Supplementary Table 2. Stable isotope compositions from serial sampling and associated diet and drinking water compositions.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   |   |   |   |   |   |   |   |   |   |
|  |  |  |   | **Structural Carbonate** |  |  | **Diet** |  | **Water** |
|  | **Position\*** |  | **13Csc** | **18Osc** | **CO3** |  | **13C** |  | **18Ow** |
|   | **(mm)** |   | **(‰, VPDB)** | **(‰, VSMOW)** | **Wt %** |  | **(‰, VPDB)** |  | **(‰, VSMOW)** |
|  |  |  |  |  |  |  |  |  |  |
| **ON9 (Delaware), 12,360 ± 120 14C yr BP (AA84998, this study)** |  |  |
|  | 1 |  | -10.4 | 24.9 | 6.0 |  | -24.1 |  | -7.7 |
|  | 2 |  | -10.0 | 24.2 | 5.5 |  | -23.8 |  | -8.4 |
|  | 3 |  | -9.8 | 22.9 | 5.9 |  | -23.6 |  | -9.8 |
|  | 4 |  | -9.4 | 22.5 | 5.7 |  | -23.2 |  | -10.2 |
|  | 5 |  | -9.3 | 21.2 | 5.0 |  | -23.1 |  | -11.6 |
|  | 6 |  | -9.5 | 20.7 | 6.4 |  | -23.2 |  | -12.1 |
|  | 8 |  | -9.6 | 20.2 | 2.8 |  | -23.3 |  | -12.6 |
|  | 9 |  | **-9.4** | **20.0** | **6.0** |  | -23.2 |  | **-12.8** |
|  | 10 |  | -9.2 | 20.0 | 5.7 |  | -23.0 |  | -12.8 |
|  | 11 |  | -9.1 | 21.1 | 6.0 |  | -22.9 |  | -11.6 |
|  | 12 |  | -9.3 | 24.1 | 5.2 |  | -23.1 |  | -8.6 |
|  | 13 |  | -9.7 | 25.1 | 2.0 |  | -23.5 |  | -7.5 |
|  | 14 |  | -9.9 | 23.6 | 5.7 |  | -23.7 |  | -9.1 |
|  | 15 |  | -9.6 | 23.6 | 4.6 |  | -23.4 |  | -9.0 |
|  | 16 |  | -9.1 | 22.2 | 5.2 |  | -22.9 |  | -10.5 |
|  | 17 |  | -9.3 | 21.6 | 6.3 |  | -23.1 |  | -11.1 |
|  | 18 |  | -9.6 | 21.3 | 4.0 |  | -23.4 |  | -11.4 |
|  | 19 |  | -9.4 | 21.0 | 3.6 |  | -23.2 |  | -11.7 |
|  | 20 |  | -9.2 | 21.2 | 5.3 |  | -23.0 |  | -11.5 |
|  | 21 |  | -9.0 | 23.9 | 4.2 |  | -22.8 |  | -8.8 |
|  | 22 |  | -9.6 | 26.3 | 5.4 |  | -23.3 |  | -6.2 |
|  | 23 |  | -9.5 | 27.6 | 4.0 |  | -23.2 |  | -4.8 |
|  | 24 |  | -9.0 | 23.8 | 5.4 |  | -22.8 |  | -8.8 |
|  | 25 |  | -9.1 | 20.8 |  |  | -22.8 |  | -12.0 |
|  | 26 |  | -9.4 | 20.4 | 5.9 |  | -23.2 |  | -12.4 |
|  | 27 |  | -9.9 | 20.3 | 5.8 |  | -23.6 |  | -12.5 |
|  | 28 |  | -9.2 | 21.1 | 5.6 |  | -23.0 |  | -11.6 |
|  | 29 |  | -9.3 | 25.1 | 5.3 |  | -23.0 |  | -7.4 |
|  | 30 |  | **-9.9** | **25.2** | **5.9** |  | -23.7 |  | **-7.4** |
|  | 31 |  | -9.3 | 22.6 | 5.3 |  | -23.1 |  | -10.1 |
|  | 32 |  | -9.4 | 20.7 | 5.5 |  | -23.2 |  | -12.1 |
|  | 33 |  | -10.1 | 19.7 | 6.2 |  | -23.8 |  | -13.1 |
|  | 34 |  | **-9.8** | **19.3** | **5.5** |  | -23.6 |  | **-13.5** |
|  | 35 |  | -9.3 | 21.4 | 5.4 |  | -23.0 |  | -11.3 |
|  | 36 |  | -10.3 | 24.2 | 5.7 |  | -24.1 |  | -8.4 |
|  | 37 |  | -9.2 | 22.6 | 5.1 |  | -22.9 |  | -10.1 |
