Biogeosciences

Discussions

Open Access

Supplement of

Oceanic N₂O emissions in the 21st century

J. Martinez-Rey et al.

Correspondence to: J. Martinez-Rey (jorge.martinez-rey@lsce.ipsl.fr)

1 <div align="center">Supplementary Material</div>

2

Table S1: Box model boundary conditions and parameters. NEMO-PISCES model output values are taken from the historical averaged 1985 to 2005 time period and the future averaged 2080 to 2100 time period.

| parameter	quantity	units	source
surface N_2O	10	TgN	PISCES model output
deep N_2O	1000	TgN	PISCES model output
yield N_2O prod. from POC (e)	0.0025	mol N_2O /mol C	Nevison et al. (2003)
yield sea-to-air N_2O flux (k)	0.8	mol N_2O air/mol N_2O surface	assumption that most of the surface N_2O is outgassed.
export POC @100m in 2005	6.22	PgC yr^{-1}	PISCES model output
export POC @100m in 2100	5.30	PgC yr^{-1}	PISCES model output

3
4

5   Fig. S1: Oxygen modulating function *f(O₂)* in the Low-O$_2$ production pathway term included in
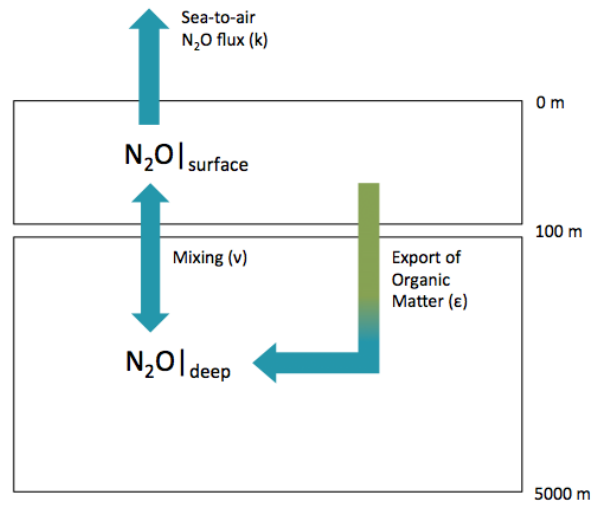
6   P.OMZ from Goreau et al. (1980).
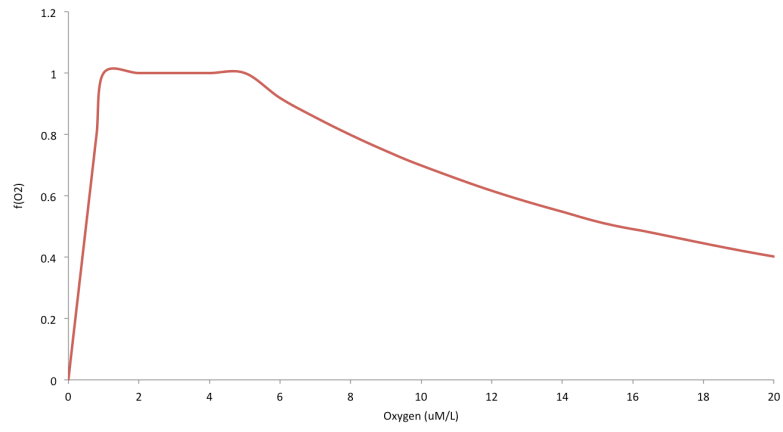
7

8

9   Fig. S2: Vertically integrated (a) high-O_2 and (b) low-O_2 production pathways (in gN m^{-2} yr^{-1})

10   in P.OMZ for the averaged 1985 to 2005 historical simulation.

11

(a)   (b)
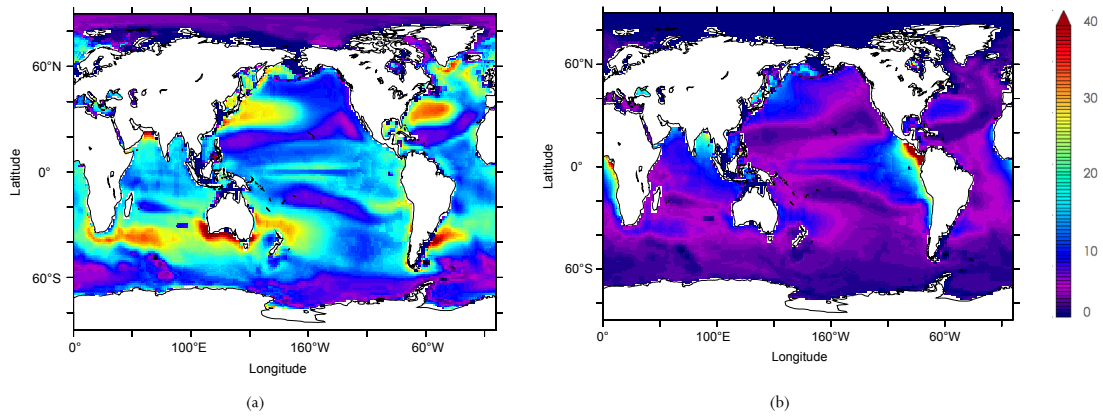
12
13

14 Fig. S3: Diagram of the box model. N_2O inventory is separated into surface and deep

15 concentrations above and below 100m. The fraction of N_2O outgassed to the atmosphere (k),

16 mixing ratio (v) between deep and surface and the rate of N_2O production from the export of

17 organic matter to depth (e) regulate the N_2O budget in the ocean interior.

18