Climate and Oceanographic Summary, Great Australian Bight 2018 - 6

Kirsten Rough – 10th January 2018

Summary:

The GAB continues to warm progressively at the sea surface.

Longer-term forecasts indicate a fishing season where conditions will be suitable for SBT over a wide area and remain suitable in current fishing locations until at least the end of February.

Upwelling continues to be a prominent feature on satellite images and is leading to marked differences between water temperatures at the sea surface and the sea floor, especially below Eyre Peninsula. This is also leading to very rapid and dramatic changes in sea surface temperatures across recreational fishing areas of the lower Southeast and western Victoria.

Chlorophyll levels are ideal for SBT across a very wide area of the GAB; and responding to nutrient input from the upwelling.

Early indications are that those historically reliable outer shelf central GAB fishing areas continue to not hold SBT despite highly suitable ocean temperatures; this has been the situation since the seismic survey of 2012. Please continue to monitor these locations during the broad scans of the broader GAB area.

Forecast Sea Surface Temperature (SST) and SBT Habitat:

This year conditions continue to warm over a broader area at an earlier point in time compared to what has occurred coming into the last season; current habitat distribution is shown in Figure 1.

Updated **Longer-term forecasts** of conditions in the GAB are shown in Figure 2, and continue to indicate that the sea conditions this season will be suitable over a broad area and start retracting through March – this probably indicates that the upwelling will continue to be a significant feature of this fishing season.

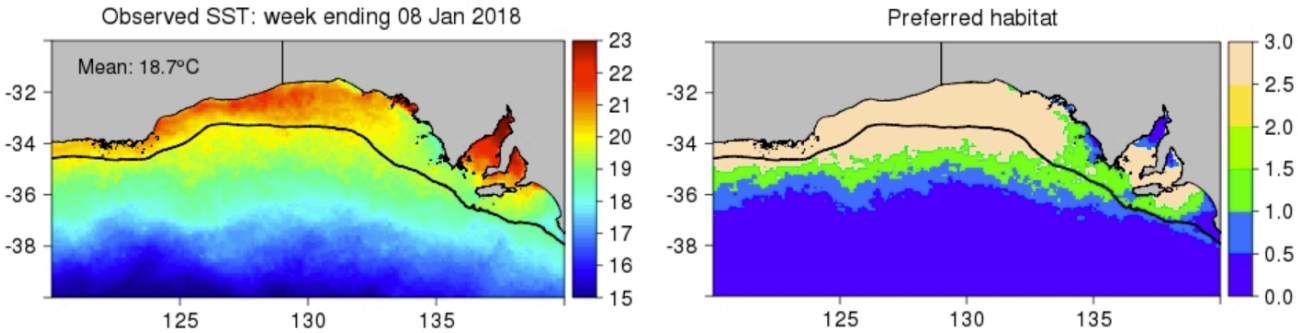


Figure 1: Sea Surface Temperature and SBT Habitat over the past week (CSIRO 2018 - GAB Forecasting Website)

