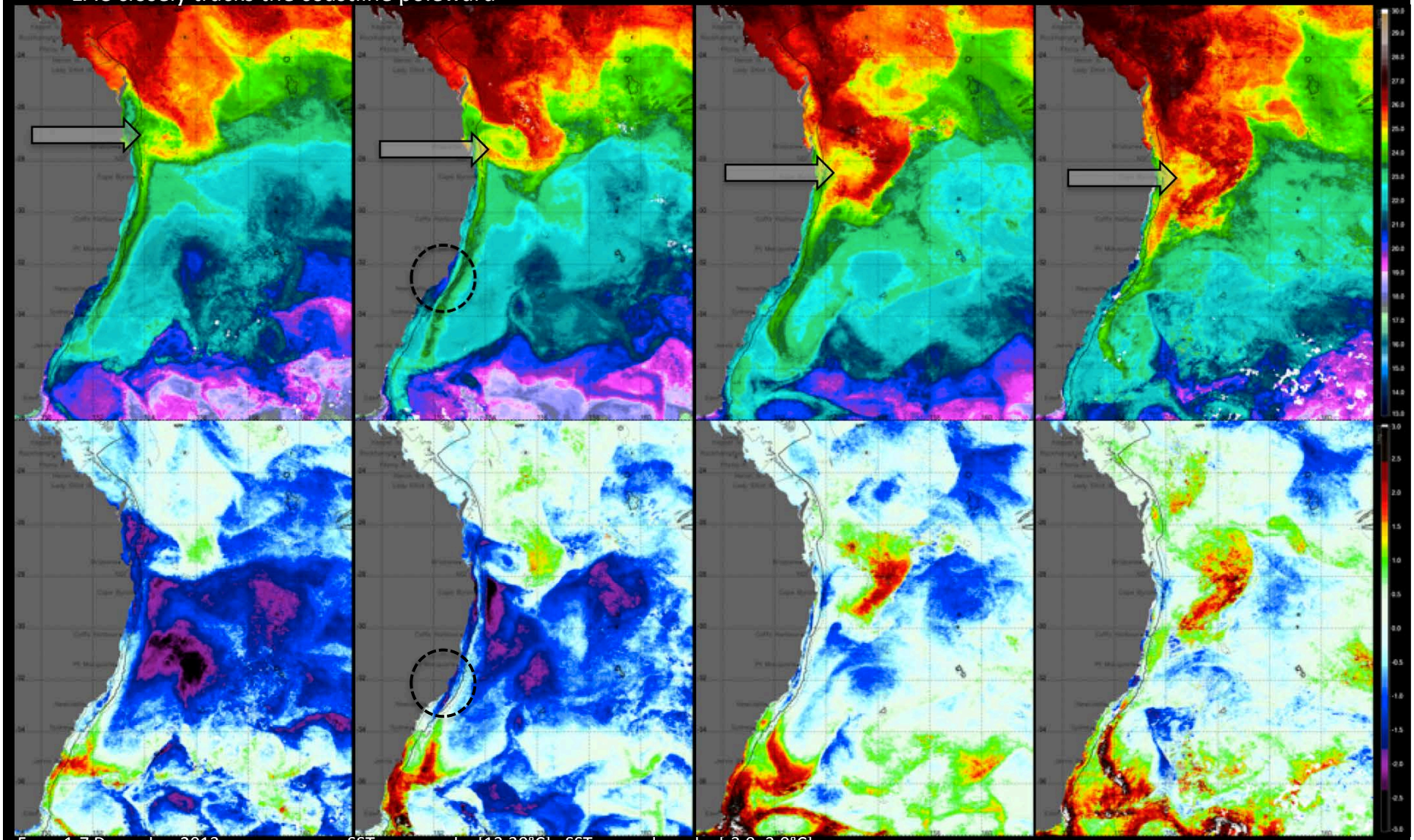
- Southward flowing EAC tracking the shelf very closely as indicated by the clear and strong frontal boundary between the high chlorophyll shelf (red to green) waters and oligotrophic (purplish) waters

