

WAIMOS Slocum Glider vs Tropical Cyclone Rusty

The IMOS Australian National Facility for Ocean Gliders (ANFOG) has active glider deployments in the Pilbara and Kimberley regions presently experiencing Severe Tropical Cyclone Rusty. The slow-moving Category 4 severe tropical cyclone is expected to reach the Pilbara coast in the vicinity of Pardoo late on 27 Feb 2013. The Kimberley mission, deployed on the 14 Feb 2013, is surveying the waters to the northeast of TC Rusty (data are on <http://www.anfog.uwa.edu.au>).

The data collected by this glider is very interesting in terms of sediment re-suspension and the light climate. The following figures tell the story.

Figure 1: Tropical cyclone winds (Purple indicates 40-50 knot winds). Glider tracks are shown in yellow, with the planned transect route shown in green. At its present location the Kimberley glider is experiencing these extremely high wind gusts (up to 125km/hr). Note a second glider is located offshore from Cape Preston in the Pilbara and also has evidence of higher winds.

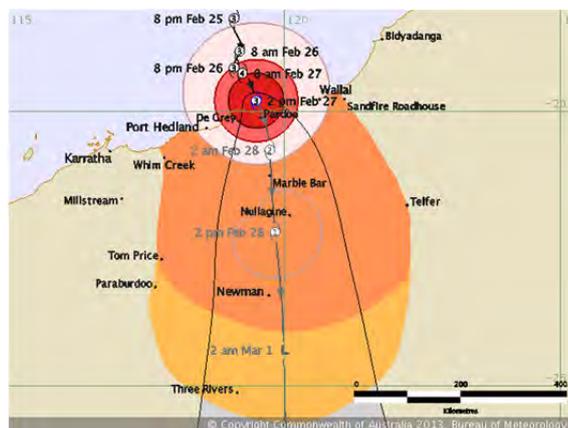
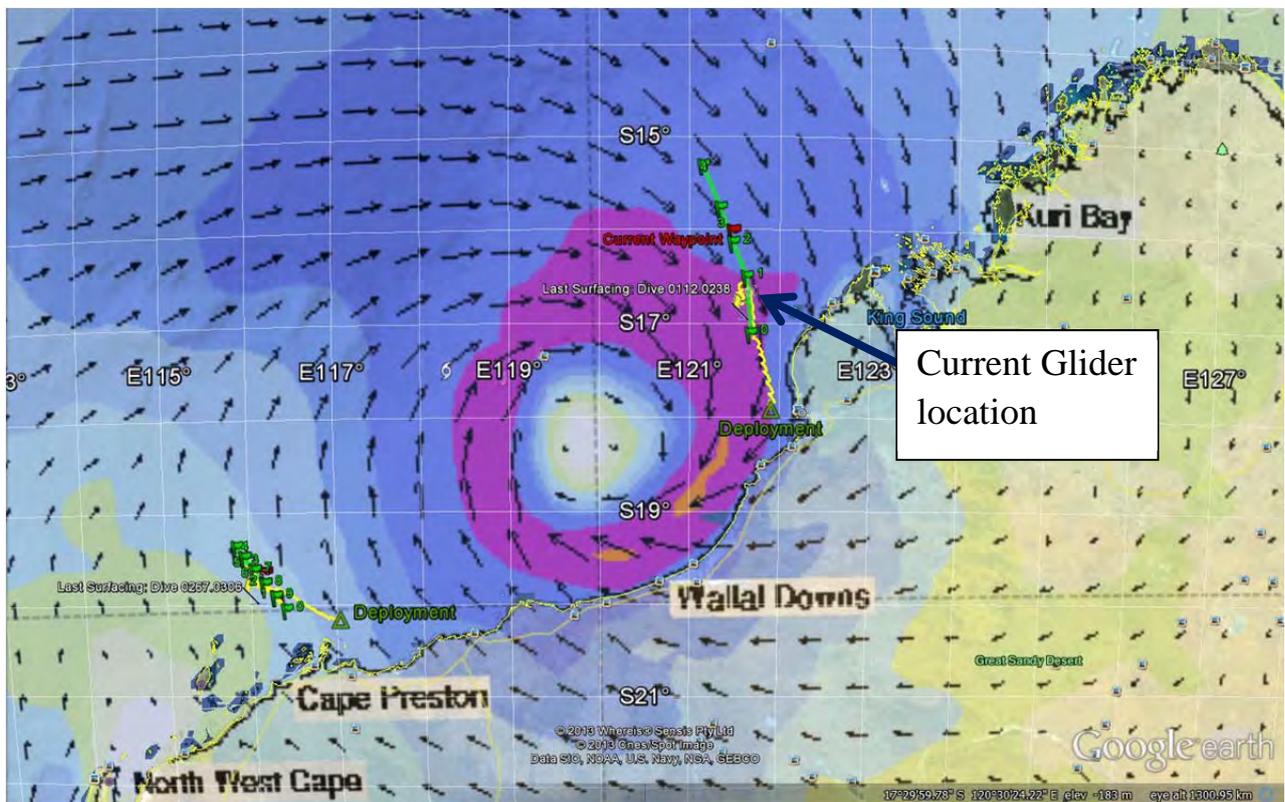


Figure 2: The glider has been instructed to travel north along the planned transect (shown in green in Figure 1) – however, the strong northerly winds have ‘kept’ the glider almost stationary in the past 3 days.



