

GOMECC O2 Underway Data Readme File

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The output of the Aandera oxygen sensor in units of percent oxygen saturation was calibrated in two ways. In the first, the output of the optode was regressed against oxygen saturation computed from the shallowest Niskin sample from each station. The optode reading closest in time to the surface bottle trip was used. Discrete oxygen concentration determined by amperometric Winkler titration was converted to percent saturation using the equations determined by Benson and Krause (1984). No correction was made for variations in barometric pressure. A total of 40 data pairs were included in the regression (the total is less than 90 because there were times when the optode was not operational). The standard error of the regression or root mean square error was $\pm 1.3\%$. In other words the calibrated optode data in terms of percent oxygen saturation was $\pm 1.3\%$ over the duration of the cruise, i.e. July 11 to Aug 2, 2007. The optode was also calibrated against discrete oxygen samples drawn directly from the barrel in which the optode was situated. It was expected that this might yield a tighter calibration. A total of 11 discrete samples were drawn over 24 hour between July 27 and 28, 2007. Surprisingly it did not. The root mean square error of this regression was $\pm 2.3\%$. The problem was most likely due to problems drawing some of the discrete samples. Based on past experience this latter calibration method generally yields superior results to the former method.

Benson BB, Krause D (1984). The concentration and isotopic fractionation of oxygen dissolved in freshwater and seawater in equilibrium with the atmosphere. *Limnol Oceanogr* 29:620-632.