- Southern portion of the study region remain dominated by relatively higher chlorophyll waters but with levels significantly lower compared to previous months as the eddy dynamics in the region appear to also have weakened



December 2013 Weekly MODIS SST means (top panel) and anomalies (bottom panel)

- Large cyclonic eddy spun-off south Fraser partially impacting the poleward EAC
- Intense positive SST anomalies mostly along the southwest corner of the study region, increasing in extent towards Week 4
- Intense negative SST anomalies mostly offshore from 24°S during Weeks 1&2 gradually dissipating towards Week 4. Encircled region denote intense negative SST anomalies associated with strong shelf-break upwelling as narrow and strong EAC closely tracks the coastline poleward



From 1-7 December 2013

SST mean scale: [13,30°C] ; SST anomaly scale: [-3.0, 3.0°C]

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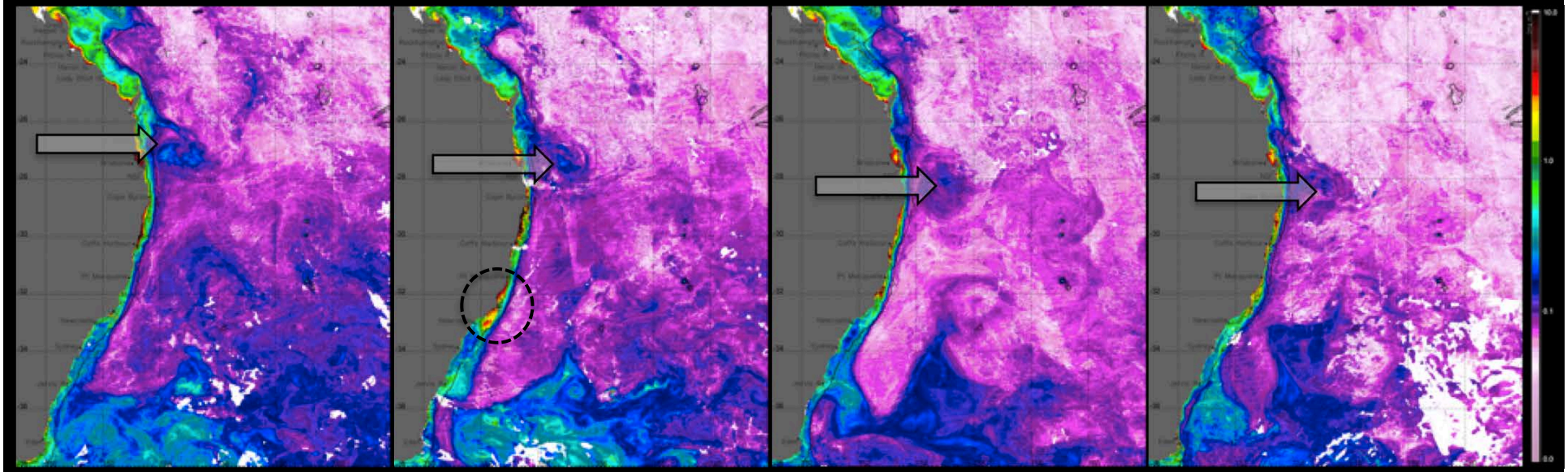
December 2013 Weekly MODIS CHLOR means

