**S3:** Slopes, intercepts, and statistics of the decadal linear models of $\delta^{13}C$ in ocean dissolved $CO_2$, dissolved inorganic carbon (DIC), $POC_{water}$, $POC_{ice}$ and arctic marine mammal tissues; DF = degrees of freedom; Lines in bold are considered significant ($p < 0.005$).

| | Slope | | | Intercept | | | Linear model | |
|---|---|---|---|---|---|---|---|---|
| | slope | SD | p-value | Intercept | SD | p-value | $R^2$ (%) | F-statistic (DF) |
| **$POC_{water}$** | | | | | | | | |
| **Beaufort sea** | **−0.117** | **−0.033** | **<0.005** | **207.7** | **67.1** | **<0.005** | **21.1** | **12.22 (41)** |
| European Arctic | −0.499 | 0.265 | 0.076 | 974.2 | 530.7 | 0.08 | 42.9 | 3.5 (18) |
| **Arctic basins** | **−0.256** | **−0.057** | **<0.005** | **486.4** | **114.3** | **<0.005** | **19.2** | **20.2 (85)** |
| Bering sea | −0.019 | 0.046 | 0.679 | 14.7 | 92.9 | 0.875 | 0.29 | 0.19 (60) |
| Chukchi sea | +0.008 | 0.071 | 0.906 | −39.6 | 141.9 | 0.782 | 0.85 | 0.01 (34) |
| **All data** | **−0.149** | **0.028** | **<0.005** | **273.0** | **55.2** | **<0.005** | **9.4** | **29.3 (311)** |
| **$POC_{ice}$** | | | | | | | | |
| All data | −0.185 | 0.106 | 0.084 | 350.5 | 211.9 | 0.103 | 2.9 | 3.1 (69) |
| **DIC** | | | | | | | | |
| **All data** | **−0.011** | **0.001** | **<0.005** | **22.8** | **2.5** | **<0.005** | **5.1** | **72.9 (1333)** |
| **$CO_2$** | | | | | | | | |
| **All data** | **−0.011** | **0.002** | **<0.005** | **12.1** | **4.9** | **0.013** | **1.5** | **20 (1333)** |
| **Marine mammals** | | | | | | | | |
| **Northern fur seal - Bering sea/Gulf of Alaska** | **−0.020** | **0.003** | **<0.005** | **23.9** | **6.5** | **<0.005** | **49.2** | **36.8 (38)** |
| **Ringed seal - East Greenland** | **−0.046** | **0.012** | **<0.005** | **74.7** | **23.4** | **<0.005** | **31.3** | **15.5 (34)** |
| **Beluga whale –Hudson Bay** | **−0.026** | **0.003** | **<0.005** | **36.6** | **6.7** | **<0.005** | **57.9** | **60.1 (38)** |
| **Beluga whale – Baffin Bay** | **−0.021** | **0.006** | **<0.005** | **25.7** | **11.8** | **0.040** | **30.8** | **12 (24)** |
| **Bowhead whale – Bering sea/Chukchi sea** | **−0.064** | **0.007** | **<0.005** | **104.2** | **13.6** | **<0.005** | **72.3** | **80.7 (32)** |