Climate and Oceanographic Summary, Great Australian Bight 2018 - 4

Kirsten Rough – 27th December 2017

Summary:

The GAB continues to warm progressively at the sea surface and the warm water at a number of key locations is extending deeper into the water column.

Longer-term forecasts are indicating a fishing season where conditions will be suitable for SBT over a very wide area.

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.

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

Forecast Sea Surface Temperature and SBT Habitat:

This year conditions continue to warm over a broader area at a much earlier point in time compared to what has occurred coming into previous fishing seasons. In these images the plot on the left shows forecasted sea surface temperature and the plot on the right shows the areas that have conditions suitable for juvenile Southern Bluefin Tuna. Preferred habitat includes areas with a value of one or more (i.e. green to bone colour). Note that the shallow water and low resolution of the current satellite and modeling system mean that these forecasts cannot be displayed for the Sanders and Young Rocks regions.

Updated **Longer-term forecasts** of conditions in the GAB through the 2018-fishing season are shown in Figure 1. These are indicating that the sea conditions this season will be warmer over a much broader area than they were last season (and most previous seasons other than 2013). This could mean a higher proportion of smaller fish amongst the normal cohorts in the eastern areas. The forecasts are indicating that conditions will be suitable for surfacing SBT right through to the Victorian border in February.

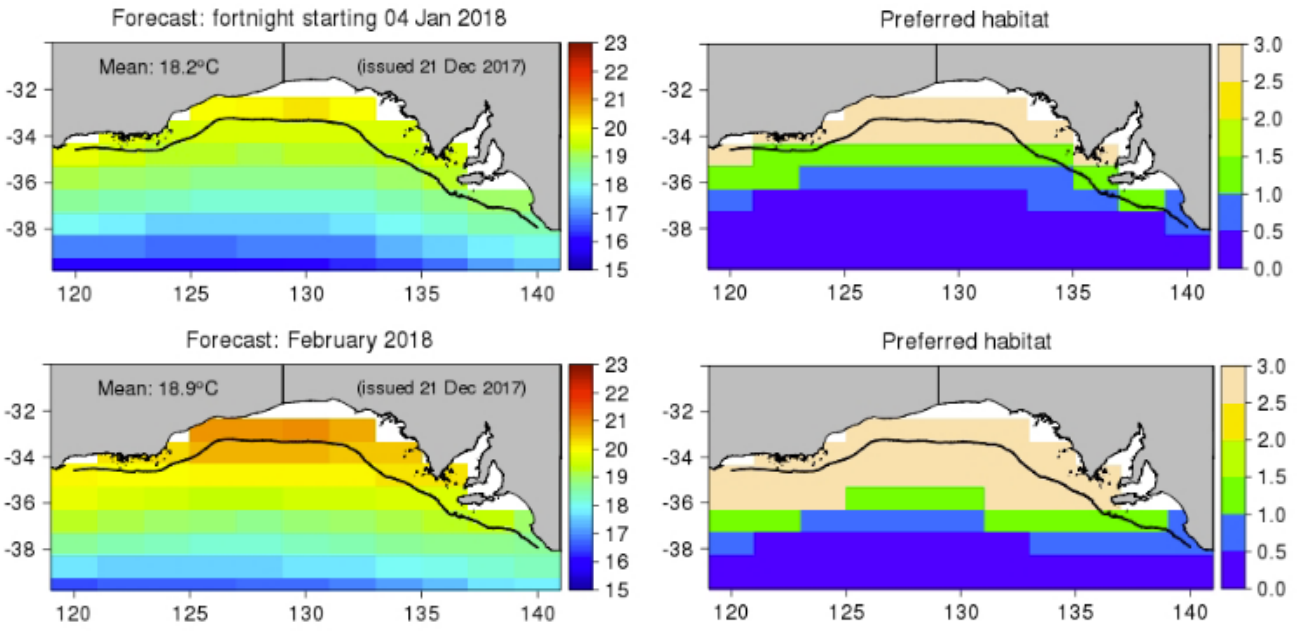


Figure 1: Forecasts of Sea Temperature and SBT habitat issued on 21st December for the first fortnight of January and for the start of February 2018 (CSIRO 2017 – GAB Forecasting Website).

