

Supplementary Table 1: Mass balance calculation of
PETM carbonate ion effect

Simulation		Injection (mol C)	
		8.75E+16	1.75E+17
Modern	ΔCO_3^{--} (mmol/kg)	-21.0	-43.3
	$\Delta\delta^{13}\text{C}$ (‰) ¹	0.27	0.56
High CO_3^{--}	ΔCO_3^{--} (mmol/kg)	-17.0	-41.4
	$\Delta\delta^{13}\text{C}$ (‰) ¹	0.22	0.54

¹Change in foraminiferal calcite $\delta^{13}\text{C}$ during the PETM resulting from the carbonate ion effect, calculated using a slope of -0.013 ‰/ ΔCO_3^{--} .