Figure 3: Depth mean currents show the influence of the TC Rusty winds with the southerly currents (red line in Figure) increasing with time since 22 Feb. The depth mean southerly currents are now up to 0.8 ms^{-1}

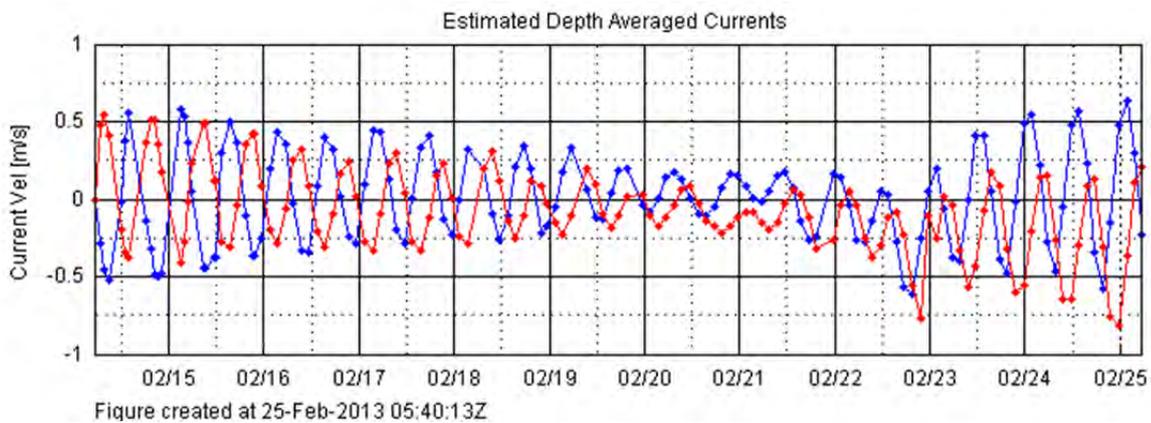


Figure 4: The Temperature data show a well-mixed water column with the offshore waters decreasing in temperature.

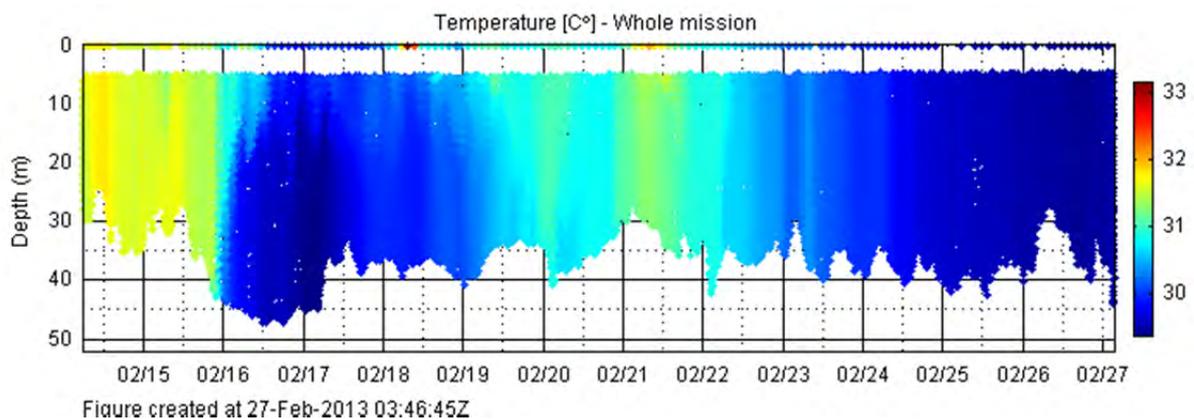


Figure 5: The density data also reflect the well mixed water column.

