

ANOMALIES OF OXYGEN MEASUREMENTS PERFORMED WITH AANDERAA OPTODES

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Abstract

Four sets of measurements performed between 2005 and 2010 in the deep central Atlantic, and in deep Mediterranean Sea, and the Arctic Ocean revealed a strange performance of Aanderaa Optode 3830 sensors mounted on RCM11 current meters in low current regimes (current speeds $> 10 \text{ cm s}^{-1}$).

All oxygen data sets collected during these deployments showed significant drops of oxygen (of the order of 50-100 $\mu\text{mol/l}$) affecting the Optode data stability in low hydrodynamic conditions (fig.1). High correlations between all acquired parameters (i.e. temperature, turbidity, speed and direction of currents) allowed verifying that no unusual event perturbed the mooring areas during the periods of acquisition, although natural events responsible of so abrupt, short and intense oxygen variations can't be easily found.

Despite the well-known performance of the Aanderaa Optodes, these experiences suggested that the data acquired by optodes installed on RCM11s could not be always reliable, especially in low energy systems (typical for the deep ocean) and that current speeds should always be considered in order to verify the reliability of the data recorded.

A series of test in controlled water condition was performed in order to better understand eventual sensor dependence on speed current variations and to evaluate sensor stability in quasi-stationary water.

Keywords: Oxygen, Optode, deep-sea, current meter, long-term measurement