GAB Sea Surface Temperature (SST):

The broader GAB area is progressively warming with warm currents continuing to round Cape Leeuwin in the west and cool water from the Bonney Upwelling remains a prominent feature in the east (Figure 2). Actual SST along the 200m-depth contour is shown in Figure 3. This year (now), SST along the shelf-break is at or exceeds 18°C from longitude 120 to 139°E.

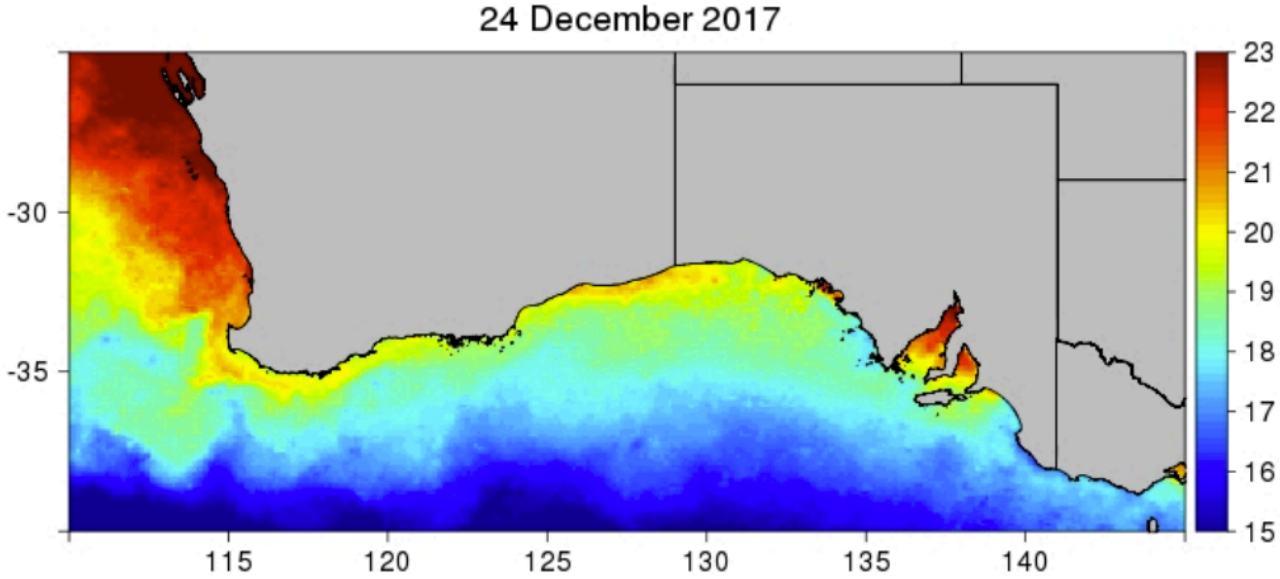


Figure 2: Sea Surface Temperature across southern Australia over the past week (CSIRO 2017 - GAB Forecasting Website)

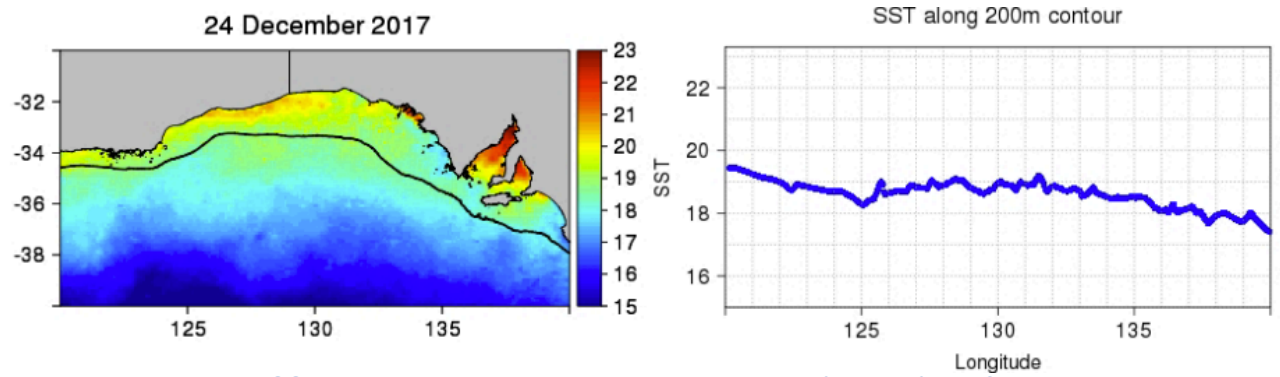


Figure 3: Most recent SST satellite image between longitudes 120° to 140°E (left) and corresponding graph of SST along the shelf break (right) (CSIRO 2017 - GAB Forecasting Website)