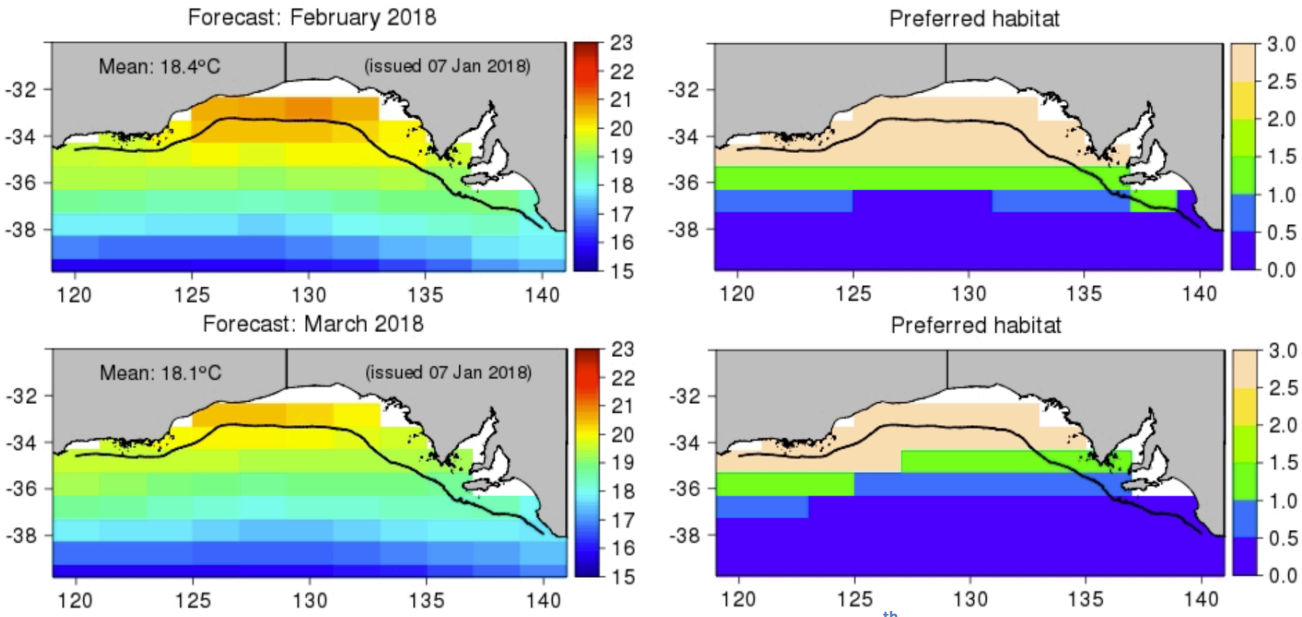


Figure 2: Longer term forecasts of Sea Temperature and SBT habitat issued on 7th January for February and March 2018 (CSIRO 2018 – GAB Forecasting Website).

GAB Sea Surface Temperature (SST):

The broader GAB area continues warming with the influence of local weather and warm currents continuing to feed in from the west. Cool water from the Bonney Upwelling remains a prominent feature in the east of the GAB and west coast of Eyre Peninsula (Figure 3). Actual SST along the 200m-depth contour is shown in Figure 4. This year (now), SST along the shelf-break is at or exceeds 19°C across the entire area to the Victorian border. Peaks along the shelf break at approximately 131°30'E, 132°40'E, 135°45'E, 136°20'E and 139°20'E might represent suitable thermal fronts.

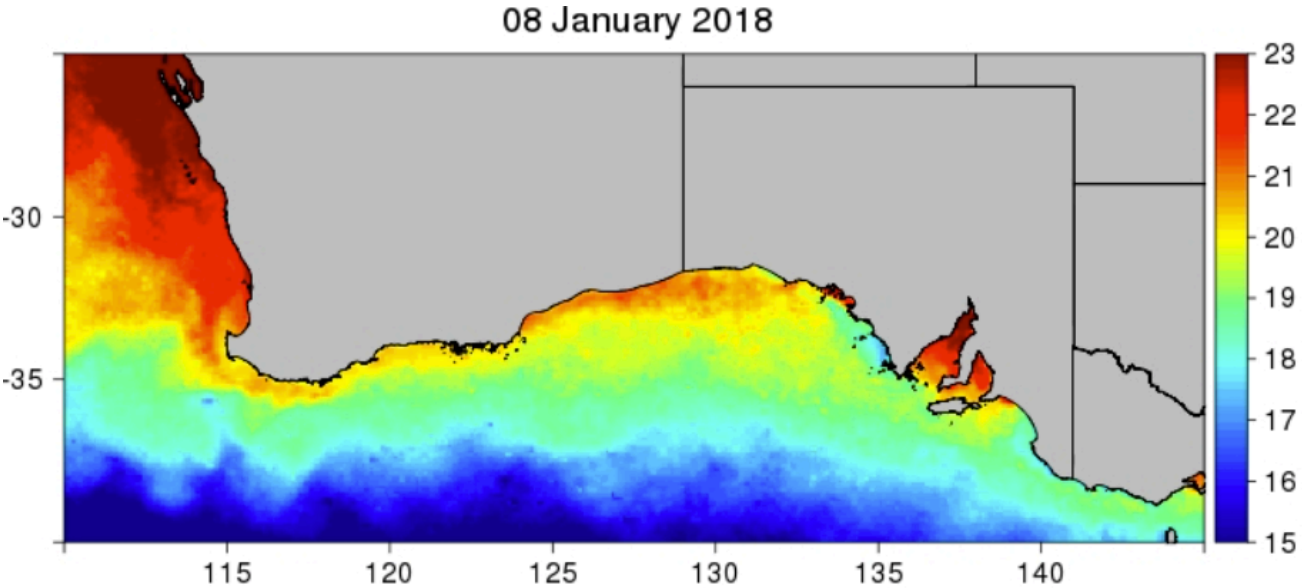


Figure 3: Sea Surface Temperature across southern Australia over the past week (CSIRO 2018 - GAB Forecasting Website)

