Geoscientific
Model Development

Supplement of

Sensitivity of asymmetric oxygen minimum zones to mixing intensity and stoichiometry in the tropical Pacific using a basin-scale model (OGCM-DMEC V1.4)

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Table S1. Model simulations with different parameterizations for oxygen to carbon (O:C) utilization ratio and background diffusion.

| Simulations	O:C utilization ratio	background diffusion
Reference	1.3	0
Kb0.1	1.3	0.1
Kb0.25	1.3	0.25
Kb0.5	1.3	0.5
Km6.9	1.3*DO/(DO+6.9)	0
Km18.7	1.3*DO/(DO+18.7)	0
Km6.9Kb0.25	1.3*DO/(DO+6.9)	0.25
Km6.9Kb0.5	1.3*DO/(DO+6.9)	0.5
Km18.7Kb0.25	1.3*DO/(DO+18.7)	0.25
Km18.7Kb0.5	1.3*DO/(DO+18.7)	0.5

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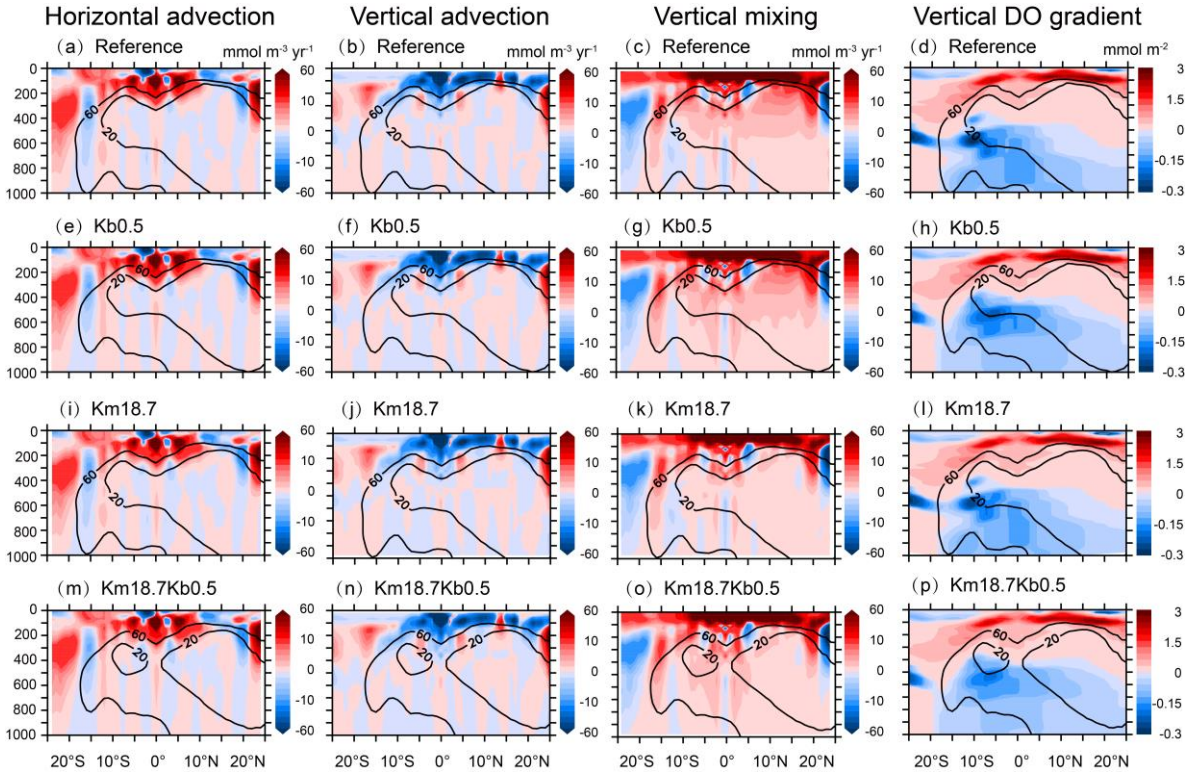
Figure S1. Simulated DO flux by horizontal advection, vertical advection, vertical mixing and vertical DO gradient over 120-90°W from the reference run (**a, b, c, and d**), an enhanced vertical mixing (**e, f, g, and h**), a reduced O:C utilization ratio (**i, j, k, and l**), and combination of an enhanced vertical mixing and a reduced O:C utilization ratio (**m, n, o, and p**). Black lines denote contours of DO concentrations of 20 mmol m^{-3} and 60 mmol m^{-3}.
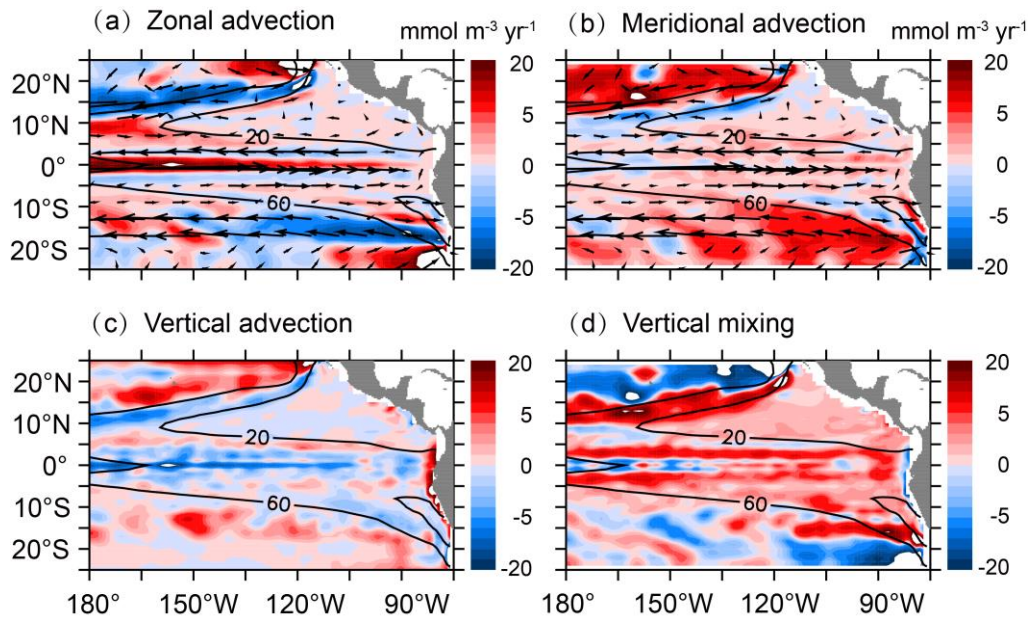
Figure S2. DO supply averaged over 200-700 m from Km18.7Kb0.5 through **(a)** zonal advection, **(b)** meridional advection, **(c)** vertical advection, and **(d)** vertical mixing. The black arrows in **(a)** and **(b)** denote the direction and strength of currents. Black lines in **(a-d)** denote contours of DO concentrations of 20 mmol m^{-3} and 60 mmol m^{-3} from the best simulation (Km18.7Kb0.5).

