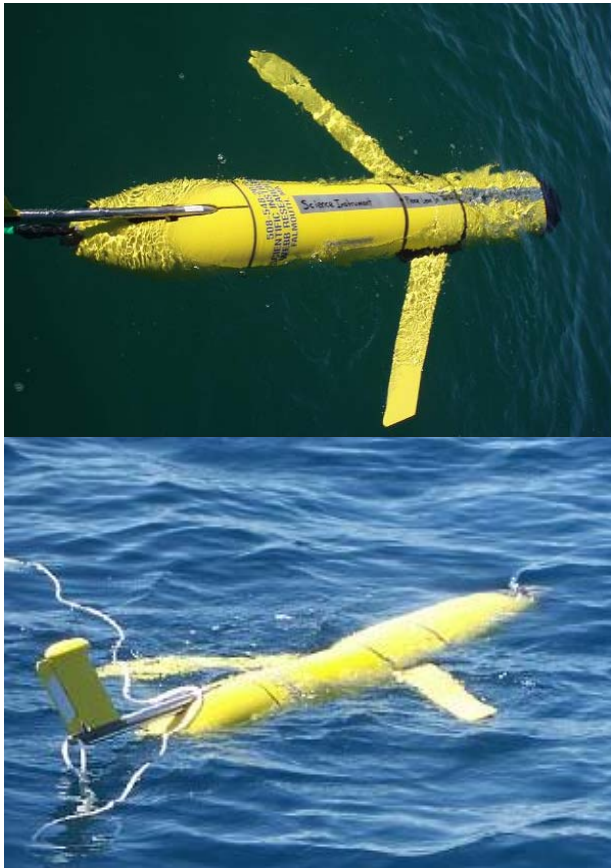


# Ocean Reef Seaglider Trial – Summer 2007

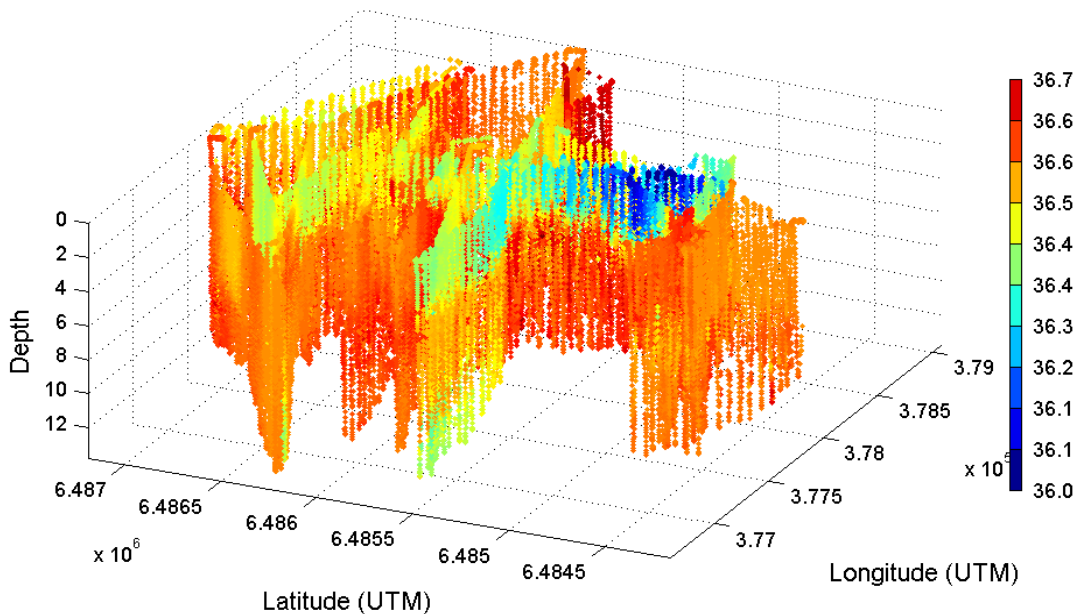


As part of the Specialist Investigative Studies programme, a gliding autonomous underwater vehicle (AUV), known as 'Seaglider', was deployed in the vicinity of the Ocean Reef ocean outlets (refer adjacent images). The Seaglider was deployed over a two day period and in that time completed cross-shore and along-shore transects over the full extent of the water column profile i.e. top-bottom. The Seaglider's mission was to provide a comprehensive 'snap shot' of chemical and physical water quality characteristics in 3-dimensional space i.e. vertical and horizontal.

The Seaglider detected an approximate 0.5 PSU decrease in salinity in the immediate vicinity of the outlet as a result of the dilution of the freshwater effluent at the surface of the water column. The wastewater plume was confirmed to undergo further dilution with distance from the outlet, with surface salinities 0.1 PSU less than ambient 2-3 km from the outlet (refer figure below).

Images above: Gliding autonomous underwater vehicle (AUV) - Seaglider.

Salinity (PSU): start 30-Jan-2007 02:00 end 31-Jan-2007 23:49 GMT



Three dimensional plot of salinity data collected by Seaglider between 30<sup>th</sup> January and 2<sup>nd</sup> February, 2007. Note the presence of the treated waste water plume visible as blue points at the surface of the water column (horizontal grid is 500m spacing).

In the surface waters, the effect of the effluent was to enhance growth of phytoplankton 2-3 km to the north of the outlets. This reflects presumably the lag period between assimilation of nitrogen and subsequent growth of phytoplankton.

Elevated turbidity levels were sampled near the sediment/water interface, probably reflecting resuspension of the bottom sediments.

Results generated by the Seaglider trial may be used in the future to complement data collected as part of the PLOOM monitoring programme. It was envisaged (by the sub contractor GHD) that the PLOOM monitoring programme could firstly, provide data necessary for the ground truthing of Seaglider data and second, be used in conjunction with Seaglider deployments to optimise understanding of temporal and spatial variability in the behaviour and /or characteristics of the treated wastewater plume.

The Seaglider trial successfully demonstrated the vehicles capabilities to:

- Collect continuously high quality physical (temperature, salinity, turbidity), chemical (dissolved oxygen) and biological (chlorophyll-a) data over an extended spatial range i.e. 5-10 km<sup>2</sup>, and;
- Map the extent of the treated waste water plume both vertically and horizontally, despite considerable dilution rates in the range 100-1000.