|  | 38 |  | -10.2 | 20.6 | 4.2 |  | -24.0 |  | -12.1 |
|  | 39 |  | -9.6 | 19.5 | 5.9 |  | -23.4 |  | -13.3 |
|  |  |  |  |  |  |  |  |  |  |
| **ON14 (Rodney), 11,400 450, 12,000 ± 500 14C yr BP (dates on muck)** |
|  | 1 |  | -10.3 | 20.5 | 5.5 |  | -24.1 |  | -12.2 |
|  | 2 |  | -10.5 | 23.1 | 5.8 |  | -24.3 |  | -9.6 |
|  | 3 |  | -11.0 | 24.4 | 6.1 |  | -24.7 |  | -8.2 |
|  | 4 |  | -11.2 | 22.8 | 6.2 |  | -25.0 |  | -9.9 |
|  | 5 |  | -11.3 | 21.6 | 5.4 |  | -25.1 |  | -11.1 |
|  | 6 |  | -11.1 | 20.5 | 5.0 |  | -24.8 |  | -12.3 |
|  | 7 |  | -11.0 | 18.6 | 5.2 |  | -24.8 |  | -14.2 |
|  | 8 |  | -10.9 | 19.1 | 5.0 |  | -24.7 |  | -13.7 |
|  | 9 |  | -10.9 | 17.7 | 5.1 |  | -24.6 |  | -15.1 |
|  | 10 |  | -10.8 | 17.8 | 5.2 |  | -24.5 |  | -15.1 |
|  | 11 |  | -10.8 | 18.1 | 6.0 |  | -24.5 |  | -14.7 |
|  | **12** |  | **-10.9** | **19.8** | **5.6** |  | -24.6 |  | **-13.0** |
|  | 13 |  | -10.7 | 22.3 | 4.6 |  | -24.5 |  | -10.4 |
|  | 14 |  | -10.7 | 22.8 | 5.4 |  | -24.5 |  | -9.9 |
|  | 15 |  | -10.6 | 20.7 | 4.4 |  | -24.4 |  | -12.0 |
|  | 16 |  | -10.4 | 18.7 | 4.3 |  | -24.2 |  | -14.1 |
|  | 17 |  | -10.6 | 19.1 |  |  | -24.4 |  | -13.8 |
|  | 18 |  | -10.4 | 19.7 | 4.7 |  | -24.1 |  | -13.1 |
|  | 19 |  | -10.2 | 20.6 | 4.8 |  | -24.0 |  | -12.2 |
|  | 20 |  | -10.4 | 23.2 | 4.8 |  | -24.2 |  | -9.5 |
|  | 21 |  | -10.8 | 22.9 | 5.0 |  | -24.6 |  | -9.8 |
|  | 22 |  | -10.1 | 20.8 | 5.8 |  | -23.8 |  | -12.0 |
|  | 23 |  | -10.0 | 18.6 | 7.1 |  | -23.7 |  | -14.3 |
|  | 24 |  | -10.0 | 17.8 | 5.6 |  | -23.8 |  | -15.1 |
|  | 25 |  | -10.1 | 21.2 | 5.9 |  | -23.9 |  | -11.6 |
|  | 26 |  | -10.7 | 23.5 | 5.6 |  | -24.4 |  | -9.1 |
|  | 27 |  | -10.3 | 21.9 | 5.5 |  | -24.1 |  | -10.8 |
|  | 28 |  | -10.2 | 19.3 | 5.6 |  | -23.9 |  | -13.5 |
|  | 29 |  | -10.1 | 18.7 | 5.3 |  | -23.8 |  | -14.2 |
|  | 30 |  | -10.0 | 19.4 | 5.0 |  | -23.8 |  | -13.4 |
|  | 31 |  | -10.2 | 22.8 | 5.4 |  | -24.0 |  | -9.8 |
|  | 32 |  | -10.3 | 24.2 | 5.3 |  | -24.1 |  | -8.4 |
|  | 33 |  | -9.9 | 21.7 | 6.1 |  | -23.6 |  | -11.0 |
|  | 34 |  | -9.7 | 18.9 | 5.5 |  | -23.5 |  | -13.9 |
|  | 35 |  | -9.7 | 22.0 | 6.0 |  | -23.4 |  | -10.7 |
|  | 36 |  | -10.6 | 23.6 | 5.0 |  | -24.4 |  | -9.0 |
|  |  |  |  |  |  |  |  |  |  |
| **ON7 (Caradoc), 11,120  110 14C yr BP (AA84980, this study)** |  |  |
|  | 1 |  | -10.8 | 20.5 | 5.5 |  | -24.5 |  | -12.2 |
|  | 2 |  | -10.9 | 20.7 | 5.5 |  | -24.6 |  | -12.0 |
|  | 3 |  | **-11.0** | **20.3** | **5.3** |  | -24.7 |  | **-12.5** |
|  | 4 |  | -11.0 | 20.0 | 5.3 |  | -24.8 |  | -12.8 |
|  | 5 |  | -10.9 | 19.5 | 4.9 |  | -24.6 |  | -13.3 |
