**Data repository (Supplementary material)**

***TOC and δ13Corg analyses***

Sample list and results.

Pignola-Abriola

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **m** | **sample** | **Lithology** | **TOC%** | ***δ13C*org** |
| 58.10 | Pa i 191 | Silicificated limestone | 1.984 |   |
| 57.80 | Pai 189 | Silicificated limestone | 2.321 | -25.56 |
| 57.65 | GNM 119 | Silicificated limestone | 0.149 |   |
| 57.50 | Pai 187 | Silicificated limestone | 2.014 | -24.66 |
| 57.05 | Pai 185 | Silicificated limestone | 1.863 | -26.43 |
| 56.76 | GNM 117 | Silicificated limestone | 0.452 | -26.61 |
| 56.50 | Pai 184 | Silicificated limestone | 2.103 | -25.80 |
| 55.70 | GNI 29 | Silicificated limestone | 0.960 | -24.41 |
| 55.63 | Pai 180 | Black shale | 3.654 | -25.71 |
| 55.55 | GNI 28 | Black shale | 1.259 | -25.63 |
| 55.25 | GNI 27 | Black shale | 5.548 | -25.40 |
| 54.45 | Pai 173 | Silicificated limestone | 5.663 | -25.77 |
| 53.75 | GNM 102 | Silicificated limestone | 8.410 | -27.83 |
| 53.15 | Pai 168 | Marlstone | 1.359 | -25.67 |
| 52.65 | GNI 26 | Silicificated limestone | 5.684 | -25.85 |
| 52.50 | Pai 166 | Marlstone | 0.136 | -25.26 |
| 52.13 | Pai 164 | Silicificated limestone | 0.963 |   |
| 51.65 | Pai 162 | Silicificated limestone | 0.079 | -26.52 |
| 51.40 | GNI 25 | Silicificated limestone | 6.664 | -25.97 |
| 51.05 | GNM 85 | Silicificated limestone | 0.618 | -25.86 |
| 50.80 | Pai 160 | Black shale | 0.096 | -25.17 |
| 50.20 | Pai 157 | Silicificated limestone | 0.107 | -25.03 |
| 49.25 | GNI 24 | Marlstone | 4.780 | -26.56 |
| 49.15 | GNI 23 | Marlstone | 9.895 | -24.36 |
| 48.90 | GNI 22 | Black shale | 3.667 | -26.15 |
| 48.65 | Pai 155 | Silicificated limestone | 2.113 | -25.72 |
| 48.40 | GNI 21 | Black shale | 5.074 | -25.77 |
| 48.10 | GNI 20 | Black shale | 12.653 | -25.40 |
| 47.40 | GNI 19B | Black shale | 9.024 | -25.86 |
| 47.20 | Pai 146 | Silicificated limestone | 1.895 |   |
| 46.80 | GNI 19 | Black shale | 0.943 | -25.68 |
| 46.45 | GNI 18 | Silicificated limestone | 11.623 | -26.05 |
| 46.30 | GNI 17 | Black shale | 12.589 | -26.37 |
| 45.95 | Pai 143 | Black shale | 0.106 | -24.90 |
| 45.80 | GNI 16 | Black shale | 0.728 | -27.10 |
| 45.65 | Pai 142 | Silicificated limestone | 10.337 | -25.89 |
| 45.30 | GNI 15 | Silicificated limestone | 2.032 | -27.13 |
| 45.23 | GNI 14 | Marlstone | 2.566 | -25.42 |
| 45.18 | Pai 139 | Silicificated limestone |   | -27.58 |
| 44.95 | Pai 136 | Silicificated limestone | 6.856 | -25.80 |
| 44.75 | Pai 134 | Black shale | 2.321 | -24.91 |
| 44.35 | GNM 52 | Silicificated limestone | 8.663 | -29.95 |
| 43.30 | GNP 3 | Marlstone | 7.845 | -27.26 |
| 42.60 | Pa i 119 | Silicificated limestone | 8.045 |   |
| 42.35 | GNP 2 | Silicificated limestone | 10.681 | -28.28 |
| 42.28 | GNM 41A | Marlstone | 8.327 | -27.55 |
| 42.20 | Pai 116 | Silicificated limestone | 6.125 | -25.18 |
| 41.30 | Pai 111 | Silicificated limestone | 8.014 | -24.46 |
| 40.70 | GNM 37 | Silicificated limestone | 6.074 | -27.97 |
| 40.19 | GNM 35B | Silicificated limestone | 10.557 | -26.55 |
| 40.00 | Pai 108 | Marlstone | 13.025 | -25.47 |
| 39.35 | GNP 1 | Silicificated limestone | 2.967 | -27.93 |
| 38.30 | Pai 104 | Marlstone | 1.451 | -24.31 |
| 37.73 | GNI 13 | Marlstone | 0.818 | -25.58 |
