

Climate and Oceanographic Summary, Great Australian Bight 2019 - 1

Kirsten Rough – 23rd October 2018

Background:

This project was initiated after the unusual distribution of Southern Bluefin Tuna (SBT) through the 2011-12 fishing season. In response to this, the status of the major climate systems that influence ocean conditions and currents through the SBT fishing areas are routinely monitored. Information updates on local conditions (ocean temperature, chlorophyll and currents) was distributed weekly over the past 6 fishing seasons – and will continue for this next season. This very preliminary brief contains items of relevance for the 2019-fishing season.

Summary:

The situation at the moment is looking like an-historically typical season, with nothing to indicate an early or a late start, nor fish leaving or moving through the area at an unusually rapid rate.

The broader climate system driver of the Pacific Ocean has continued in a “neutral phase” that is now tending towards El Niño (a situation similar to 2010 and 2015 season). This climate system has an influence over weather patterns; in the GAB this can mean LOTS of strong southeasterly winds.

The broader climate system driver of the Indian Ocean has had very little influence over the Leeuwin Current over the past 6-months, and this is forecast to continue throughout the fishing period of the 2019 season.

Under these forecasted broader climate conditions, upwelling will occur, and will very likely be strong and persistent. In fact the plots of sea temperature at the seafloor from earlier this month indicate there has already been a significant pulse of cold water upwelled onto the shelf area to the west of Kangaroo Island. For SBT fishing this may lead to smaller, more condensed areas of sea surface warmth where SBT school-up at the surface sunbaking. Strong upwelling also means that SBT will not move rapidly or unusually through the GAB this season.

There are no seismic surveys with approval to operate through the 2019 season; however applications are continuing to be lodged for the area covering Rocky Island and the Cabbage Patch (in the Duntroon Basin adjacent to Eyre Peninsula) and an area adjacent to the current eastern fishing areas (in the Otway Basin).

Norwegian Oil Company, Equinor are continuing to progress their plans to drill in the location of the 2012 BP seismic survey area of the central GAB. Their intention remains to have a Dynamic Positioned (DP) Rig in the area from October 2019. Dynamic Positioning means thrusters not anchors hold the rig on location.

All Commonwealth Marine Parks in the GAB and Kangaroo Island area are now active. This means there are restrictions on where activities can be done - and NO FISHING OR TOWING in Green Zones. I will send out the details, co-ordinates and maps in an email prior to fishing operations.

Areas of Ocean Warming coming into the 2019 fishing season:

The Pacific Ocean climate system (ENSO) remains in a neutral phase that is now tending towards El Niño, a situation similar to both the 2010 and 2015-fishing seasons. Thresholds to formally declare a mild El Niño may occur through December/January. The main negative effect of this climate

phase is reducing rainfall over the land area of the eastern half of Australia, however this system also imparts an influence over weather patterns. For the GAB this can mean LOTS of strong southeasterly winds. Very high, high-pressure systems have already been a significant feature through September and October. These large strong high-pressure systems usually have well defined calm periods so fishing can be quite pulsed with everyone fishing and filling tow cages on the same day(s).

Air temperatures through November and December are predicted to be slightly warmer than average, but nothing super extreme. This may lead to daily fluctuations in the satellite images of temperature at the water surface.

The broader climate system driver of the Indian Ocean has had very little influence over the Leeuwin Current over the past 6-months, and this is forecast to continue throughout the fishing period of the 2019 season. The current and forecast warming pattern of the Indian Ocean means cooler waters on the Australian side, which leads to less tropical cyclones off North West WA and a slower, weaker Leeuwin Current.

The distribution of warmer or cooler water masses in areas adjacent to Australia and through the GAB for October is shown below:

- Figure 1 is the situation coming into the 2016-fishing season; large areas of the GAB and Indian Ocean were unseasonably warm.
- Figure 2 coming into the 2017-fishing season; large areas of the GAB were unseasonably cool.
- Figure 3 coming into the 2018-fishing season; a bit cool to the west of WA and western GAB
- Figure 4 shows the situation over the past month, and shows nothing particularly unusual.

Essentially at this stage there is nothing to suggest a strong Leeuwin Current, suppressed upwelling or that fish will move rapidly through the GAB fishing area or leave early.

Please note however that these systems are very dynamic so updates will be provided progressively as the fishing season approaches and progresses.

