**Supplementary material 2. Tables showing anchor points used.**

Table 1.

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| **Anchor points used for tuning in the Gerbe section.** |
| Stratigraphic height (m) | Age (Ma)♠ | Cycle |
| 7.6 | 47.338 | Eccentricity maxima |
| 37.4 | 47.236 | Eccentricity maxima |
| 58.3 | 47.189 | Eccentricity minima |
| 102.5 | 47.082 | Eccentricity minima |
| 179.5 | 46.960 | Eccentricity maxima  |
| 5 anchor points employed to tune the Gerbe section to the eccentricity time scale. ♠Ages obtained from the GPTS of Gradstein *et al.* (2012). |
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| Table 2.**Anchor points for tuning in Labuerda section 2.** |
| Height (m) | Age (Ma) | Cycle |
| 34.974 | 46.098 | Eccentricity maxima |
| 71.958 | 45.994 | Eccentricity maxima |
| 110.55 | 45.891 | Eccentricity maxima |
| 166.026 | 45.789 | Eccentricity maxima |
| 209.442 | 45.618 | Eccentricity maxima  |
| 243.813 | 45.512 | Eccentricity maxima |
| 277.38 | 45.409 | Eccentricity maxima |
| 314.771 | 45.323 | Eccentricity maxima |
| 356.976 | 45.278 | Eccentricity minima |
| 9 anchor points used to tune the Labuerda section 2 to the eccentricity curves of the La2010a orbital solution of Laskar *et al.* (2011). |

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Table 3.

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| **Anchor points used for tuning the Boltaña section.** |
| Height (m) | Age (Ma) | Matched cycle |
| 19 | 45.226 | Eccentricity maxima |
| 47.4 | 45.120 | Eccentricity maxima |
| 79.4 | 45.015 | Eccentricity maxima |
| 104.8 | 44.9 | Eccentricity minima |
| 130.2 | 44.795 | Eccentricity maxima |
| 157.8 | 44.619 | Eccentricity minima |
| 6 anchor points used to tune the Boltaña section to eccentricity. |

Table 4.

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| **Anchor points for orbital tuning in the Forcaz section.** |
| Height (m) | Age (Ma) | Cycle |
| 9.2 | 44.619 | Eccentricity maxima |
| 26.6 | 44.585 | Eccentricity maxima |
| 50.4 | 44.488 | Eccentricity maxima |
| 67.4 | 44.384 | Eccentricity maxima |
| 114.8 | 44.28 | Eccentricity maxima |
| 143.6 | 44.181 | Eccentricity maxima  |
| 161 | 44.099 | Eccentricity maxima |
| 174.8 | 44.053 | Eccentricity minima |
| 8 anchor points employed to tune the Forcaz section to the eccentricity curves of the La2010a orbital solution of Laskar *et al.* (2011). |

Table 5.

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| **Anchor points for orbital tuning in the Morillo Reservoir section.** |
| Height (m) | Age (Ma) | Cycle |
| 4.8 | 43.635 | Obliquity maxima |
| 18.4 | 43.614 | Obliquity maxima |
| 30.2 | 43.594 | Obliquity maxima |
| 43.2 | 43.572 | Obliquity maxima |
| 57 | 43.541 | Obliquity maxima |
| 68.8 | 43.523 | Obliquity maxima |
| 80.8 | 43.502 | Obliquity maxima |
| 93.2 | 43.481 | Obliquity maxima |
| 103 | 43.459 | Obliquity maxima |
| 115.4 | 43.434 | Obliquity maxima |
| 8 anchor points employed to tune the Morillo reservoir section to the obliquity curves of the La2010a orbital solution of Laskar *et al.* (2011). |