The most recent **fine-scale Sea Surface and Sea Floor Temperatures** are shown in (Figure 4 and Figure 5); these are indicating progressive warming of the Gulfs and shallow areas adjacent to fishing grounds of recent seasons. Water temperature profile snapshots of the situation down through the water column at five locations across the GAB; west to east: Outer Shelf area at longitude approximating 132°E; 134°E south west of Rocky Island; 135°E near the Cabbage Patch, 137°E near Young Rocks and 138°E in the vicinity of Sanders Banks are shown in Figure 6. This week at all of these locations the warm water is extending deeper into the water column; and that the temperature scales on all plots were recalibrated and updated on the 25th, which is why there is a distinct line visible. Full details on salinity profiles, wind and water current speed and direction can be found on the e-SA Marine website link listed at the end of this document.

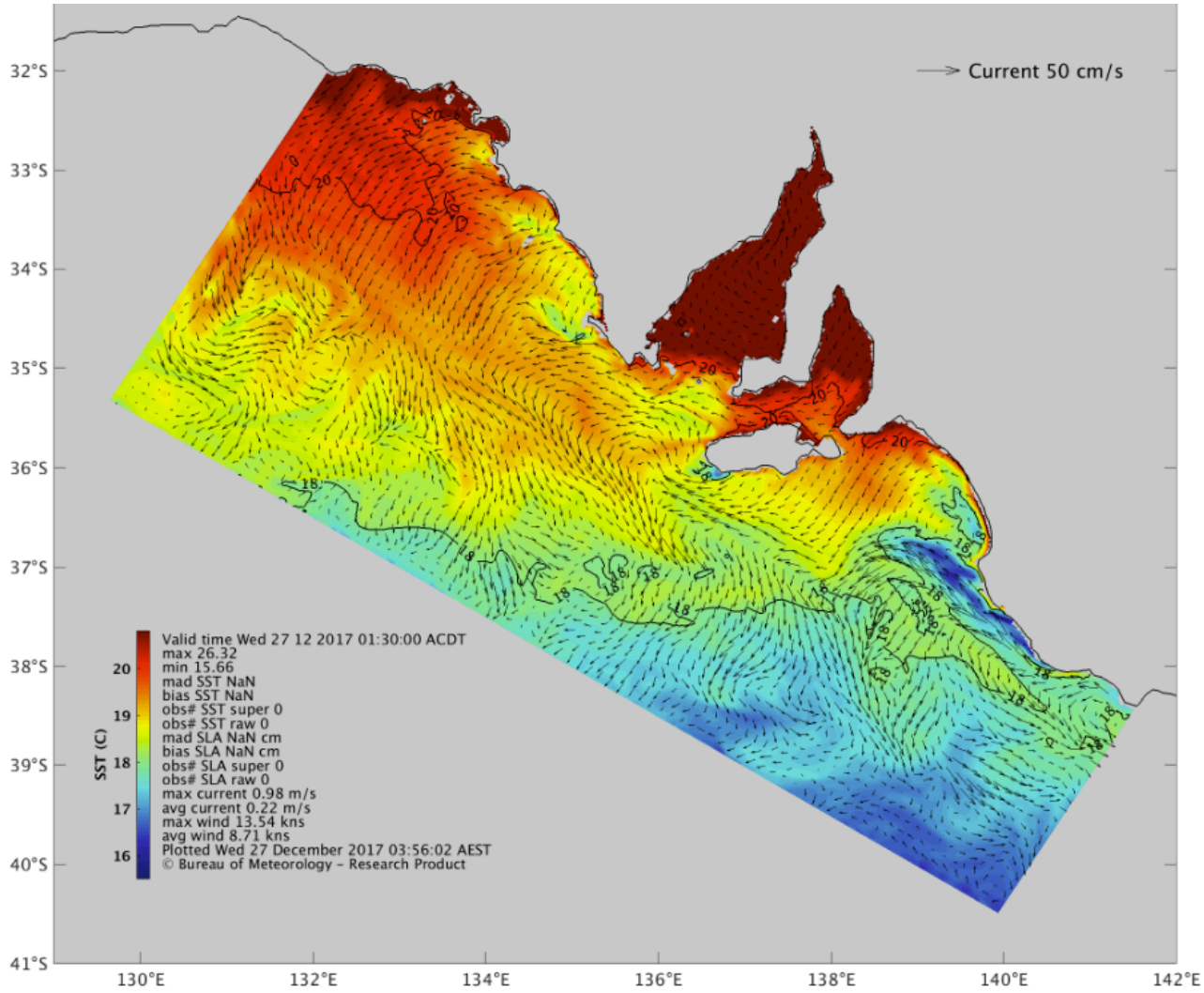


Figure 4: Snapshot of the actual Sea Surface Temperature on the 27th December 2017, the 18 and 20°C temperature contours are marked by solid black lines, the direction and strength of the water currents are indicated by the black arrows (SARDI-BoM 2017 – eSA Marine website).

