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Supplemental Information for

Coupled Deep-Water Flow and Climate Variability in the Mid-Pleistocene North Atlantic

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Table DR1. Onset time of planktonic $\delta^{18}\text{O}$, $\overline{\text{SS}}$, and IRD relative to benthic $\delta^{18}\text{O}$, $\delta^{13}\text{C}$ shifts for 12 significant* $\delta^{13}\text{C}$ excursions

Event #	Age ka	benthic $\delta^{18}\text{O}$ vs $\delta^{13}\text{C}$ decrease	$\overline{\text{SS}}$ increase vs benthic $\delta^{18}\text{O}$ light	Benthic $\delta^{18}\text{O}$ vs planktonic $\delta^{18}\text{O}$	IRD vs benthic $\delta^{18}\text{O}$
1	762.42	S	No SS shift	no plank shift	3 pt before, -410 a
2	767.81	S	1 pt later, 300 a	2 pt later, 610 a	S
3	772.96	S	5 pt later, 1500 a	S	3 pt later
4	~777.2	C lead ? gap	Indet, but prob SS lead; gap in O ben	At least 8 pt later, 1100 a	At least 6 pt later
5; T'IX'	789.73	O lead, 1 pt, >100 a	3pt later, 390 a	> 2 pt later, > 220 a	5 pt later but signif background
6	803.34	S	6 pt later, 1955 a	6 pt later, 1955 a	4 pt later, 325 a
7	812.12	S	2 pt later, 650 a	1 pt later, 330 a	4 pt later, 1300 a
8	824.87	S	3 pt later, 1310 a	2 pt later, 880 a	2 pt later, 120 a
9	833.2	$\delta^{13}\text{C}$ is 4 pt later, 1310 a	2 pt before/4 pt later, -450 a/1310a	4 pt later, 1310 a. (S with $\delta^{13}\text{C}$)	8 pt later, 2280 a
10	844.63	S	1 pt later, 90 a	5 pt later, 400 a	S & 4pt & 8pt
11; T'X'	867.12	S	2 pt later, 330 a	2 pt before, -590 a	S
Summary		Mainly S	-450 to +1955 Avge exc #8 = 815 a (870 a inc 8+, 675 a inc 8-)	-590 to +1955 Avge inc #10 = 640 a (815 a exc)	Mainly later by >800 a IRD main pulse $\approx \delta^{18}\text{O}_{\text{plank}}$

* The excursions (except # 4 and 9) were defined by being lower than 0.25 ‰ less than the local mean $\delta^{13}\text{C}$ estimated by the regression of $\delta^{13}\text{C}$ on age. ($\delta^{13}\text{C} = 2.400 - 0.002405 t$, where t is age in ka). Most of the benthic $\delta^{13}\text{C}$ spikes start at the same sample as the benthic $\delta^{18}\text{O}$ rise. S = simultaneous, i.e same sample. 'pt' = data point