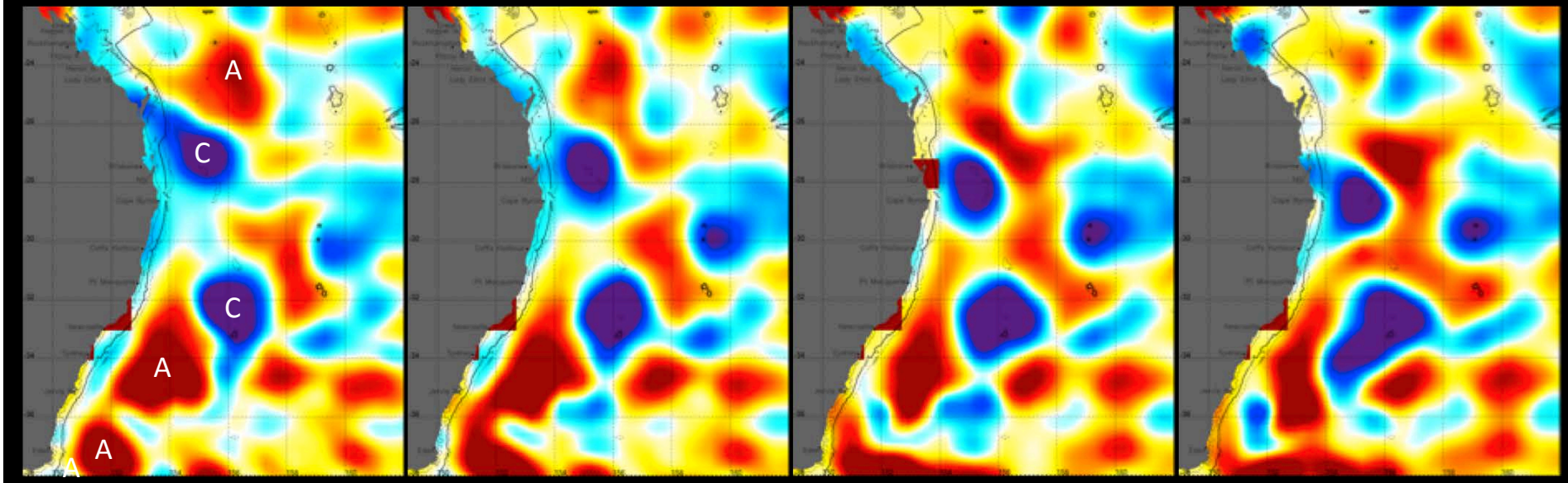
- Surface manifestation of an active weak Capricorn Eddy towards Week 3
- Surface signal of upwelled high chlorophyll and potentially offshore entrained shelf waters inside the cyclonic eddy spun-off south Fraser. Signal gradually weakening towards Week 4
- Intense shelf-break upwelling apparent during Week 2 between Port Macquarie and Newcastle (encircled region) as a result of the EAC encroachment as it continues poleward
- EAC southern limb clearly pinched off from the main flow at Week 3 eventually eroded towards Week 4 as EAC becomes replenished from the north



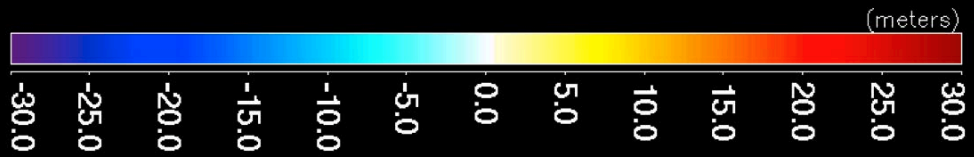
From 1-7 December 2013

Weekly AVISO Maps of Sea Level Anomalies

- Corresponding maps of sea level anomalies from AVISO show the primary EAC flow partially impacted by a cyclonic eddy spun-off Fraser coast (Week 1) forcing the Current to 'flow around' the eastern boundary of eddy and continue poleward (Week 2-4)
- See next OceanMaps slide clearly showing EAC veered eastward around this cyclonic eddy before continuing southward