| 37.50 | GNI 12 | Black shale | 5.960 | -24.90 |
| 37.30 | GNI 11 | Black shale | 6.261 | -25.76 |
| 36.80 | Pai 101 | Marlstone | 0.941 |   |
| 36.10 | GNI 10 | Black shale | 8.876 | -23.70 |
| 35.70 | GNI 9 | Silicificated limestone | 3.992 | -24.19 |
| 33.80 | Parc 1 | Silicificated limestone | 2.354 | -27.78 |
| 33.40 | Parc 3 | Silicificated limestone | 1.979 | -25.97 |
| 32.95 | Parc 6 | Silicificated limestone | 1.853 | -27.50 |
| 32.70 | Parc 7 | Silicificated limestone | 2.580 |   |
| 32.05 | Parc 10 | Silicificated limestone | 3.668 | -27.87 |
| 31.70 | GNI 8 | Marlstone | 1.855 | -25.67 |
| 31.65 | GNI 7 | Marlstone | 0.309 | -24.58 |
| 31.60 | GNI 6 | Marlstone | 0.164 | -24.45 |
| 31.50 | Parc 12 | Silicificated limestone | 2.923 | -25.96 |
| 30.89 | Parc 15 | Silicificated limestone | 1.880 | -27.18 |
| 30.70 | GNI 5 | Black shale | 1.348 | -25.72 |
| 30.65 | GNI 4 | Black shale | 0.152 | -25.30 |
| 30.55 | GNI 3 | Black shale | 6.841 | -26.95 |
| 30.40 | Parc 16 | Silicificated limestone | 2.036 |   |
| 30.30 | GNI 2 | Black shale | 5.996 | -25.66 |
| 29.90 | GNI 1 | Black shale | 2.589 | -27.68 |
| 28.00 | Pai 76 | Silicificated limestone | 2.654 | -24.91 |
| 27.60 | Pai 74 | Silicificated limestone | 0.092 | -23.73 |
| 27.40 | Pai 72 | Silicificated limestone | 3.854 | -20.78 |
| 27.10 | Pai 70 | Silicificated limestone | 0.221 | -23.89 |
| 26.80 | Pai 68 | Silicificated limestone | 0.191 | -23.50 |
| 26.60 | Pai 65 | Silicificated limestone | 2.966 | -25.38 |
| 25.80 | Pai 63 | Silicificated limestone | 0.412 | -26.52 |
| 25.00 | Pa i 61 | Silicificated limestone | 0.323 |   |
| 24.82 | Pa i 60 | Silicificated limestone | 3.771 |   |
| 23.80 | Pai 56 | Silicificated limestone | 0.320 | -23.51 |
| 23.55 | Pai 55 | Silicificated limestone | 3.657 | -23.80 |
| 23.30 | Pai 54 | Silicificated limestone | 0.226 | -23.31 |
| 23.00 | Pai 52 | Silicificated limestone | 0.358 | -26.73 |
| 22.60 | Pai 50 | Silicificated limestone | 2.851 | -26.61 |
| 22.10 | Pai 49 | Silicificated limestone | 0.126 | -26.64 |
| 21.70 | Pai 47 | Silicificated limestone | 0.160 | -27.71 |
| 21.50 | Pa i 46 | Silicificated limestone | 1.674 |   |
| 21.00 | Pai 43 | Silicificated limestone | 0.891 | -24.84 |
| 20.80 | Pai 41 | Silicificated limestone | 3.221 | -27.57 |
| 19.80 | Pai 39 | Silicificated limestone | 0.153 | -28.61 |
| 19.65 | Pa i 38 | Silicificated limestone | 7.345 |   |
| 19.30 | Pai 37 | Limestone dolomite | 0.152 | -25.73 |
| 18.88 | Pai 35 | Limestone dolomite | 1.861 | -25.07 |
| 18.60 | Pa i 34 | Silicificated limestone | 0.301 |   |
| 18.10 | pa 9 | Limestone dolomite | 0.301 | -26.36 |
| 17.94 | Pa i 32 | Silicificated limestone | 4.233 | -24.91 |
| 17.50 | Pa i 31 | Limestone dolomite | 1.981 | -25.23 |
| 17.20 | pa 8 | Limestone dolomite | 0.419 | -26.08 |
| 16.90 | Pa i 29 | Limestone dolomite | 6.425 | -25.60 |
| 16.49 | Pai 19 | Limestone dolomite | 3.364 | -26.19 |
| 16.40 | pa 7 | Limestone dolomite | 0.399 |   |
| 16.22 | Pai 16 | Limestone dolomite | 3.526 | -25.95 |
| 11.80 | pa 2 | Limestone dolomite | 0.336 | -24.76 |
| 11.13 | Pa i 11 | Limestone dolomite | 3.668 |   |
| 9.74 | Pa i 9 | Limestone dolomite | 3.045 |   |
| 7.75 | pa 1 | Limestone dolomite | 0.367 | -25.11 |
| 0.00 | Pai 0 | Limestone dolomite | 2.341 | -24.67 |