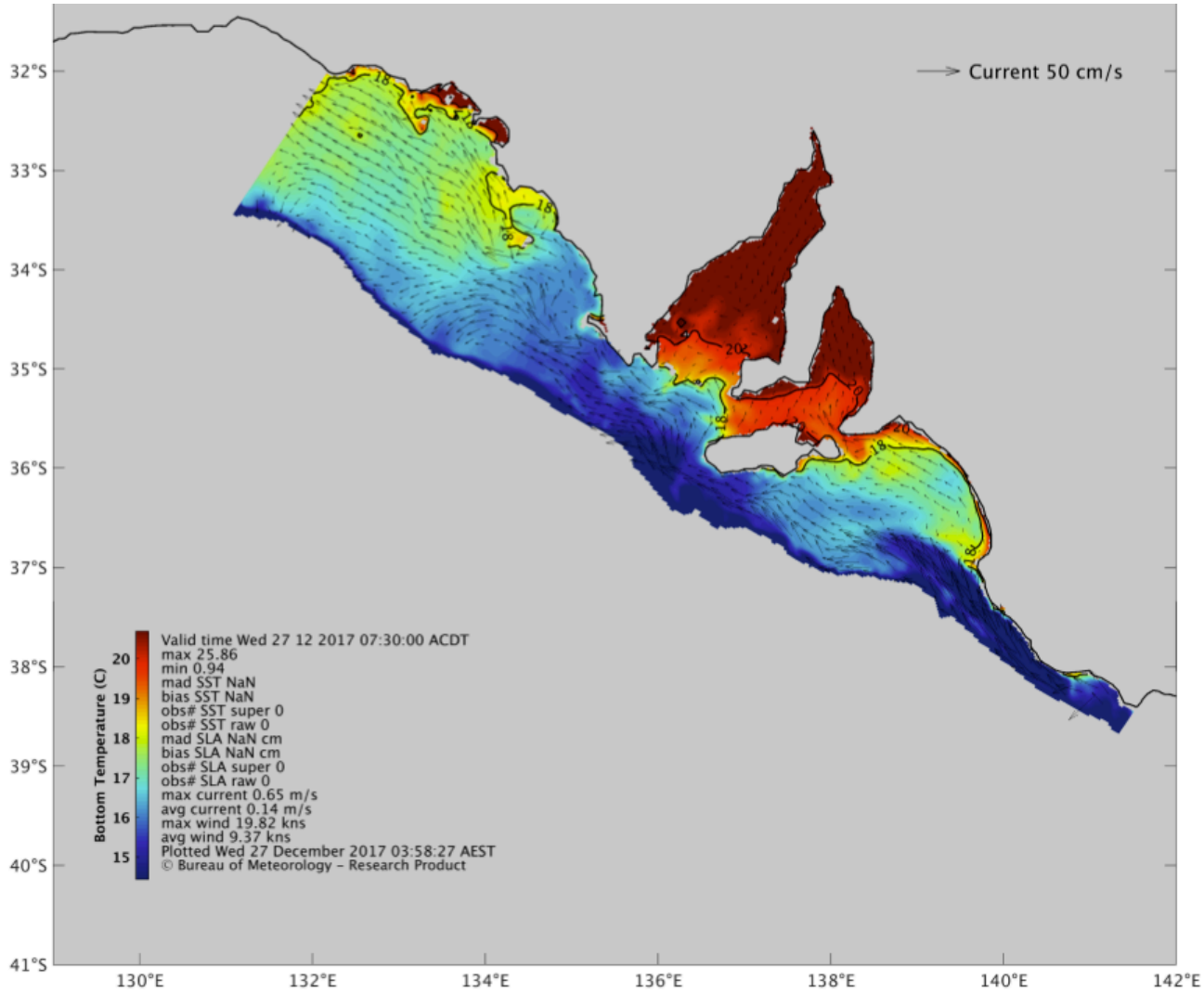
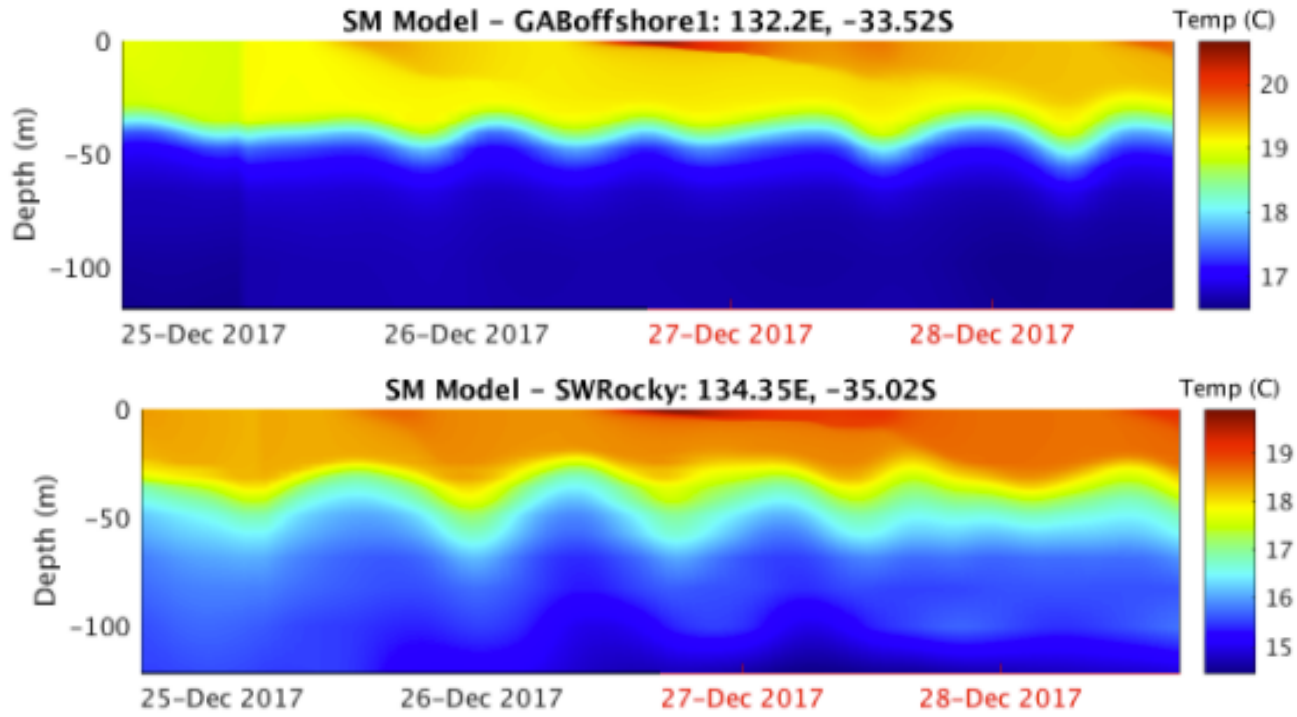


Figure 5: Snapshot of the actual Sea Floor Temperature on the 27th December 2017; the 18 and 20°C temperature contours are marked by solid black lines, the direction and strength of the water currents are indicated by the black arrows (SARDI-BoM 2017 – eSA Marine website).



