

Supplementary Information

Table S1: Tie points used on each core to make age models with their attendant errors and indicated in Figures 5 and 6. Uncertainties correspond to the resolution of each age model on its respective core. Also absolute dates (^{14}C and biostratigraphy based on planktonic foraminifera assemblage) are indicated. Years are expressed as Before Common Era (BCE) and Common Era (CE).

| Core | Composite depth (cm) | Method | Ages (years BCE/CE) | Age-uncertainties interval (years BCE/CE) |
|---------|--------------------------|--------------------------|---------------------|---|
| MIN1 | 2-2.5 | Mg/Ca | 1895 CE | 1864-1923 CE |
| | 6.5-7 | | 1564 CE | 1523-1606 CE |
| | 7-7.5 | ^{14}C | 1523 CE | 1408-1523 CE |
| | 8-8.5 | | 1455 CE | 1423-1491 CE |
| | 10.5-11 | Mg/Ca | 1237 CE | 1202-1315 CE |
| | 13.5-14 | | 1012 CE | 990-1043 CE |
| | 19-19.2 | ^{14}C | 392 CE | 295-535 CE |
| | 20-21 | | 234 CE | 1970-289 CE |
| 24-24.5 | Mg/Ca | 63 BCE | 76-11 BCE | |
| MIN2 | 1-1.5 | | 1915 CE | 1887-1944 CE |
| | 7-7.5 | Mg/Ca | 1580 CE | 1556-1605 CE |
| | 9-9.5 | | 1497 CE | 1485-1511 CE |
| | 11-11.5 | ^{14}C | 1448 CE | 1440-1598 CE |
| | 16-16.5 | Mg/Ca | 1263 CE | 1235-1306 CE |
| | 18-18.5 | | 1170 CE | 1170-1312 CE |
| | 25-25.5 | ^{14}C | 829 CE | 804-989 CE |
| | 28.5-29 | | 651 CE | 520-680 CE |
| MR3.3 | 0.5-1 | Foraminiferal Assemblage | 1708 CE | 1708-1728 CE |
| | 3.5-4 | | 1484 CE | 1383-1484 CE |
| | 6.5-7 | | 1256 CE | 1063-1256 CE |
| | 12-12.5 | ^{14}C | 989 CE | 911-1085 CE |
| | 16-17 | | 497 CE | 438-621 CE |
| | 20-21 | | 50 CE | 88 B.C.E.-107 CE |
| | 24-25 | | 388 BCE | 388-214 BCE |
| 26-27 | Foraminiferal Assemblage | 702 BCE | 798-702 BCE | |
| MR3.1A | 5-5.5 | | 1627 CE | 1545-1665 CE |
| | 6.5-7 | Mg/Ca | 1400 CE | 1350-1484 CE |
| | 10-10.5 | | 1050 CE | 1021-1165 CE |
| | 12.5-13 | | 766 CE | 597-824 CE |
| | 13-13.5 | Mn ICP-MS | 597 CE | 497-766 CE |
| | 13.5-14 | Mg/Ca | 497 CE | 433-597 CE |
| | 15-16 | Mn ICP-MS | 254 CE | 184-390 CE |
| | 21-22 | Mg/Ca | 133 BCE | 170 B.C.E.-25 BCE |
| | 22-23 | | 170 BCE | 207 -133 BCE |
| | 24-25 | Mn ICP-MS | 551 BCE | 625-207 BCE |
| | 26-27 | Mg/Ca | 702 BCE | 779-625 BCE |
| MR3.1B | 13-14 | Mn-XRF | 618 CE | 532-702 CE |
| | 14-14.25 | Mn ICP-MS | 597 CE | 501-683 CE |
| | 15-16 | Mn-XRF | 317 CE | 65-557 CE |
| | 16-16.25 | | 254 CE | 184-506 CE |
| | 23.5-23.75 | Mn ICP-MS | 189 BCE | 226-152 BCE |
| MR3.2 | 13-14 | Mn-XRF | 766 CE | 468-824 CE |
| | 15-16 | | 317 CE | 202-468 CE |

Table S2: $\delta^{18}\text{O}_{\text{sw}}$ calculated according to different paleotemperature equations for core tops from Balears (time spanned ~last 50 years).

| Core | Depth (cm) | $\delta^{18}\text{O}_c$ (VPDB‰) | Mg/Ca-SST (°C) | $\delta^{18}\text{O}_{\text{sw}}$ (SMOW) Shackleton (1964) | $\delta^{18}\text{O}_{\text{sw}}$ (SMOW) Bemis et al., 1998 | $\delta^{18}\text{O}_{\text{sw}}$ (SMOW) Mulitza et al., 2003 |
|--------|------------|---------------------------------|----------------|--|---|---|
| MIN1 | 1 | 1.2 | 15.8 | 1.2 | 2.1 | 1.7 |
| | 1.5 | 1.1 | 17.1 | 1.5 | 2.3 | 1.9 |
| MIN2 | 0.5 | 1.1 | 16.2 | 1.2 | 2.1 | 1.7 |
| | 1 | 1.1 | 16.4 | 1.3 | 2.1 | 1.8 |
| MR3.1B | 0.25 | 1.3 | 15.8 | 1.3 | 2.2 | 1.8 |

Table S3: SST averages obtained from the 10 core top samples from the central-western Mediterranean Sea used in this study after applying the different published *G. bulloides* temperature calibrations and compared to the our study's calibration.

| Mg/Ca = A exp (B * SST) | A | B | Core top SST average (°C) |
|--|--------|--------|---------------------------|
| Mashiotta et al., (1999) | 0.474 | 0.107 | 21.7 |
| Lea et al., (1999) | 0.53 | 0.1 | 19.4 |
| Elderfield and Ganssen (2000) | 0.56 | 0.1 | 18.6 |
| Anand et al., (2003) | 0.81 | 0.081 | 12.1 |
| McConnell and Thunell (2005) | 1.2 | 0.057 | 6.3 |
| Cléroux et al., (2008) | 0.78 | 0.082 | 12.6 |
| Thornalley, Elderfield and McCave (2009) | 0.794 | 0.1 | 15.1 |
| Patton et al., (2011) | 0.97 | 0.066 | 8.7 |
| This study | 0.6788 | 0.0973 | 16.4 |

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