|  | 6 |  | -10.5 | 18.4 | 2.6 |  | -24.3 |  | -14.5 |
|  | 7 |  | -10.5 | 18.7 | 5.5 |  | -24.3 |  | -14.2 |
|  | 8 |  | -10.5 | 18.6 | 5.4 |  | -24.2 |  | -14.2 |
|  | 9 |  | -10.5 | 18.4 | 5.5 |  | -24.3 |  | -14.4 |
|  | 10 |  | **-10.5** | **19.1** | **5.5** |  | -24.2 |  | **-13.8** |
|  | 11 |  | -10.4 | 20.1 | 5.9 |  | -24.2 |  | -12.6 |
|  | 12 |  | -10.5 | 20.2 | 5.5 |  | -24.2 |  | -12.6 |
|  | 13 |  | -10.5 | 21.4 | 4.6 |  | -24.3 |  | -11.3 |
|  | 14 |  | -10.7 | 22.0 | 5.8 |  | -24.5 |  | -10.7 |
|  | 15 |  | -10.9 | 21.7 | 4.9 |  | -24.6 |  | -11.0 |
|  | 16 |  | -10.9 | 21.7 | 6.2 |  | -24.6 |  | -11.0 |
|  | 17 |  | -10.1 | 19.1 | 5.0 |  | -23.9 |  | -13.7 |
|  | 18 |  | **-10.1** | **18.8** | **5.3** |  | -23.9 |  | **-14.0** |
|  | 19 |  | -10.1 | 18.5 | 4.9 |  | -23.9 |  | -14.3 |
|  | 20 |  | -10.2 | 18.3 | 6.0 |  | -23.9 |  | -14.5 |
|  | 21 |  | -10.3 | 18.3 | 4.2 |  | -24.1 |  | -14.5 |
|  | 22 |  | -10.2 | 18.6 | 5.6 |  | -23.9 |  | -14.3 |
|  | 23 |  | -10.3 | 18.7 | 5.6 |  | -24.1 |  | -14.1 |
|  | 24 |  | -10.2 | 19.3 | 5.4 |  | -24.0 |  | -13.5 |
|  | 25 |  | -10.4 | 21.5 | 5.0 |  | -24.2 |  | -11.3 |
|  | 26 |  | -10.5 | 22.5 | 5.9 |  | -24.3 |  | -10.2 |
|  | 27 |  | -10.9 | 21.5 | 5.8 |  | -24.6 |  | -11.2 |
|  | 28 |  | **-10.1** | **20.0** | **5.4** |  | -23.9 |  | **-12.8** |
|  | 29 |  | -10.2 | 18.0 | 5.2 |  | -23.9 |  | -14.9 |
|  | 30 |  | -10.3 | 17.3 | 5.5 |  | -24.0 |  | -15.6 |
|  | 31 |  | -10.2 | 17.7 | 4.9 |  | -23.9 |  | -15.2 |
|  | 33 |  | -11.2 | 22.1 | 5.2 |  | -24.9 |  | -10.6 |
|  |  |  |  |  |  |  |  |  |  |
| **NY4 (Hiscock), 11,033 ± 40 to 10,350 ± 60 14C yr BP (not directly dated)** |  |  |
|  | 2 |  | -10.6 | 20.5 | 6.5 |  | -24.3 |  | -12.3 |
|  | 3 |  | -10.7 | 20.6 | 6.0 |  | -24.5 |  | -12.2 |
|  | 4 |  | -10.3 | 20.8 | 5.0 |  | -24.1 |  | -12.0 |
|  | 5 |  | -10.2 | 21.1 | 7.9 |  | -24.0 |  | -11.6 |
|  | 6 |  | -10.3 | 20.6 | 6.8 |  | -24.1 |  | -12.2 |
|  | 7 |  | -10.8 | 20.8 | 5.5 |  | -24.6 |  | -12.0 |
|  | 8 |  | -11.3 | 20.4 | 5.2 |  | -25.1 |  | -12.4 |
|  | 9 |  | -11.4 | 18.8 | 6.1 |  | -25.2 |  | -14.0 |
|  | 10 |  | -11.3 | 19.5 | 5.4 |  | -25.0 |  | -13.3 |
|  | 11 |  | -11.4 | 19.2 | 5.3 |  | -25.2 |  | -13.7 |
|  | 13 |  | -10.7 | 20.9 | 4.3 |  | -24.4 |  | -11.9 |
|  | 14 |  | -11.5 | 22.4 | 3.0 |  | -25.3 |  | -10.3 |
|  | 15 |  | -11.5 | 21.7 | 5.8 |  | -25.2 |  | -11.0 |
|  | 16 |  | -11.2 | 20.4 | 4.9 |  | -24.9 |  | -12.4 |
|   | 17 |   | -11.4 | 20.4 | 3.6 |   | -25.2 |   | -12.3 |

Values in **bold** are the results of duplicate analyses.