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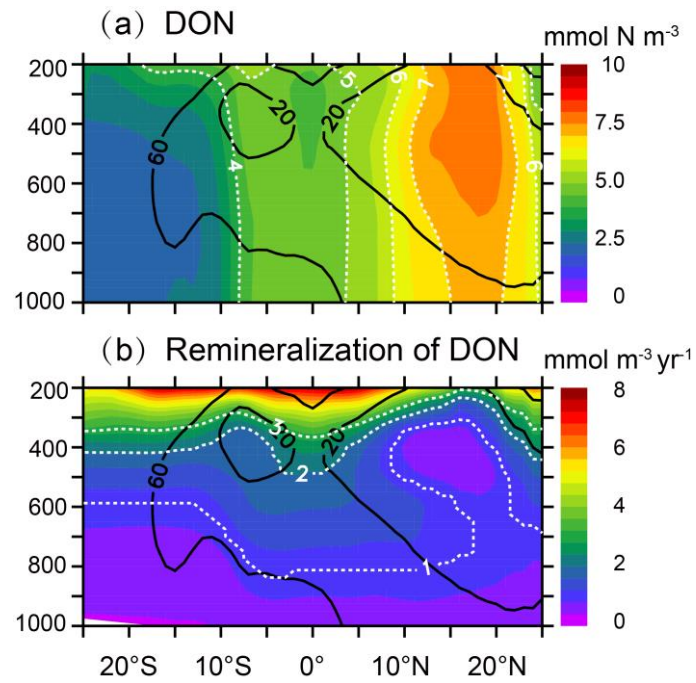
Figure S3. Vertical and horizontal distributions of **(a)** DON and **(b)** remineralization of DON from Km18.7Kb0.5 over 120-90°W. Black lines in **(a and b)** denote contours of DO concentrations of 20 mmol m^{-3} and 60 mmol m^{-3}.

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