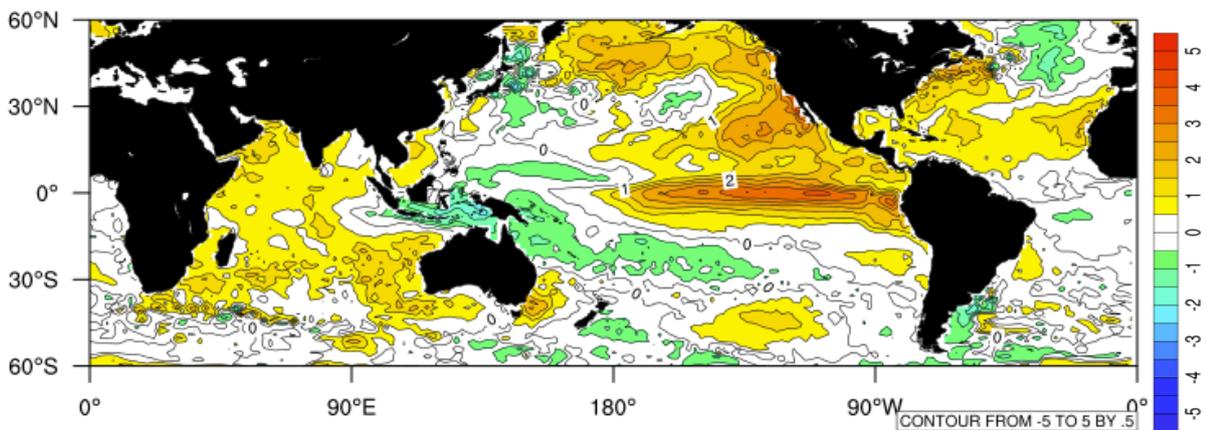


Figure 1: Global Sea Surface Temperature anomalies evident through October 2015, coming into the 2016-fishing season. The scale bar on the right of the image shows how many degrees above or below the long-term average (Bureau of Meteorology 2015).

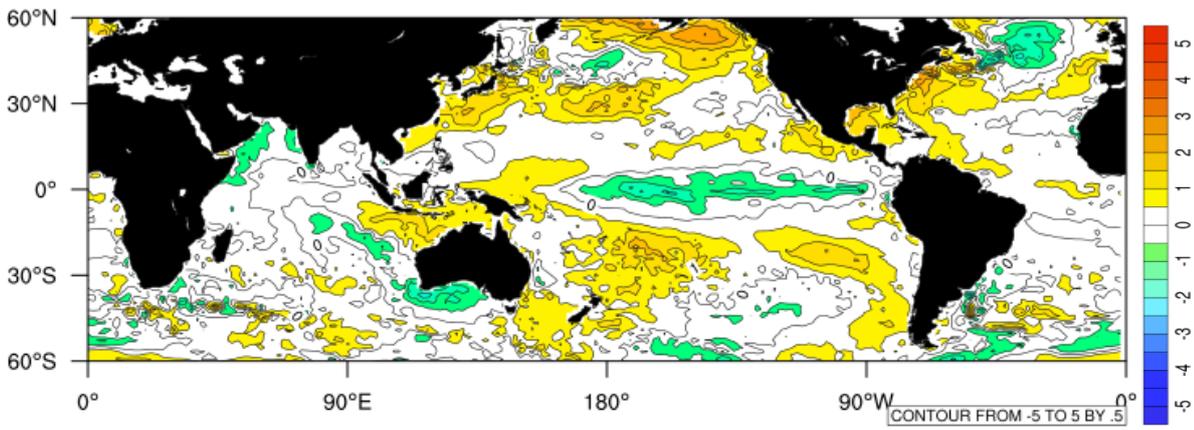


Figure 2: Global Sea Surface Temperature anomalies evident through October 2016, coming into the 2017-fishing season (Bureau of Meteorology 2016).

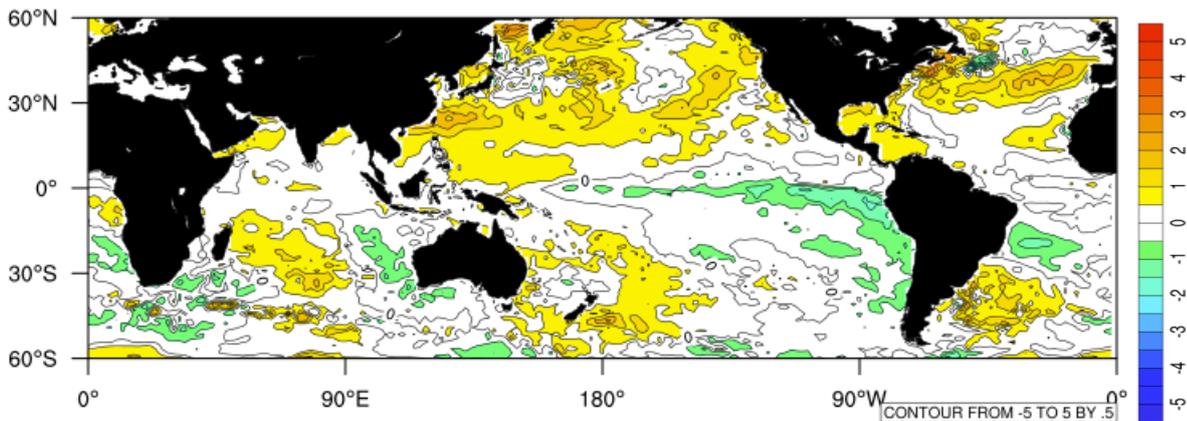


Figure 3: Global Sea Surface Temperature anomalies evident through October 2017, coming into the 2018-fishing season (Bureau of Meteorology 2017).