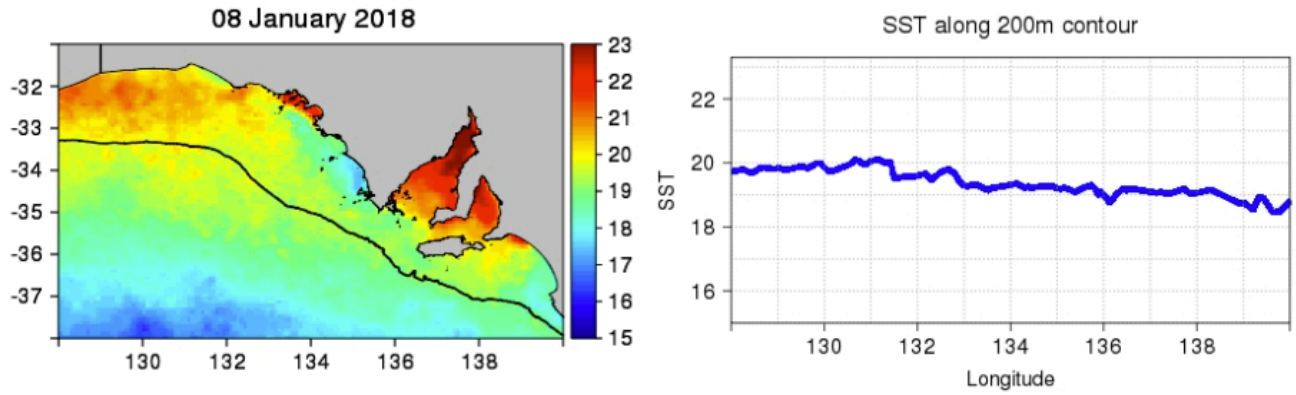


Figure 4: Most recent SST satellite image between longitudes 128° to 140°E (left) and corresponding graph of SST along the shelf break (right) (CSIRO 2018 - GAB Forecasting Website)

How the SST conditions across the broader GAB area of December 2017 compare with December coming into the previous 5 fishing seasons is shown in Figure 5. This season the 20°C+ areas are much smaller than they were through 2012 to 2015, but the overall GAB average temperature remains the same or higher than those seasons. This is because the area with SST around 18°C occurs over a much larger portion of the image/GAB. What this is likely to mean for this season is that underlying conditions are suitable for SBT over a huge area, so potential surfacing locations are likely to be far and wide when the weather conditions lead to patches of particularly warm surface layers.

Please do note though, that while temperature is a significant factor in SBT distribution; where they stay (and are fishable) is also likely influenced by the food distribution across the area. Chlorophyll levels measured by satellite can be used as an indicator of areas where productivity is higher (or lower), and can show where food resources for a species like tuna are more likely to be enhanced. Analysis by CSIRO over decades of Aerial Survey and commercial records have found that temperature combined with chlorophyll readings are extremely good predictors of SBT distribution.

However, what is becoming increasingly apparent through recent years is that while the temperature and chlorophyll concentrations in surface waters have been in the range of what is known to be highly suitable for SBT through the outer shelf area of the central GAB (especially 131° – 133°E) across the past 5 seasons, this area has not held schools of SBT since the seismic survey of 2012. Please do continue to record observations from scoping flights over those previously reliable fishing locations – it is very important to monitor how long it will take for this area to become attractive for SBT again especially since this area is no longer being monitored through the CSIRO Aerial Survey.

