Eastern Pacific oxygen time series from the Stratus mooring and from floats

CZESCHEL R[1], WELLER RA[2] , STRAMMA L[1] AND BIGORRE S[2]

[1]*Helmholtz Centre for Ocean Research Kiel (GEOMAR), Duesternbrooker Weg 20, 24105 Kiel, Germany*
[2]*Woods Hole Oceanographic Institution (WHOI), 266 Woods Hole Rd, Woods Hole, Ma 02543, USA*

In the tropical eastern South Pacific the Stratus Ocean Reference Station (~20°S, 85°W) is located in the transition zone between the oxygen minimum zone (OMZ) and the well oxygenated subtropical gyre. This region is also known for its high eddy frequency [Chaigneau et al., 2008]. From 6 April 2011 to 29 May 2012 oxygen was measured in the mooring from 9 oxygen optodes located between 45 m and 601 m depth at the southern boundary of the oxygen minimum zone. The oxygen time series describe the passage of several eddies, including a strong anticyclonic mode water eddy in February/March 2012 with oxygen decreasing by up to 200 μmol/L and an available oxygen deficit of 10.5×10^{16} μmol in comparison to its surrounding water. The eddy observed at the mooring was formed 11 months earlier off the coast of northern Chile. During its westward propagation one float was located for 3 months in this eddy and provided hydrographic and oxygen measurements along the path of the eddy. Several other floats were placed in eddies in the region, but did not stay continuously inside these eddies. The continuous oxygen measurements in the mooring and floats indicate high oxygen variability caused by eddies with enhanced oxygen in cyclonic eddies and reduced oxygen in anticyclonic eddies. Hence, oxygen trends determined from a few measurements might be biased by eddy processes. Finally, gliders with oxygen sensors may provide better eddy surveys than floats.

REFERENCES

Chaigneau, A., Gizolme, A., Grados, C., 2008. Mesoscale eddies off Peru in altimeter records: Identification algorithms and eddy spatio-temporal patterns. *Prog. Oceanogr.*, 79, 106-119.