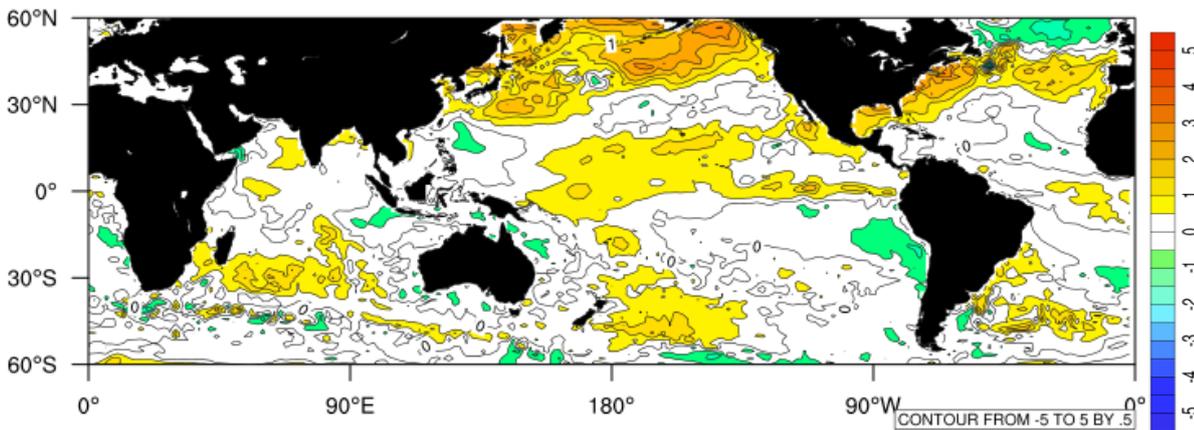


Figure 4: Global Sea Surface Temperature anomalies over the past 28-days to 23rd October 2018 (Bureau of Meteorology 2018).

GAB Sea Surface Temperature (SST):

The CSIRO, Bureau of Meteorology, ASBTIA project that developed habitat forecasts for SBT, displays sea temperature plots with a fixed scale bar and allows comparisons over time; will require updating during or shortly after this fishing season. The new forecasting system the Bureau of Meteorology is introducing will allow better resolution closer to the coast. CSIRO also have data from 10 extra archival tags retrieved from fish after 2012. I will be in touch through November to discuss additional options to potentially update the features on the website so they are more relevant to recent inshore fishing areas.

The project website link is:

<http://www.cmar.csiro.au/gab-forecasts/index.html>

The situation across the GAB for the month of September 2018 and for the same period of time over the previous 5 years can be seen in Figure 5. Particularly noticeable from these images is the limited influence of the Leeuwin Current through September this year.

The situation across the GAB over the past week is shown in Figure 6. At this stage it is still quite cool throughout the area with warming starting in the shallower inshore areas; this is suggesting a more 'historically normal' start to the fishing season.

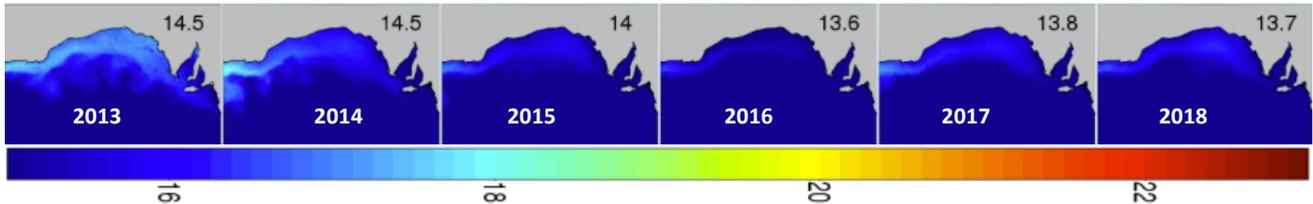


Figure 5: GAB sea surface temperatures for the area from longitude 120 to 140°E, through the month of September for 2018 and the previous 5 years; in these images aqua can contain early entry SBT (CSIRO 2018).