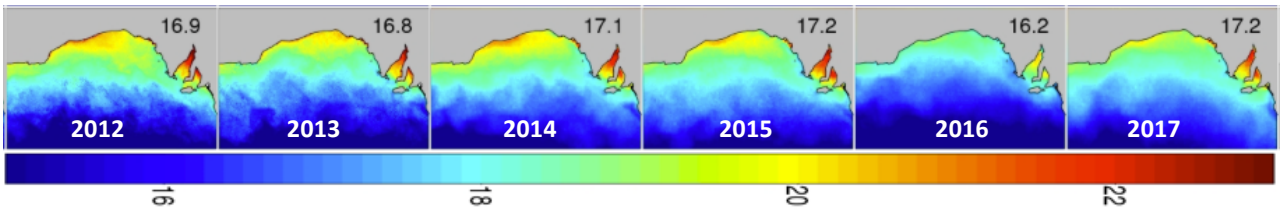
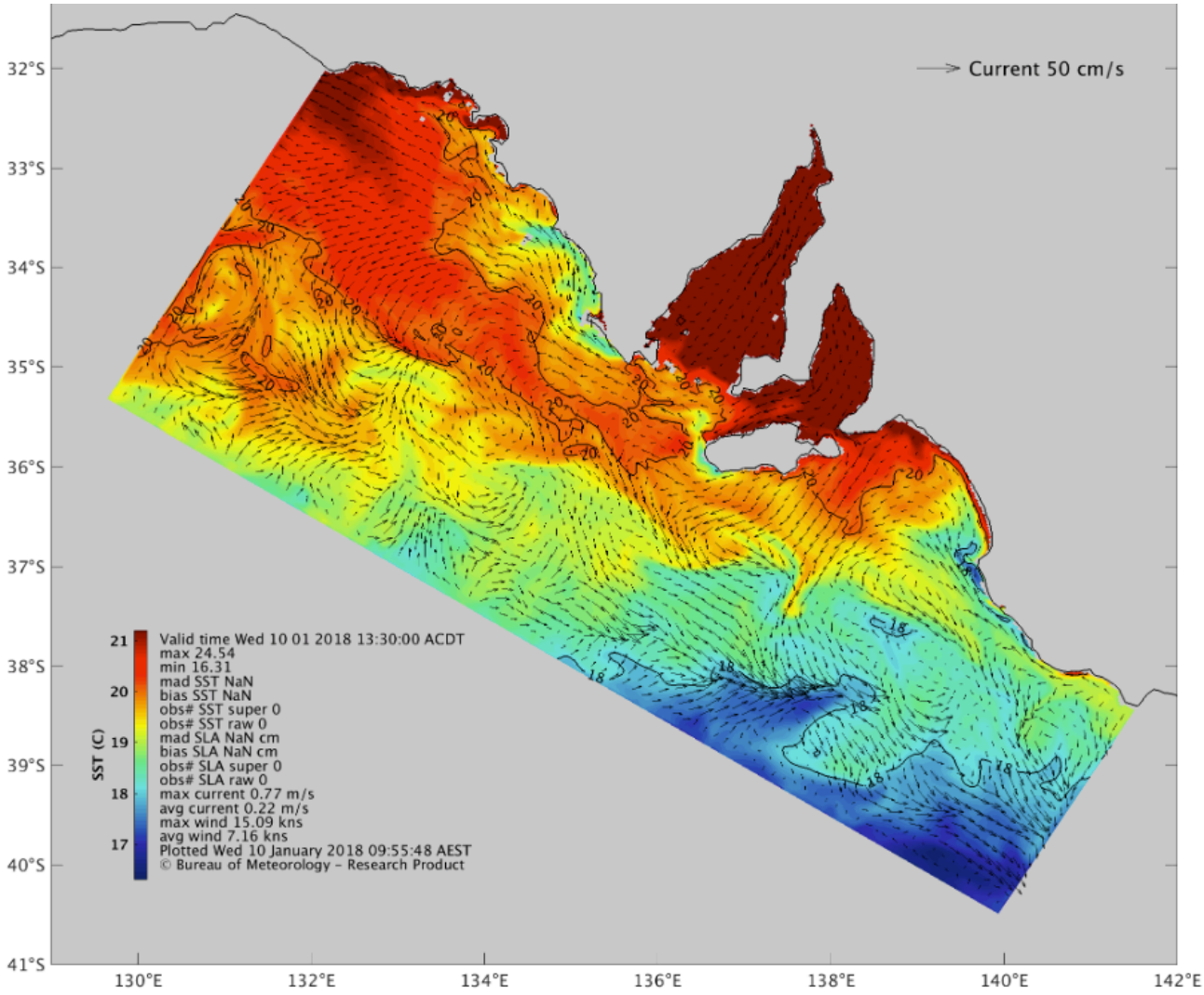


Figure 5: December Sea Surface Temperatures of the GAB area (between longitudes 120 and 140°E) for 2017 and the previous 5 years (CSIRO 2018 - GAB Forecasting Website)

