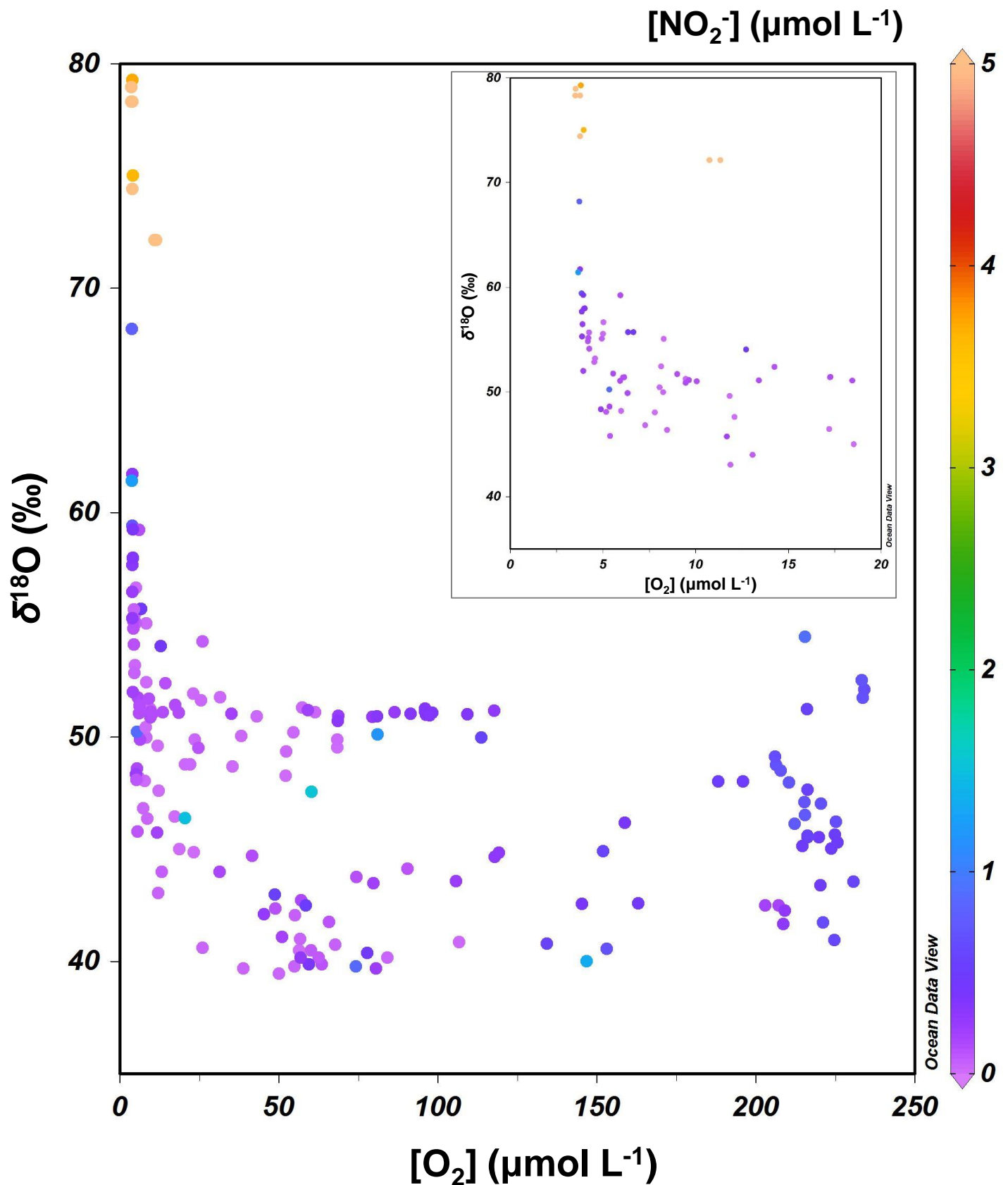


**Figure S1** Linear regression of  $\text{N}_2\text{O}$  isotopomers vs. inverse  $\text{N}_2\text{O}$  concentrations at four different water bodies (see table 1 for descriptions of water bodies).



**Figure S2** Dissolved oxygen concentrations vs.  $\delta^{18}O$ - $N_2O$  and associated nitrite concentrations from samples collected in October 2015.

Station (depth range)	Year / Month	Latitude	Longitude	Reference
A	2015 / 10	0	85.50°W	This study
(0 – 1000 m)	2012 / 11	0	85.83°W	Kock et al., 2016
B	2015 / 10	2.50°S	85.50°W	This study
(0 – 800 m)	2012 / 11	2.00°S	85.83°W	Kock et al., 2016
C	2015 / 10	9.51°S	80.31°W	This study
(0 – 800 m)	2012 / 11	9.93°S	80.25°W	Kock et al., 2016
D	2015 / 10	12.25°S	77.08°W	This study
(0 – 70 m)	2011 / 10	12.05°S	77.29°W	Baustian et al., 2012
E	2015 / 01	13.50°S	76.60°W	Ji, unpublished data
(0 – 100 m)	2009 / 01	13.50°S	76.46°W	Löscher et al., 2012
F	2015 / 01	16.30°S	73.90°W	Ji, unpublished data
(0 – 250 m)	1985 / 02	16.38°S	74.67°W	Friederich et al., 1985

**Table S1** Data sources for water column N<sub>2</sub>O distributions between El Niño (shaded rows) and normal years. All the data can be downloaded from MEMENTO database (doi:10.1029/2015EO023665)

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