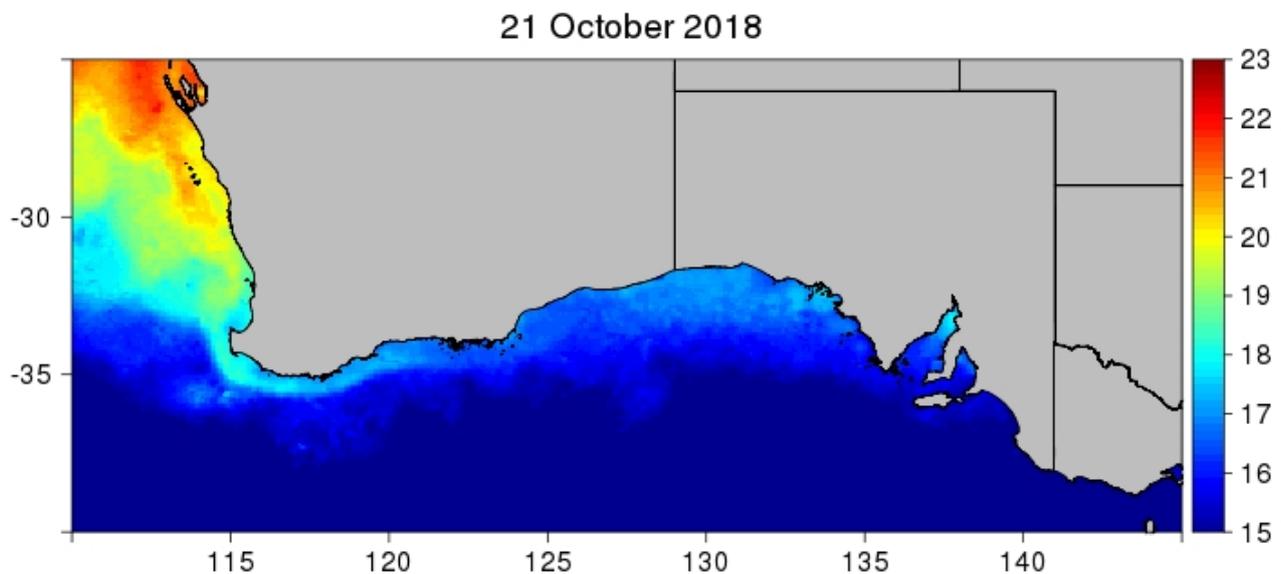


Figure 6: GAB sea surface temperatures over the past week; in these images aqua can contain early entry SBT (CSIRO 2018)

The SARDI, Bureau of Meteorology, ASBTIA (eSA-Marine) project that developed the short-term fine scale forecasts of sea surface temperature, sea floor temperature, ocean currents, water temperature and salinity profiles down through the water column, wind speed and direction will continue to be available on this link:

http://pir.sa.gov.au/research/esa_marine

Images downloaded earlier this month are indicating a very early start to upwelling coming into this season. Cold upwelled water is evident at the sea surface and particularly at the seafloor to the west of Kangaroo Island on the 10th and 11th October (Figure 7 and Figure 8). Please note with images from this website that warmer water will always appear red and cooler waters always dark blue; the actual temperature that the colour represents is shown by the legend that appears on each image, this will change as the season draws closer (red is now 16°C, through January red will represent 20°C or higher). The plot of Sea Surface Temperature anomalies (Figure 9) shows how the

situation this week compares to the average SST recorded for the same period of time over the past 5-years.