The most recent **fine-scale Sea Surface Temperature and short-term forecasts** are shown in Figure 6 The plot of surface temperature is indicating the Gulf areas are continuing to warm and that surface waters are suitable for SBT across the majority of the Bight. Surface temperatures are very dynamic with daily weather and upwelling leading to marked changes; particularly noticeable in the lower southeast of SA where there will be differences of several degrees between Thursday and Friday.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33°S
34°S
35°S
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37°S
38°S
39°S
40°S
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130°E
132°E
134°E
136°E
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142°E
SST (C)
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19
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17
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bias SST NaN
obs# SST super 0
obs# SST raw 0
mad SLA NaN cm
bias SLA NaN cm
obs# SLA super 0
obs# SLA raw 0
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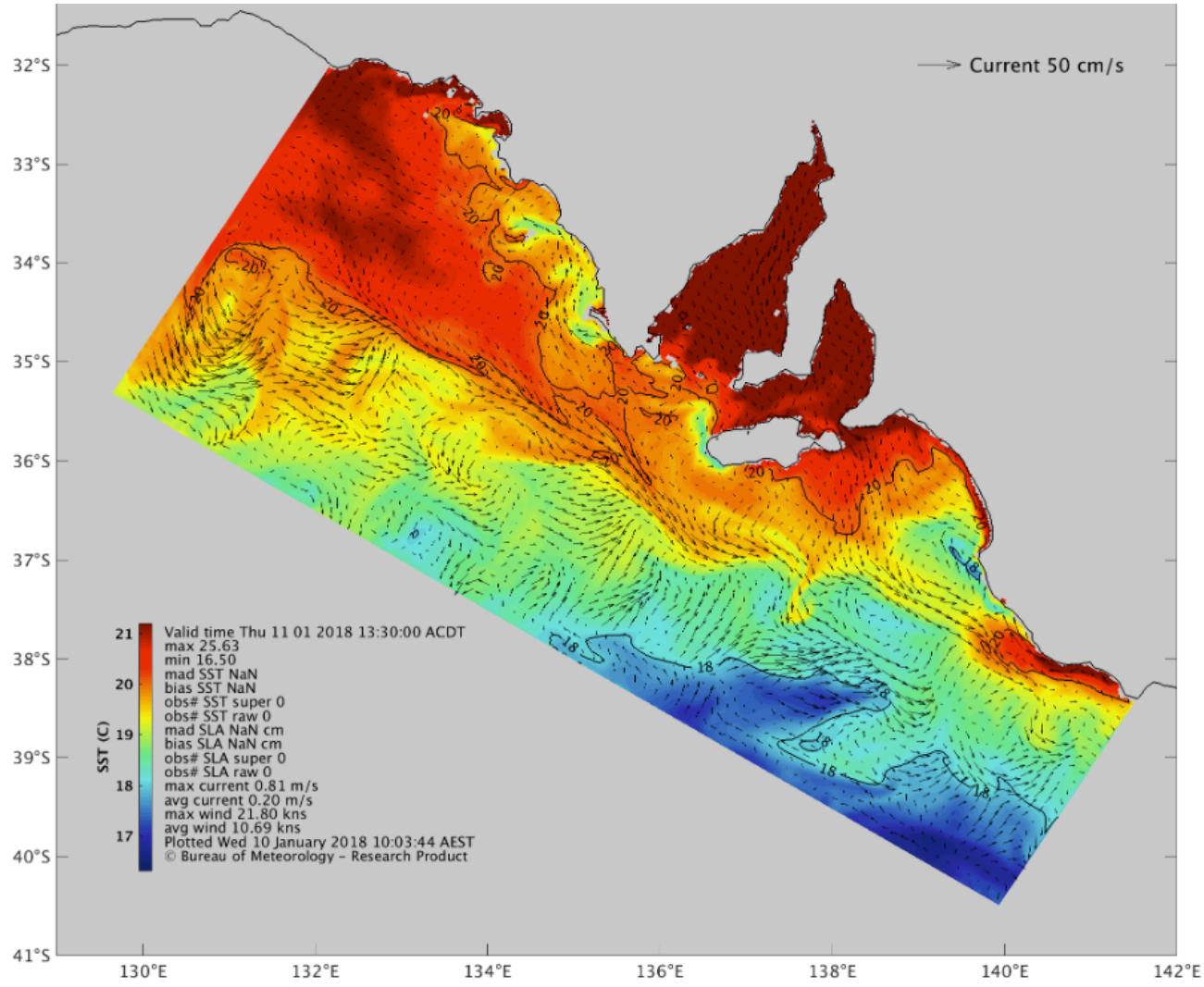
avg wind 7.16 kns
Plotted Wed 10 January 2018 09:55:48 AEST
© Bureau of Meteorology – Research Product