From 1-7 December 2013



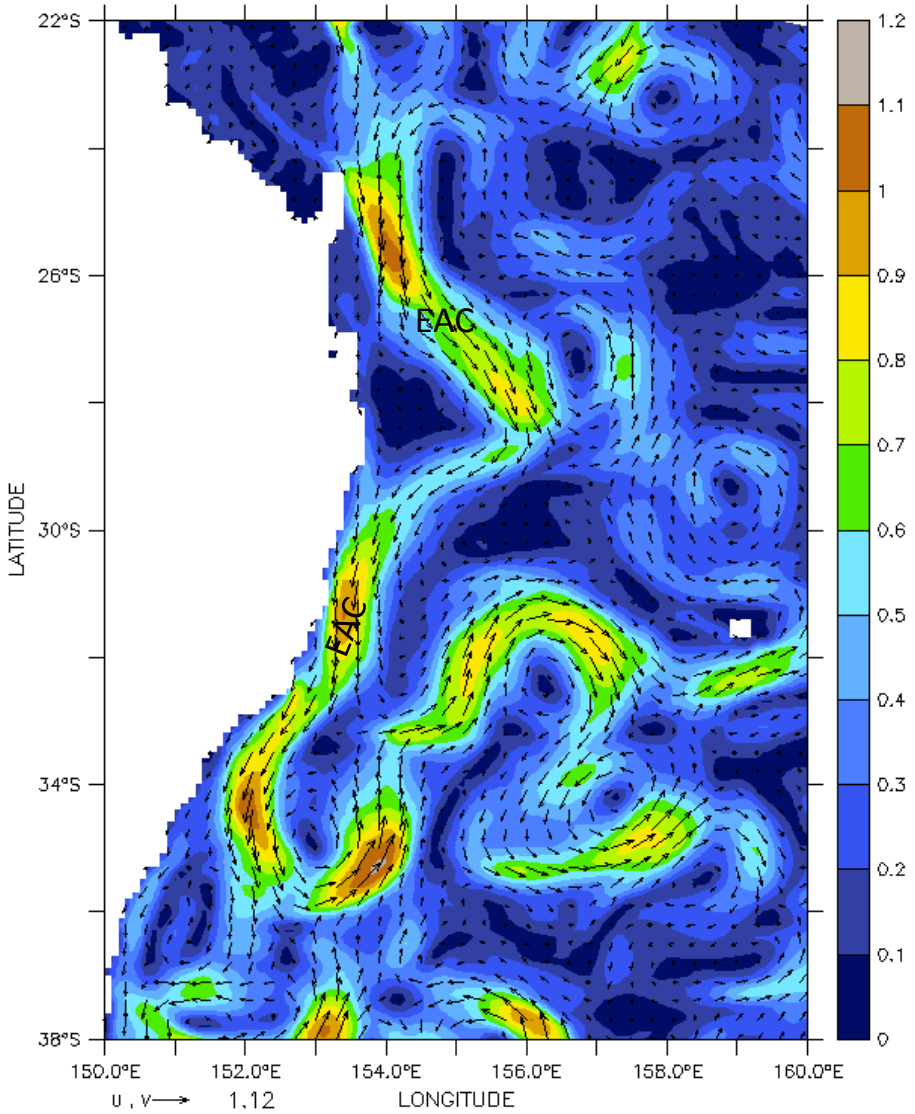
A: anticyclonic eddy; C = cyclonic eddy

OceanMaps 15m Depth Integrated Currents
December 2013

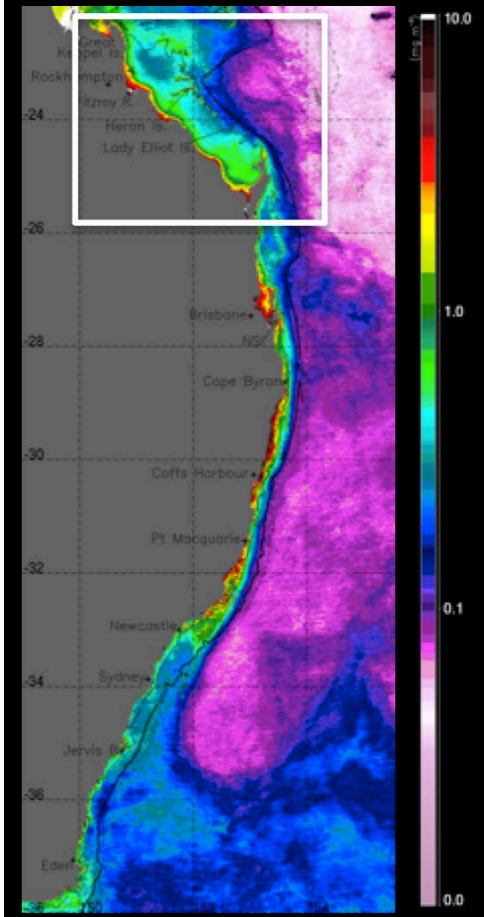
Depth integrated (0-15m) currents from OceanMaps reveal:

- EAC veered southeastward along 26.5°S, partially blocked by a cyclonic eddy located close inshore (centred at 28°S,154°E). This eddy spun-off Fraser coast as seen in the MODIS images

- Intensified EAC from ~30°S with maximum velocities of 1.12ms^{-1} tracking the shelf very closely before turning eastward into the Tasman Sea forming the Tasman front

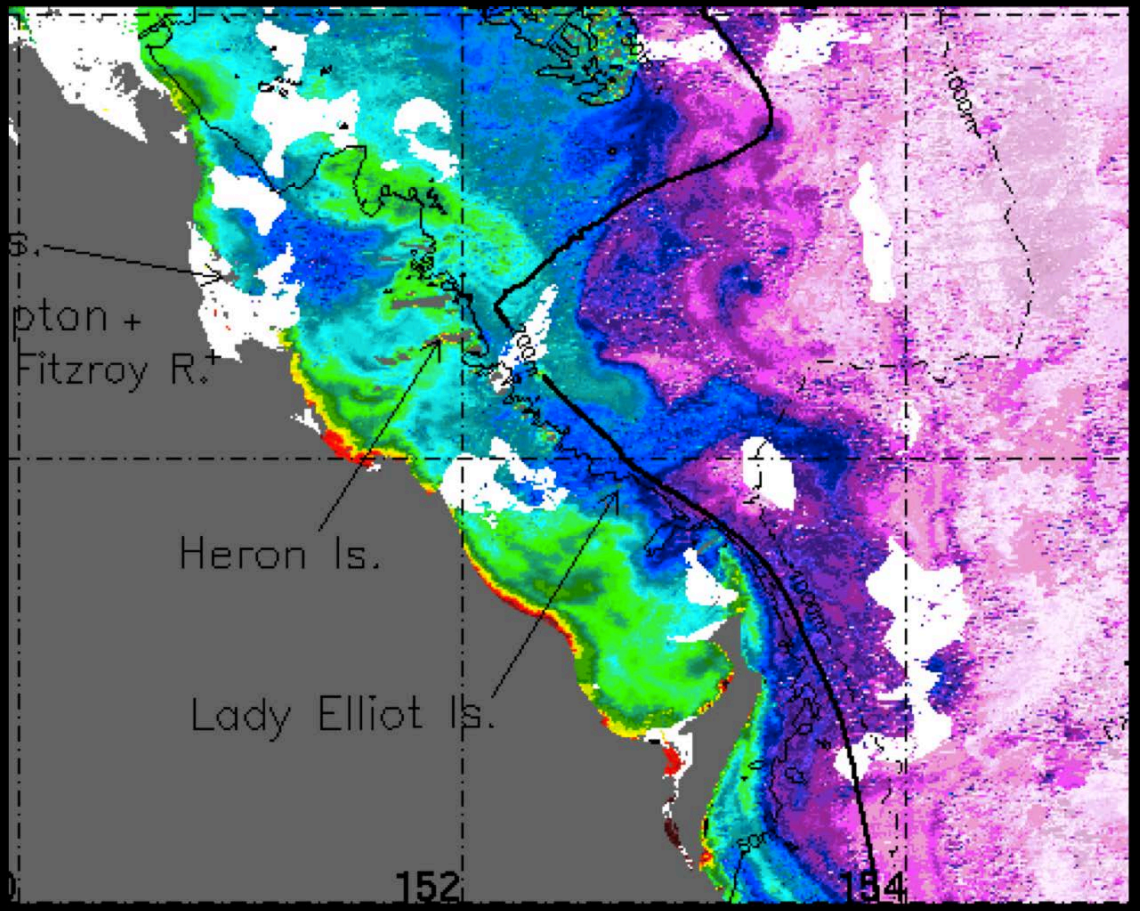


Manta sightings @ Lady Elliot Island in December 2013



Monthly mean chlorophyll (December 2013)

3D mean, 22-24 December 2013



40+ manta feeding off Lady Elliot Island during 24th December as intruded EAC waters (into Curtis Channel) generate strong front with local shelf waters along LEI enhancing local primary production = high food availability for marine animals including manta rays.