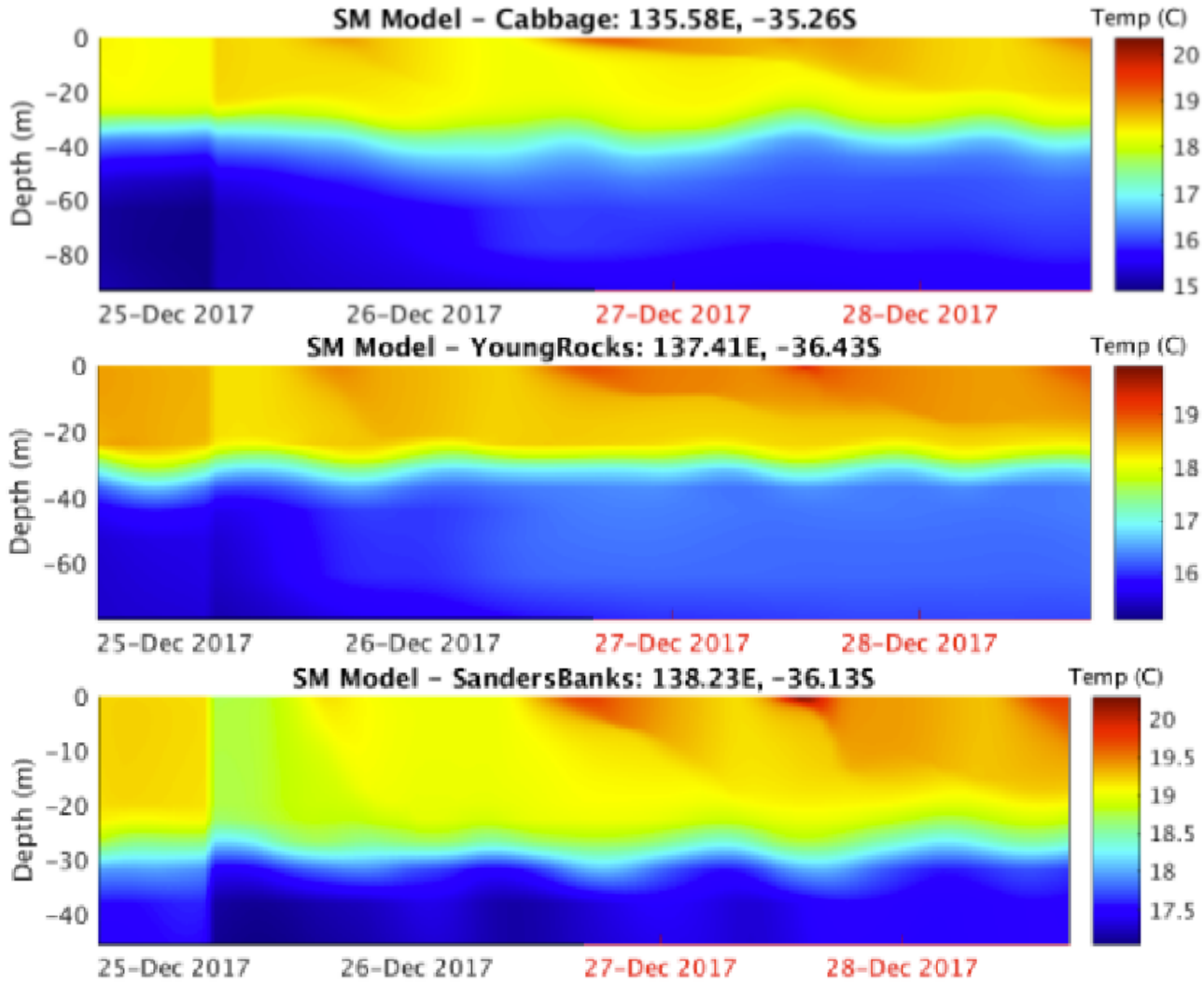


Figure 6: Water temperature profile from sea surface (0m) to sea floor (-m) for the previous (black) and future (red) 2-days for the Outer Shelf area Central GAB 132°E (top); Rocky Island (second); Cabbage Patch (third); Young Rocks (fourth) and Sanders Banks (bottom) – Please note that the scale bars for depth and temperature vary between each of these images due to variations in the local**

Chlorophyll / Productivity Levels:

A single snapshot from an individual satellite pass is shown in Figure 7; this is showing conditions highly suited to SBT over much of the GAB. Upwelling is leading to higher levels in the South East and to the southwest of Kangaroo Island.