Current 50 cm/s
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SST (C)
21
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min 16.50
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bias SST NaN
obs# SST super 0
obs# SST raw 0
mad SLA NaN cm
bias SLA NaN cm
obs# SLA super 0
obs# SLA raw 0
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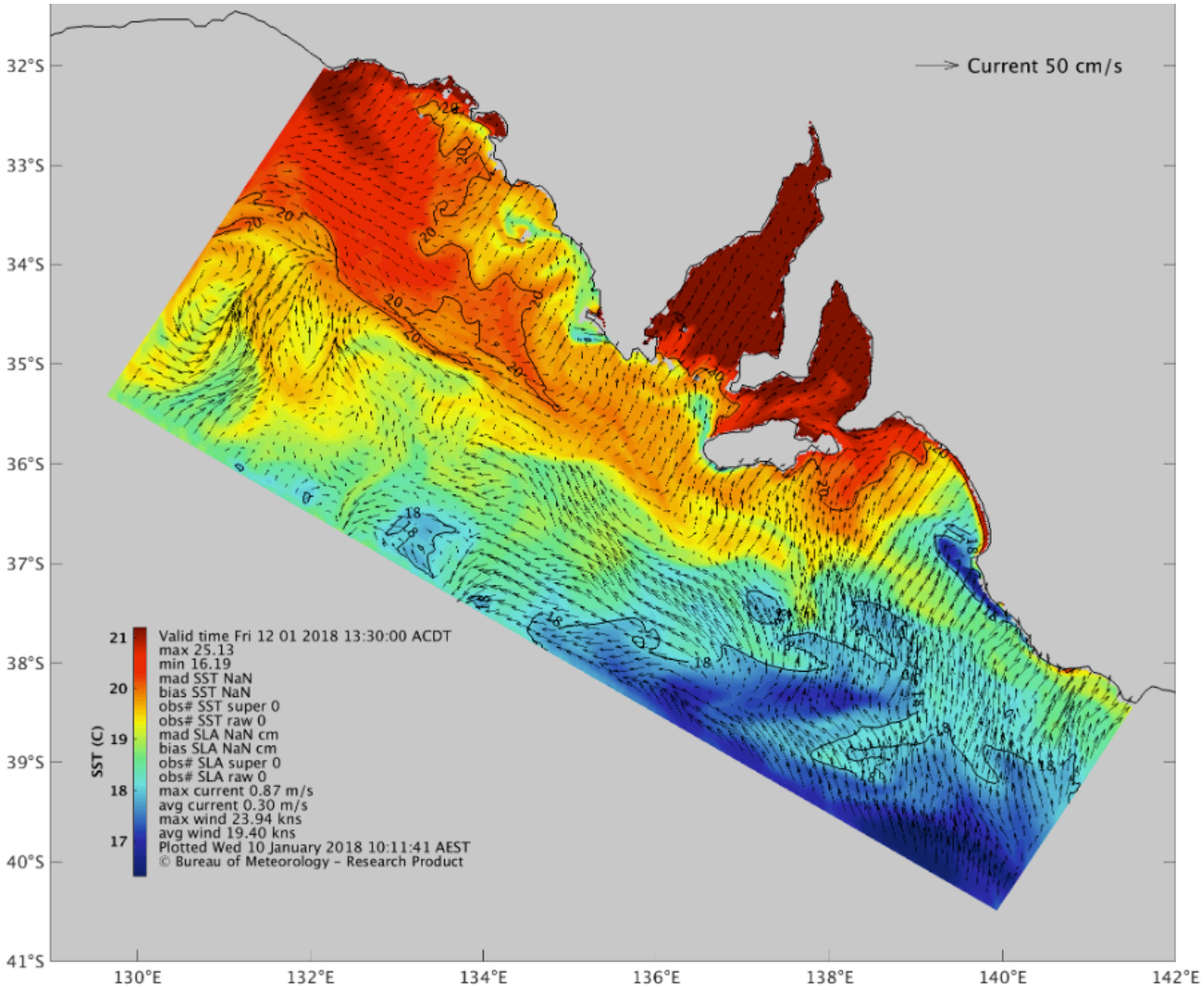

Figure 6: Snapshot of the forecast Sea Surface Temperature for the 10th (top) 11th (middle) and 12th January (bottom). The 18 and 20°C temperature contours are marked by solid black lines, the direction and strength of the water currents are indicated by the black arrows (SARDI-BoM 2017 – eSA Marine website).