Mt. Volturino

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **m** | **sample** | **Lithology** | **TOC%** | ***δ13C*org** |
| 71.00 | MV49 | Limestone | 0.611 | -19.88 |
| 68.00 | MV45.60 | Limestone | 0.115 |   |
| 66.00 | MV44 | Limestone | 0.161 | -21.89 |
| 65.00 | MV 43 | Limestone | 0.174 | -25.15 |
| 64.00 | MV42 | Limestone | 0.294 |   |
| 57.50 | MMV 9 | Limestone | 0.095 |   |
| 56.00 | MVV8 | Limestone | 0.371 |   |
| 52.00 | MMV 1 | Limestone | 0.693 | -28.05 |
| 51.50 | MV 35 | Limestone | 0.380 |   |
| 51.00 | MMV 2 | Limestone | 1.111 | -27.78 |
| 50.66 | MMV 3 | Limestone |   | -27.36 |
| 50.50 | MMV 4 | Limestone | 0.941 | -26.33 |
| 49.50 | MMV 6 | Limestone | 0.925 | -26.56 |
| 49.00 | MMV 7 | Limestone | 1.192 | -27.52 |
| 48.20 | MMV 8 | Limestone |   | -25.23 |
| 47.10 | MMV 9 | Marlstone |   | -27.46 |
| 46.60 | MMV 10 | Marlstone |   | -26.50 |
| 46.50 | MV 31 | Marlstone | 0.124 |   |
| 46.20 | MMV 11 | Marlstone |   | -25.42 |
| 45.00 | MVV 6 | Marlstone | 0.706 |   |
| 42.50 | MV 27B | Marlstone | 0.288 | -23.47 |
| 42.45 | MMV 13 | Marlstone |   | -27.35 |
| 42.00 | MV 25 | Limestone |   | -20.67 |
| 41.50 | MV 24 | Marlstone | 0.195 | -24.29 |
| 41.43 | MMV 16 | Marlstone |   | -24.25 |
| 41.00 | MV 23 | Marlstone | 0.295 | -26.13 |
| 40.20 | MV 22 | Marlstone |   | -26.12 |
| 39.50 | MV 21 | Limestone | 0.198 |   |
| 39.00 | MV 20B | Limestone | 0.384 |   |
| 38.45 | MMV 22 | Limestone |   | -24.73 |
| 38.00 | MMV 23 | Limestone |   | -24.67 |
| 38.00 | MV 17 | Limestone | 0.293 | -26.07 |
| 37.50 | MV 16 | Limestone | 0.500 | -23.15 |
| 36.30 | MMV 27 | Limestone |   | -24.30 |
| 37.00 | MV15 | Limestone | 0.479 |   |
| 36.00 | MVV 5 | Limestone | 0.329 | -24.52 |
| 35.60 | MMV 29 | Limestone |   | -24.35 |
| 35.00 | MV11 | Limestone | 1.092 | -24.86 |
| 34.00 | MVC7 | Limestone | 0.310 | -23.65 |
| 34.00 | MMV 32 | Limestone | 0.389 |   |
| 33.50 | MMV 33 | Limestone | 0.891 |   |
| 32.00 | MVV4 | Limestone | 0.367 |   |
| 31.00 | MVC6 | Limestone | 0.215 | -25.60 |
| 30.50 | MV7 | Limestone | 0.323 | -24.83 |
| 29.00 | MVC 5 | Limestone | 0.218 | -26.29 |
| 28.00 | MV 6 | Marlstone | 0.564 | -28.10 |
| 27.00 | MV 5 | Marlstone |   | -25.48 |
| 24.50 | MVC4 | Limestone | 0.205 | -24.83 |
| 23.00 | MVV 2 | Marlstone | 0.318 | -23.13 |
| 22.00 | MV 1 | Marlstone | 0.388 | -24.87 |
| 21.00 | V7 | Marlstone | 0.246 | -22.47 |
| 19.00 | V8 | Limestone | 0.230 |   |
| 18.50 | MVC 3 | Limestone | 0.231 | -26.77 |
| 18.00 | V9 | Limestone | 0.294 | -24.77 |
| 17.50 | V10 | Limestone | 0.145 |   |
| 16.50 | MVVR | Limestone | 0.321 | -25.17 |
| 15.00 | V11 | Limestone | 0.161 |   |
| 14.00 | V12 | Limestone | 0.298 | -26.14 |
| 13.50 | MVC 2 | Limestone | 0.205 | -26.01 |
| 11.00 | V13 | Limestone | 0.313 | -27.40 |
| 9.00 | V14 | Limestone | 0.313 | -26.61 |
| 8.00 | MVC1 | Limestone | 0.198 | -24.60 |
| 7.00 | V6 | Limestone | 0.289 | -25.35 |
| 6.00 | V5 | Limestone | 0.211 | -26.11 |
| 4.00 | V4 | Marlstone | 0.226 | -25.25 |
| 3.00 | V3 | Marlstone | 0.298 |   |
| 1.50 | V2 | Marlstone | 0.260 |   |
| 1.00 | V1 | Marlstone | 0.205 | -26.31 |

