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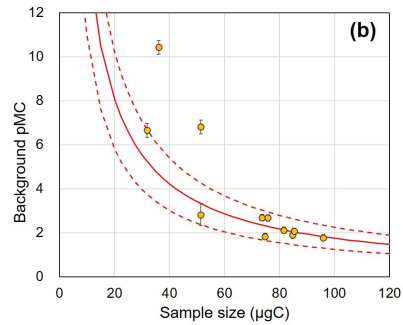
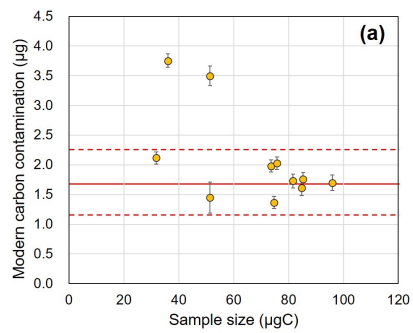
**Supplementary information**

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**Sensitivity of Holocene East Antarctic productivity to subdecadal variability set by sea ice**

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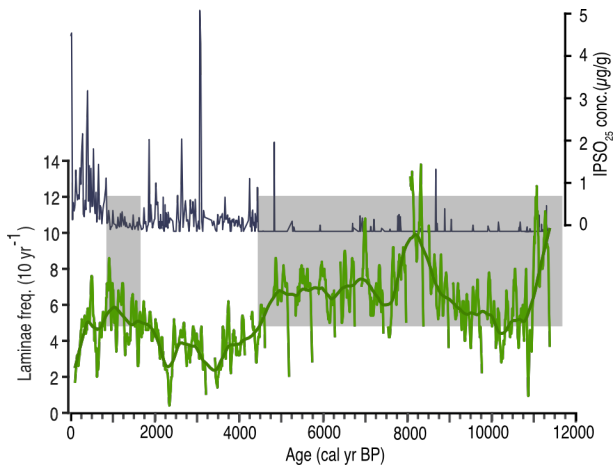
In the format provided by the authors and unedited



**Supplementary Figure 1:** (a) The Modern carbon contamination (MCC) of IAEA-C4 samples ranging from 100 to 30  $\mu\text{g C}$ . The solid and dashed lines represent the average and 2-sigma uncertainties of MCC ( $1.75 \pm 0.52 \mu\text{gC}$ ), excluding outliers. (b) pMC values of IAEA-C4 samples. The solid and dashed lines represent the average and 2-sigma uncertainties of the calculated background pMC values from MCC of  $1.75 \pm 0.52 \mu\text{g C}$ .

**Table S1.** Details of sample depths, target, sample amounts, background-corrected  $\Delta^{14}\text{C}$  and background-corrected  $^{14}\text{C}$  ages.

Sample name	Middle depth (mbsf)	Target compound	Sample amount ( $\mu\text{gC}$ )	BG-corrected $\Delta^{14}\text{C}$ (‰)	BG-corrected $^{14}\text{C}$ age (yr BP)	Lab code
1H5W 0-12	6.06	C <sub>16</sub> fatty acid	77	-181.3 $\pm$ 8.4	1545 $\pm$ 80	MTC-15482
1H5W 0-12	6.06	C <sub>16:1</sub> fatty acid	36	-210.2 $\pm$ 14.7	1835 $\pm$ 150	MTC-15617
4H3W 0-12	29.66	C <sub>16</sub> fatty acid	107	-356.3 $\pm$ 6.3	3480 $\pm$ 80	MTC-15483
6H5W 0-12	51.18	C <sub>16</sub> fatty acid	79	-401.2 $\pm$ 8.3	4060 $\pm$ 110	MTC-15484
8H5W 0-12	68.85	C <sub>16</sub> fatty acid	67	-483.7 $\pm$ 10.8	5250 $\pm$ 165	MTC-15611
11H1W 0-12	93.16	C <sub>16</sub> fatty acid	80	-574.6 $\pm$ 8.6	6805 $\pm$ 160	MTC-15485
13H5W 0-12	117.36	C <sub>16</sub> fatty acid	51	-603.2 $\pm$ 10.7	7365 $\pm$ 215	MTC-15615
15H7W 0-12	138.04	C <sub>16</sub> fatty acid	48	-628.3 $\pm$ 10.1	7890 $\pm$ 220	MTC-15616
16H1W 0-12	140.66	C <sub>16</sub> fatty acid	64	-672.3 $\pm$ 7.5	8900 $\pm$ 185	MTC-15613
17H2W 0-12	151.66	cyclophosphorbide-a-enol	57	-697.4 $\pm$ 8.3	9545 $\pm$ 220	MTC-15614
18H3W 0-12	162.66	C <sub>16</sub> fatty acid	104	-718.4 $\pm$ 7.8	10120 $\pm$ 220	MTC-15486
19H6W 0-12	176.65	C <sub>16</sub> fatty acid	33	-752.9 $\pm$ 20.2	11170 $\pm$ 655	MTC-15618



**Supplementary Figure 2: IPSO<sub>25</sub> and laminae frequency comparison.** Laminae frequency (bloom events) only pass into the ENSO frequency band (2-7 year; 1.5-5 laminae per 10 years), when there is increased coastal sea ice (increased IPSO<sub>25</sub>). Grey bars show intervals where a lack of sea ice means frequency of bloom events is outside of ENSO band (>5 laminae per 10 year; i.e. 1-2 year frequency).