The **Sea Floor Temperatures** remain cool but are warming over a broader area than was evident last week (Figure 7).

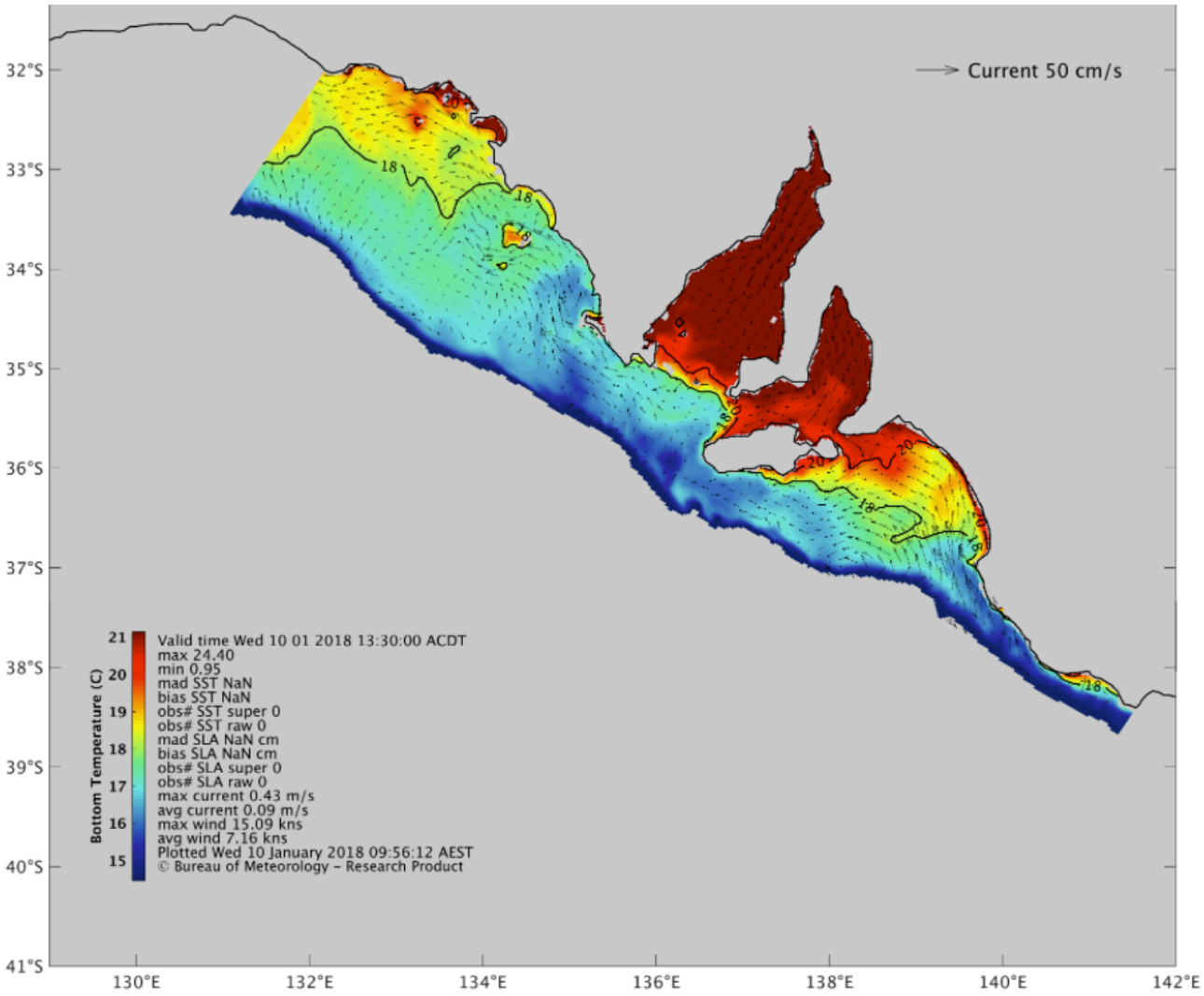

Figure 7: Snapshot of the Sea Floor Temperature on the 10th January 2018; the 18 and 20°C temperature contours are marked by solid black lines, the direction and strength of the water currents are indicated by the black arrows (SARDI-BoM 2017 – eSA Marine website).