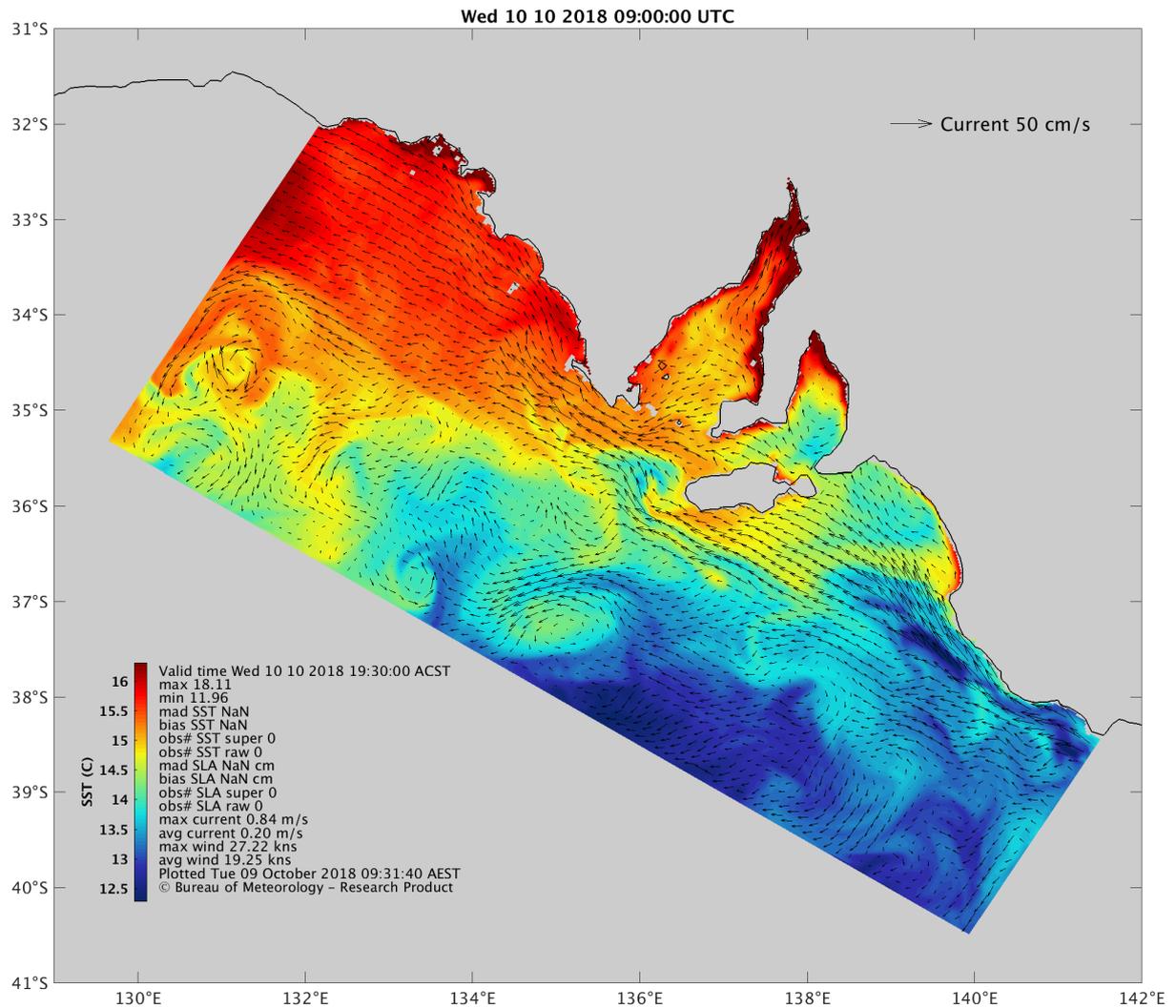


Figure 7: Sea surface temperature and water current speed and direction on the 10th October 2018; please check colour scale for ACTUAL temperatures (SARDI-BoM 2018)

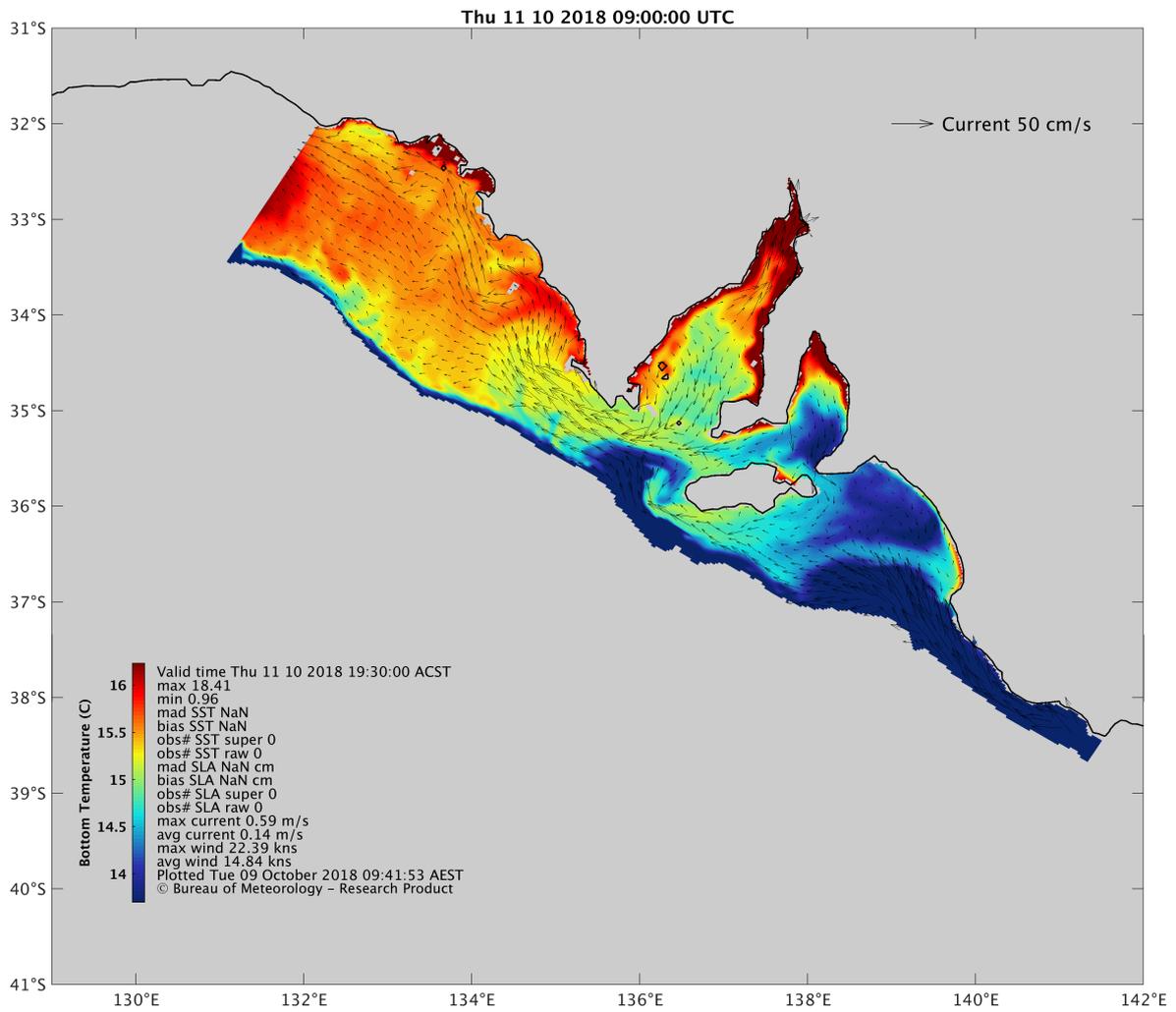


Figure 8: Sea floor temperatures and water current speed and direction on the 11th October 2018; please check colour scale for ACTUAL temperatures (SARDI-BoM 2018)