Madonna del Sirino

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **m** | **sample** | **Lithology** | **TOC%** | ***δ13C*org** |
| 77.50 | MS 61 | Limestone | 0.531 | -20.26 |
| 76.00 | MS 56 | Limestone | 0.295 | -24.95 |
| 73.50 | MS 53 | Limestone | 0.694 |   |
| 72.25 | MS 52 | Limestone | 0.103 | -26.37 |
| 67.50 | MS 49 | Silicificated limestone | 0.207 | -27.01 |
| 67.00 | MS 48 | Silicificated limestone |   | -22.36 |
| 66.20 | MSSS 24 | Silicificated limestone |   | -25.66 |
| 66.00 | MS 46 | Silicificated limestone | 0.178 |   |
| 65.00 | MSSS 23 | Silicificated limestone |   | -24.72 |
| 64.70 | MS 45 | Silicificated limestone | 0.309 | -25.30 |
| 64.50 | MS 42 | Silicificated limestone |   | -24.46 |
| 63.80 | MS 40 | Silicificated limestone | 0.097 | -25.76 |
| 63.00 | ms 39 | Limestone |   | -24.75 |
| 62.50 | ms 37 | Limestone |   | -23.14 |
| 62.00 | ms 35 | Limestone |   | -21.83 |
| 61.50 | MS 33b | Limestone | 0.147 | -25.10 |
| 60.50 | MS 30 | Limestone | 0.082 |   |
| 59.75 | MS 29 | Limestone | 0.098 |   |
| 59.00 | MS SS 17.1 | Limestone | 0.282 |   |
| 58.00 | MS 28 | Silicificated limestone | 0.856 | -25.03 |
| 57.00 | MS 26 | Silicificated limestone | 0.076 |   |
| 55.75 | MS 24 | Silicificated limestone | 0.173 | -25.42 |
| 54.50 | MS 22 | Silicificated limestone | 0.364 | -26.20 |
| 53.75 | MS 21 | Silicificated limestone | 0.301 | -24.03 |
| 52.00 | MS 20 | Silicificated limestone | 0.179 | -30.35 |
| 50.00 | MS 19 | Silicificated limestone | 0.304 | -25.66 |
| 49.00 | ms 17 | Silicificated limestone |   | -22.62 |
| 49.00 | MS SS 49 | Silicificated limestone |   |   |
| 47.50 | ms 16 | Limestone |   | -22.42 |
| 47.00 | MS SS 47 | Silicificated limestone | 0.147 | -25.99 |
| 46.00 | MS SS 46 | Silicificated limestone | 0.188 | -26.26 |
| 42.00 | MS CS 42 | Silicificated limestone | 0.051 | -26.72 |
| 39.00 | MS CS 39 | Limestone | 0.068 | -26.97 |
| 33.00 | MS SS 33 | Limestone | 0.395 | -24.77 |
| 31.0 | msss 31 | Limestone |   | -27.05 |
| 29.00 | MS SS 29 | Marlstone | 0.109 | -24.62 |
| 28.50 | ms 7 | Marlstone |   | -24.90 |
| 27.50 | ms 8 | Marlstone |   | -24.55 |

***Duration of isotopic excursions in Pignola-Abriola section (age model by Maron et al. 2015)***

Duration of isotopic excursions has been calculated by applying the age model proposed by Maron et al. (2015) on the Pignola-Abriola section. This model calculates the average accumulation rates of the Pignola-Abriola section, based on the magnetostratigraphic correlation with the Newark APTS. The sedimentation rate raises from 2.6 m/My (from 0 to 25.6 m) to 5.6 m/My (from 25.6 to 41.2 m), leading to a dramatic increase to 9.8 m/My up to the end of the section. The values of the sedimentation rate are very low, but acceptable for a pelagic basin. The increase in sediment supply coincides with an increase in siliciclastic fraction and the deposition of more shale, marl and marly limestone levels (Maron et al., 2015). The formulae applied for the age estimation are:

1. from 0 to 25.6 m: Age = -0.371\*meter + 217.89
2. from 25.6 to 41.6 m: Age = -0.1702\*meter + 212.89
3. over 41.6 m: Age = -0.1017\*meter + 210.09

For more detailed on the model construction and applications, please refer to Maron et al. (2015).