Chlorophyll / Productivity Levels:

Satellite coverage and cloud cover have limited the availability of clear images over this past week, 2 snapshots are included here to give a view of the entire area (Figure 8). These are showing conditions continue to be highly suited to SBT over much of the GAB.

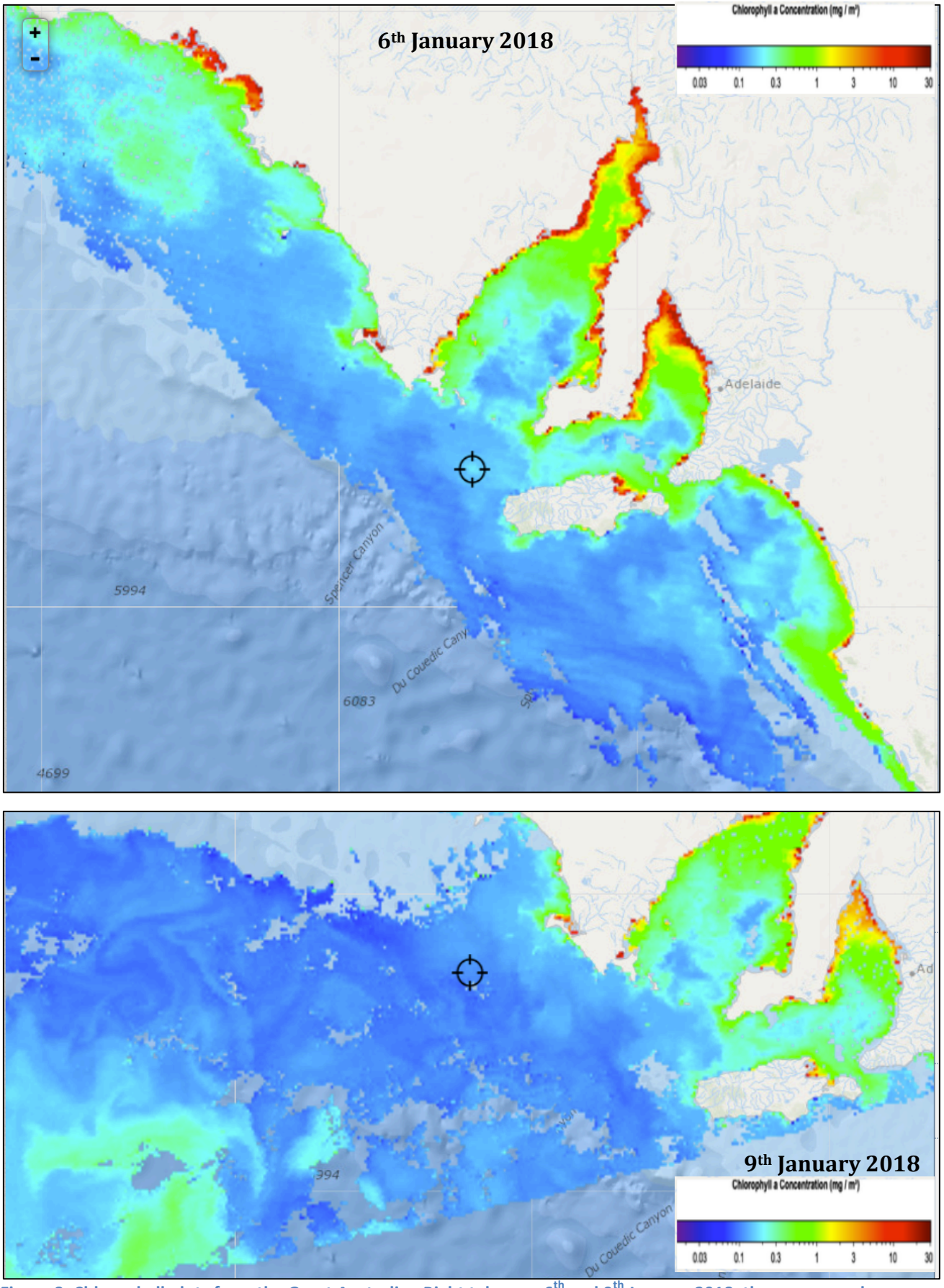

Figure 8: Chlorophyll plots from the Great Australian Bight taken on 6th and 9th January 2018, the grey areas have no readings due to cloud cover.

Relevant Websites:

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

Kirsten Rough
Phone: 0429 833 697
Email: kirstenrough@bigpond.com