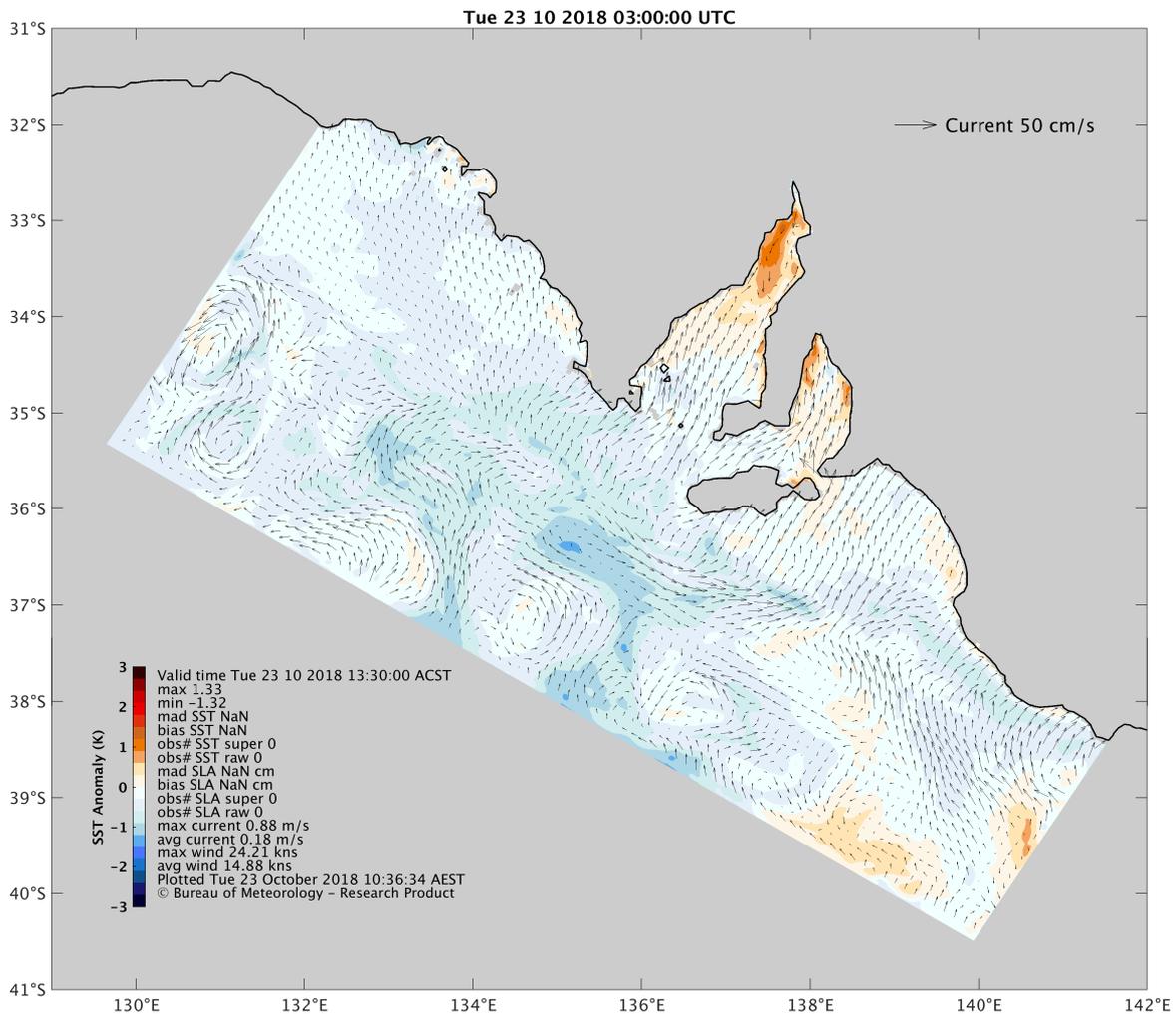


Figure 9: Sea Surface Temperature anomalies for waters adjacent to South Australia. This plot shows how the SST this week compares to the average SST for the same point in time over the past 5-years (SARDI-BoM 2018).