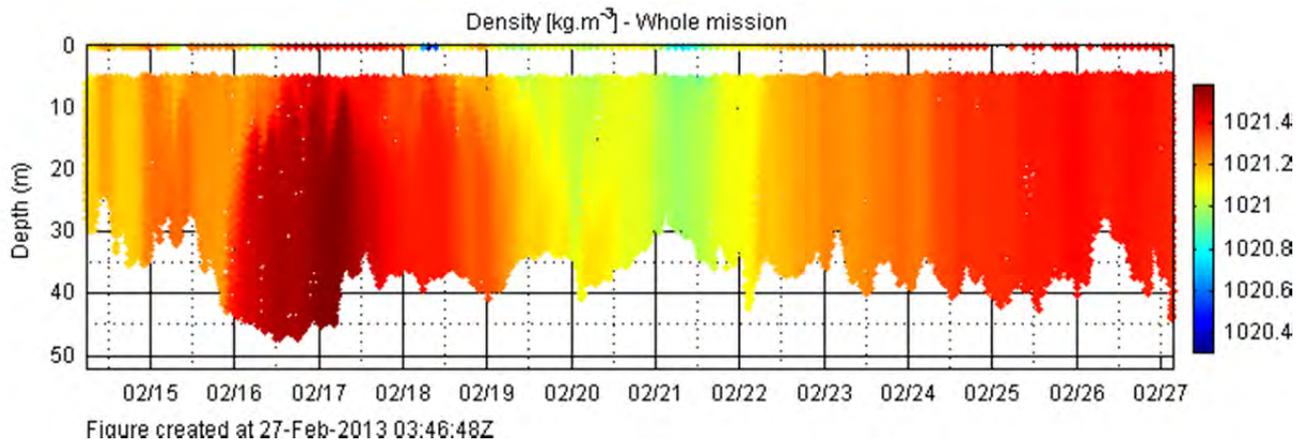


Figure 6: Chlorophyll fluorescence shows an increase during the period of high winds near the sea bed.

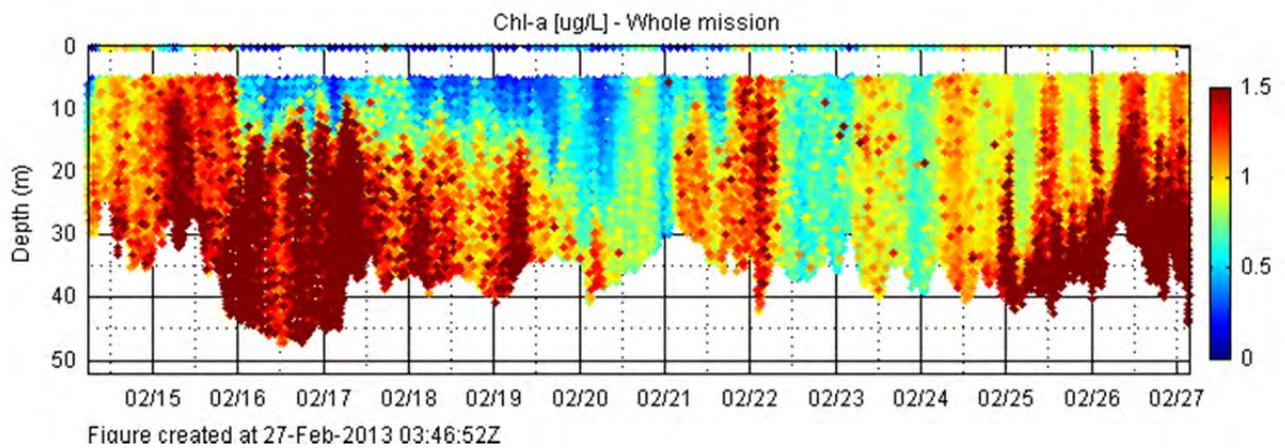


Figure 7: CDOM fluorescence also has a very strong signal.

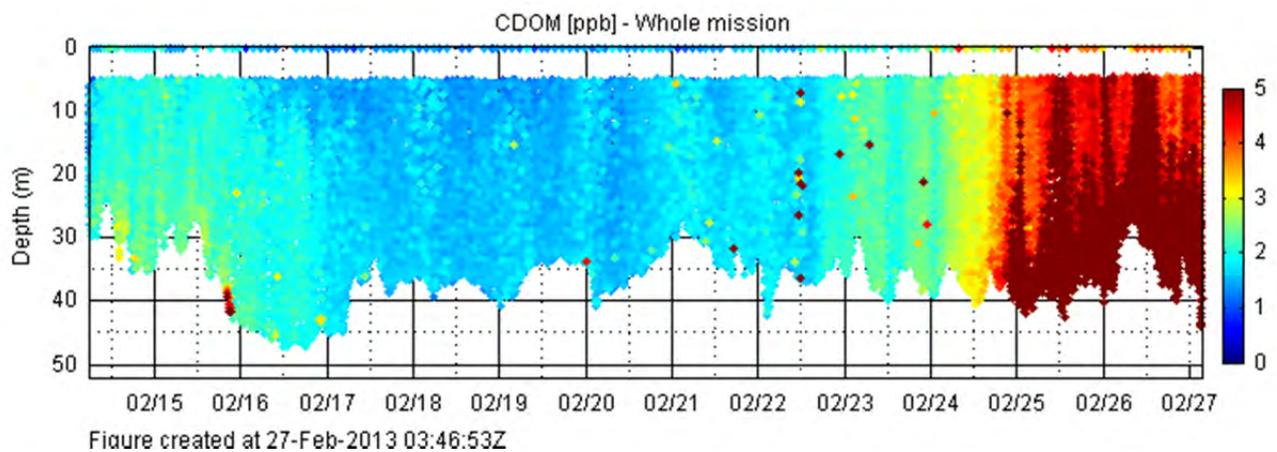


Figure 8: The strongest signal is in the backscatter (700nm) or turbidity – which has for the first time values higher than the instrument range