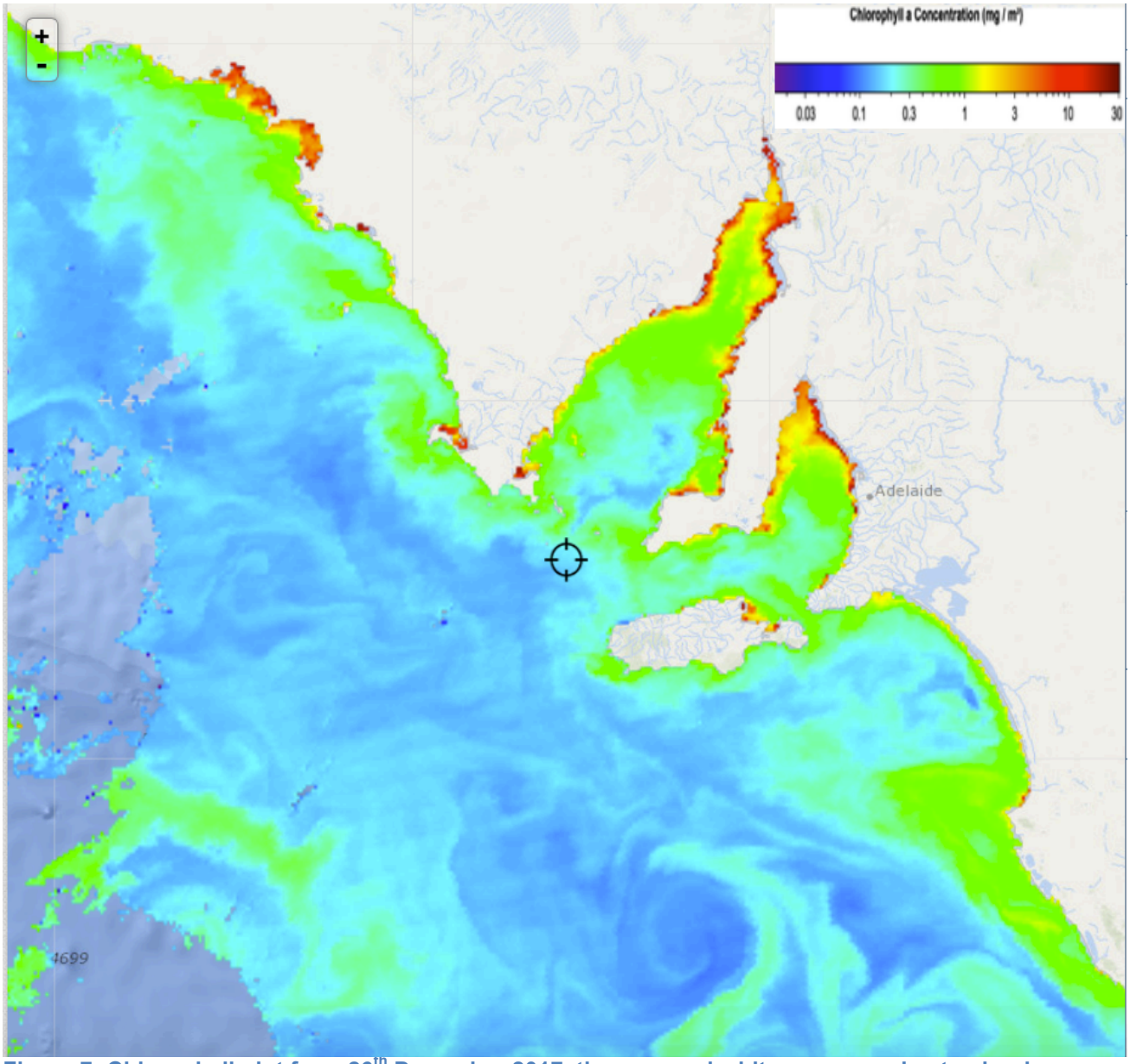


Figure 7: Chlorophyll plot from 26th December 2017, the grey and white areas are due to cloud cover.

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