Oil & Gas Exploration Update:

A map showing the locations of all Petroleum Permits currently issued in the Commonwealth waters adjacent to South Australia is shown in Figure 10. Note there is another large area west of Permit EPP43, adjacent to Western Australia that is scheduled to have both seismic surveys and exploratory wells drilled, this area is not shown in the map.

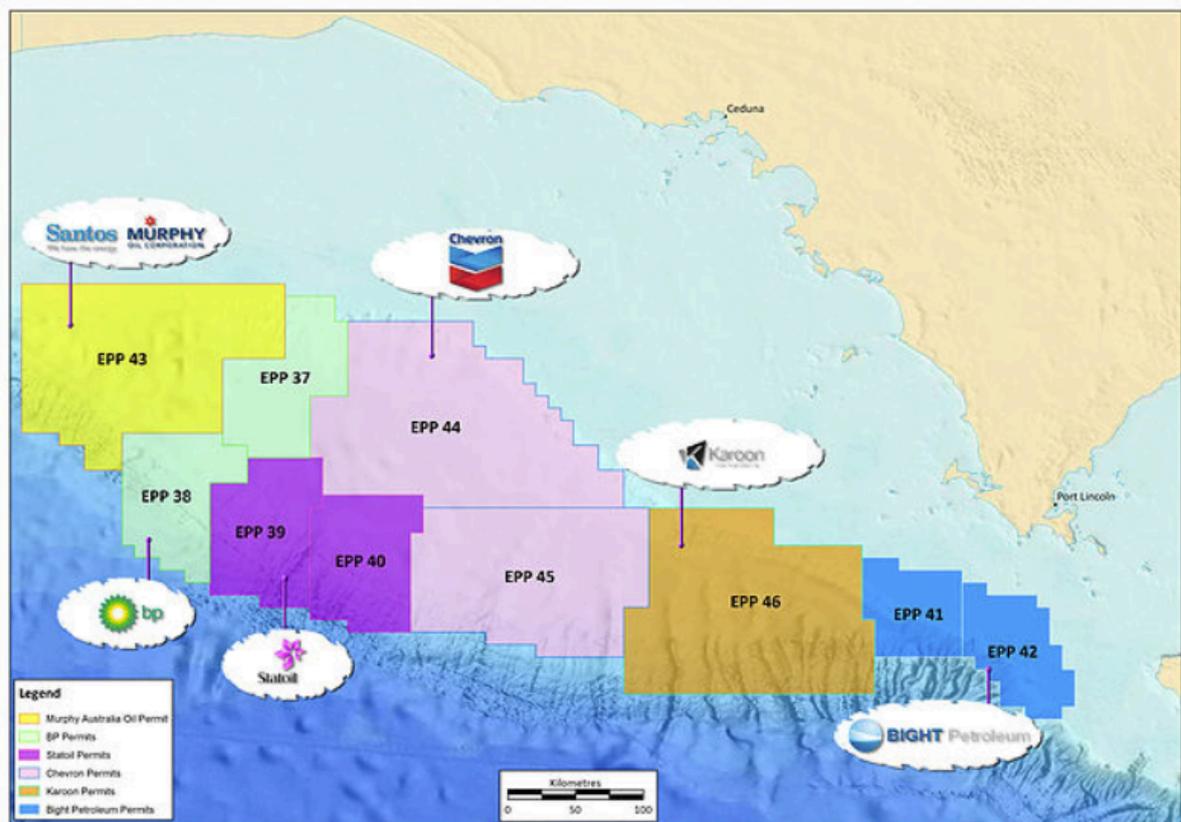


Figure 10: Identification and location of Petroleum Permits in the Great Australian Bight (GAB Exploration 2018) – please note this map has not been updated since last year; EPP37 and EPP38 no longer belong to BP, they are however currently up for auction to the highest bidder. Also out of view on this map is a very large area (25,600km²) immediately to the west of the WA/SA border which belongs to Santos.

UPDATE ON SEISMIC SURVEYS:

There are no surveys scheduled through the 2019 season. ASBTIA and other fishing associations continue to be actively involved in “consultations” on a number of seismic and drilling applications in the Great Australian Bight.

Approval has expired for the very large 2D seismic survey (covering >600,000km² from west of Eyre Peninsula to Tasmania) operating from July 2015 until May 2018.

PGS are still progressing their application to undertake 2 seismic surveys below and west of Eyre Peninsula. ASBTIA and others continue to lodge concerns to these, this process has been ongoing for 2 years now. The updated location and scale of the Duntroon MC2D, MC3D seismic surveys proposed by PGS is shown in Figure 11. This month PGS will submit its updated and modified Environmental Plan for this set of seismic surveys to NOPSEMA for assessment for the 3rd time. NOPSEMA has not accepted the plan for these surveys at the previous 2 submissions; a third rejection should mean that PGS has to prepare and lodge a new application if it wants to continue to apply for work over these permits.

There are 2 seismic survey companies proposing to undertake very large seismic surveys in the Otway Basin (southeastern SA and western Tasmania), adjacent to the Murray Commonwealth Marine Park. The Rock Lobster Association has been very active opposing these so far; this year ASBTIA has focused on the PGS survey and the drilling application from Equinor, but will prepare and submit something towards these other 2 surveys in the not too distant future.