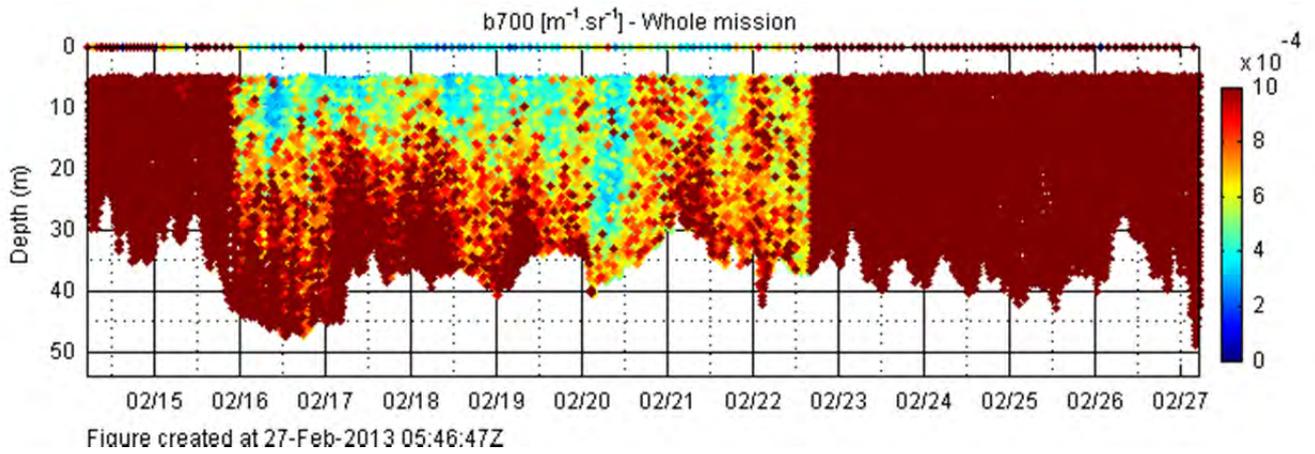


Figure 9: The strongest signal is in the backscatter (700nm) or turbidity – which, for the first time in over 150 glider deployments across Australia, has exceeded the maximum of the instrument through the whole column (i.e. turbidity levels are Off-scale !).

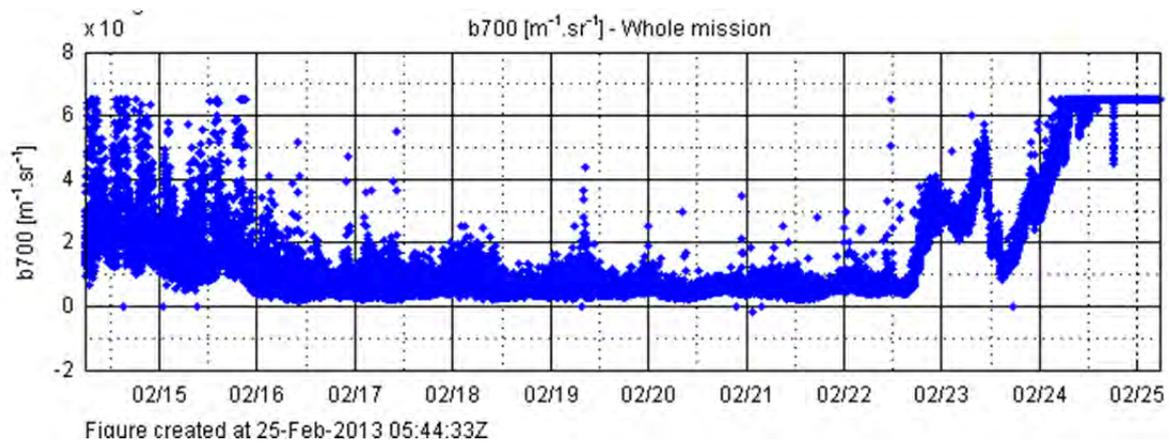


Figure 10: Not surprisingly the higher turbidity values have had a strong impact on the underwater light climate. Before the cyclone light was penetrating to the depths > 30m whilst now it is reduced to 10.

