

## Discrete dissolved oxygen data series for cruise Valdivia VA174

### Principal Investigator and Data Originator

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### Content of data series

Parameter	Unit	Parameter code	Number of samples	Number of stations	Comments
Dissolved oxygen	$\mu\text{mol l}^{-1}$	DOXYWITX	42	6 CTD	none
Oxygen saturation	Percent	OXYSZW01	42	6 CTD	none

CTD= CTD-Rosette water column sampling station.

### Originator's protocol

Water column sampling was carried out using the SeaBird Mini Rosette water sampler. Samples for oxygen analysis using the micro-Winkler method were collected at 6 CTD stations from 12 depths. Numbered glass bottles of known volume of about 160 ml were filled, via a silicone rubber tube, from the rosette bottles, and the contents fixed in the usual way by addition of 1 ml each of solutions of manganous sulphate and alkaline iodide. The contents were later acidified and titrated with about 1 ml of a solution of sodium thiosulphate using the method of Bryan et al. (1976) with a Dosimat titrator and a photo-optical end-point detector outputting to a chart recorder and a digital voltmeter with graphical display. The thiosulphate was standardised against a known solution of potassium iodate made by accurate weighing. The standardisation standard error (which indicates the accuracy of measurements) was 0.4%.

$$\text{Oxygen concentration} = V * M / (4 * (B - 2)) * 1000000 \mu\text{mol l}^{-1}$$

where:

V = volume of thiosulphate added to reach titration endpoint  
M = concentration of thiosulphate ( $0.1613 \mu\text{mol l}^{-1}$ )  
B = volume of sample bottle (about 160 ml)

Seawater saturation oxygen concentration was calculated from the temperature and salinity at the sample origin.

### BODC processing

The data were loaded into a database under the ORACLE Relational Database Management System without modification.

### Comments on data quality from data originator

Some problems were encountered with the sample titration end-point, and some data were lost as a result of this. These difficulties were due to insufficient dissolution of the precipitate before titration. It was found that addition of 1.1 ml (rather than 1.0 ml as per recipe) of 5M sulphuric acid completely dissolved the precipitate in all cases, and resulted in a satisfactory end point. Disregarding samples which gave a poor end point (and for which data were not reported), the standard deviation of replicate oxygen measurements was  $0.7 \mu\text{mol l}^{-1}$  or 0.23% saturation.

### Reference

Bryan JR, Riley JP, Williams PFlEB (1976) A Winkler procedure for making precise measurements of oxygen concentration for productivity and related studies. J. Exp. Mar. Biol. Ecol., 21, 191-197.