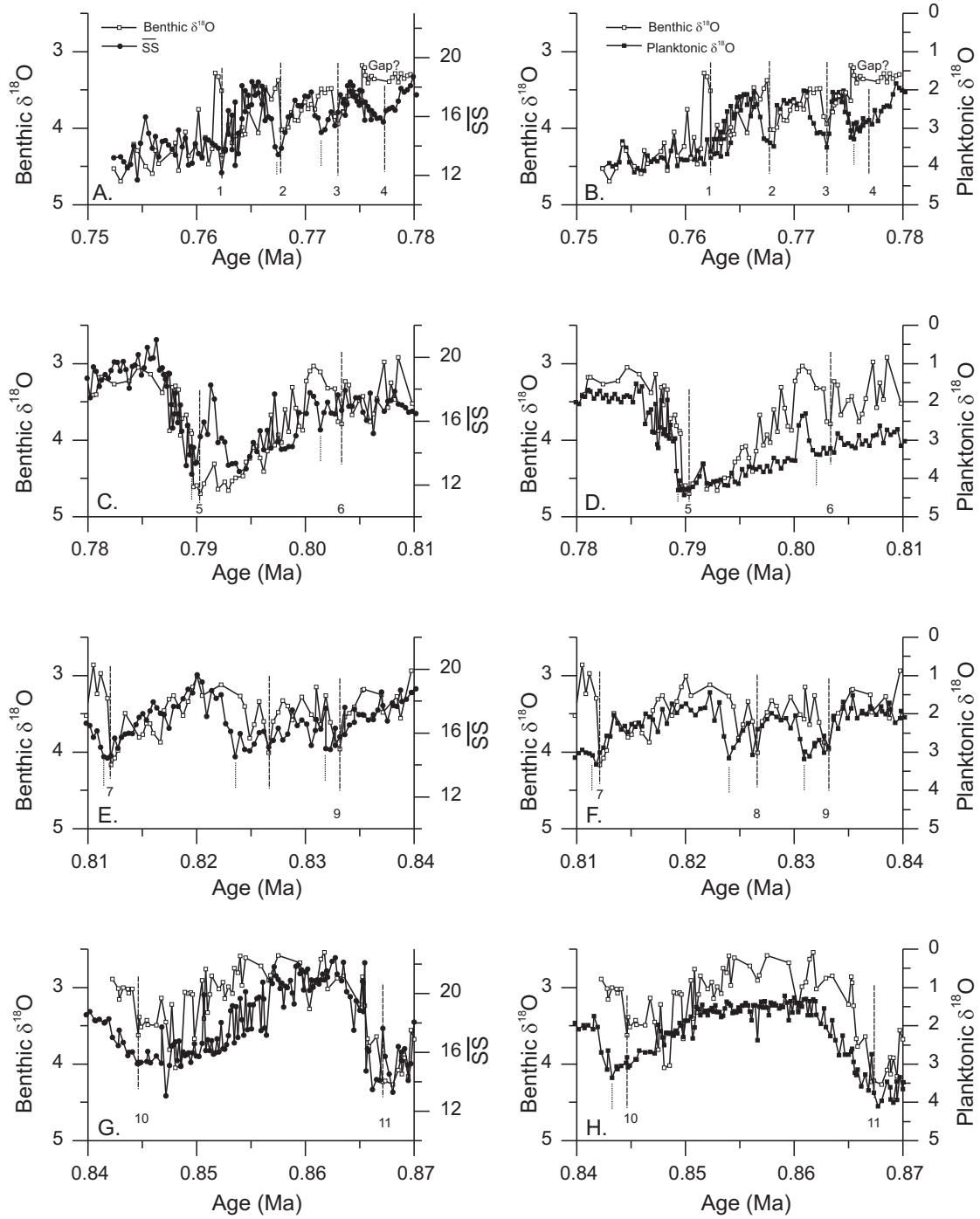


Fig. DR1. Detailed plots of (left) benthic $\delta^{18}\text{O}$ and $\overline{\text{SS}}$ and (right) benthic and planktonic $\delta^{18}\text{O}$ showing the phasing between them. The numbered vertical dashed line on each plot marks the start of a $\delta^{18}\text{O}$ (and $\delta^{13}\text{C}$) excursion and the following dotted line shows the start of the excursion in $\overline{\text{SS}}$ and planktonic $\delta^{18}\text{O}$. Where there is one line they are simultaneous (e.g. 0.867 Ma in $\delta^{18}\text{O}$).

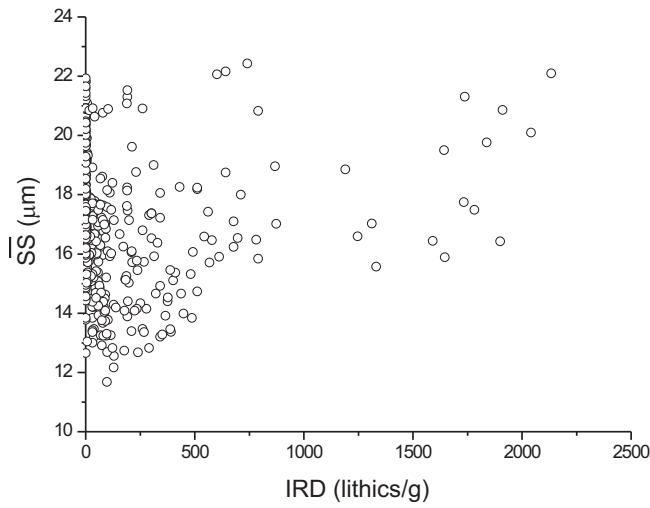


Fig. DR2. A further demonstration that the \overline{SS} size is not significantly affected by the introduction of ice-rafted debris (IRD) during the studied interval is shown by the absence of correlation between \overline{SS} and concentration of IRD in the sand fraction.

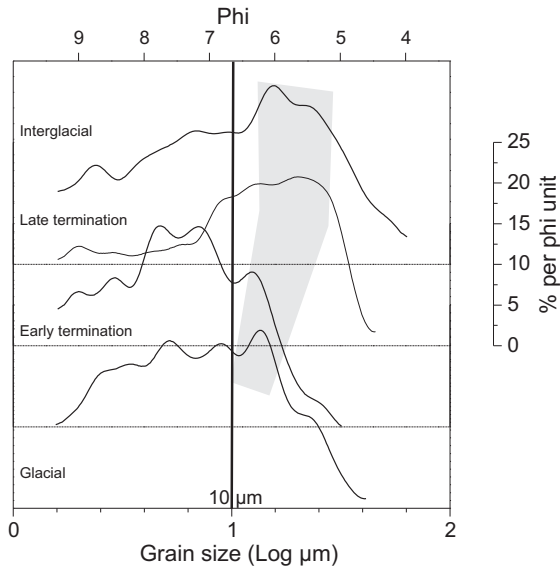


Fig. DR3 Grain size distributions from selected periods in a cycle showing the sorting changes of (a) increase in the \overline{SS} grain size and SS % and (b) decrease in the %<10 μm fine silt-clay associated with increasing flow speed from glacial through the termination to interglacial. $\Phi = -\log_{10} d$ (d = diameter of particle in mm).