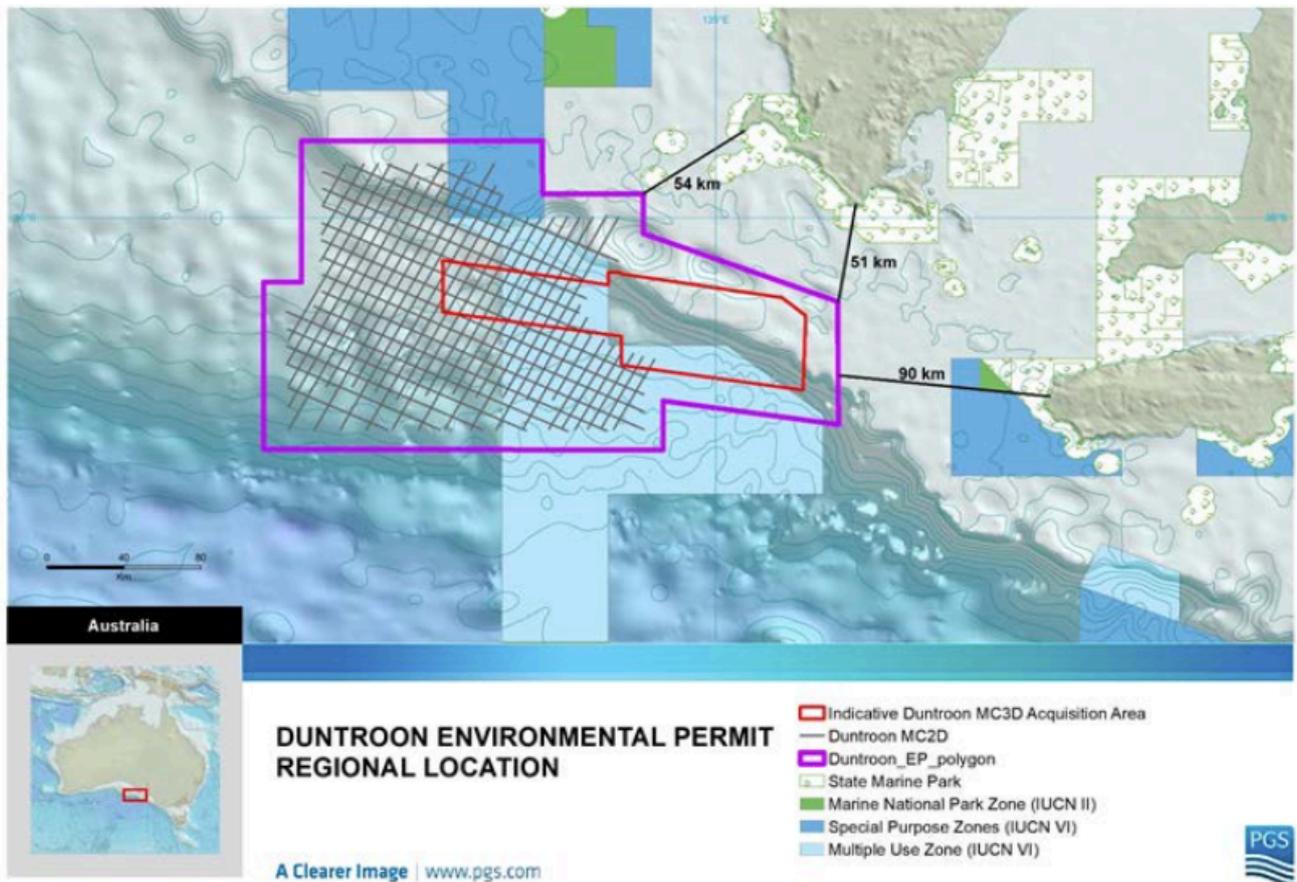


Figure 11: Duntroon Seismic Survey; total operational area outlined in Pink, proposed for 2019-2020 fishing season are the 2D transect lines in Grey and a more intense 3D survey within the area outlined in Red. (PGS 2018)

UPDATE ON EXPLORATION DRILLING:

Equinor have formally started their 'stakeholder engagement' with the fishing and aquaculture sectors through September, at this stage invitation is limited to those with interests within a 40km radius of the proposed well site. ASBTIA has responded with a comprehensive letter of concerns however we are still waiting on the majority of the relevant documents to be provided.

Any questions on any items in this update – please don't hesitate to call or email; contact details and links to the various websites used for this update are listed here:

GAB SBT Habitat Forecasts: <http://www.cmar.csiro.au/gab-forecasts/env-observed.html>

eSA Marine: http://pir.sa.gov.au/research/esa_marine/sarom

IMOS ocean monitoring: <http://oceancurrent.imos.org.au/index.php>

Bureau of Meteorology: <http://www.bom.gov.au>

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