**Table 1**. *AFTA data, sample details and associated thermal history interpretations; southernmost Norway*

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| Samplenumber | Lat/Long | Stratigraphicdivision | Strati-graphic Age\*1(Ma) | Elevation(m asl) | D\*2(106tracks/cm2) | s\*2(106tracks/cm2) | i\*2(106tracks/cm2) | P(2) \*3(%)(no. ofgrains) | Fission track age\*4(Ma) | Meantracklength\*5(μm) | StdDev\*6(μm) | Thermal history constraints\*7 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| GC361-21 | 59.142/5.250 | Caledonian | ~400 | 5 | 1.403 (4414) | 0.652 (336) | 1.007 (519) | 5(20) | 155.7 ± 15.3\* | 13.1 ± 0.6 (14) | 2.07 | >110°C, 226-156 Ma78-100°C, 180-60 Ma28-78°C,75-0 Ma |
| GC361-22 | 58.778/5.375 | Silurian | 439-409 | 10 | 1.413 (4414) | 3.150 (1792) | 3.379 (1922) | 10(20) | 228.5 ± 8.9 | 13.1 ± 0.2 (106) | 1.74 | >110°C, >263 Ma91-104°C, 255-177 Ma52-65°C, 75-0 Ma |
| GC361-25 | 60.372/5.300 | Precambrian | 570 | 15 | 1.445 (4414) | 1.000 (636) | 1.510 (961) | 24(20) | 166.7 ± 9.2 | 13.6 ± 0.2 (80) | 1.41 | >110°C ,207-168 Ma74-100°C.186-23 Ma40-60°C,78-0 Ma |
| GC361-71 | 60.372/5.300 | Precambrian basement | >542 | -800 | 1.490 (2351) | 0.423 (309) | 0.656 (479) | 2(25) | 162.8 ± 19.1\* | 11.9 ± 0.3 (18) | 1.46 | >100°C, 251-176 Ma73-105°C, 232-133 Ma65-89°C, 69-0 Ma |
| GC361-72 | 60.372/5.300 | Precambrian basement | >542 | -1480 | 1.499 (2351) | 1.988 (249) | 2.683 (336) | 79(4) | 193.4 ± 16.8 | 10.3 ± 0.8 (19) | 3.47 | >110°C, >333 Ma97-102°C, 202-52 Ma55-82°C, 62-0 Ma |
| GC361-73 | 58.929/5.705 | Precambrian basement | >542 | 0 | 1.508 (2351) | 1.726 (1382) | 1.974 (1580) | <1(20) | 225.5 ± 16.2\* | 13.4 ± 0.2 (115) | 1.70 | >110°C, 411-277 Ma97-106°C, 255-195 Ma55-70°C, 104-25 Ma |
| GC361-74 | 59.049/6.578 | Precambrian basement | >542 | 75 | 1.517 (2351) | 3.412 (979) | 4.610 (1323) | <1(20) | 204.2 ± 14.5\* | 12.9 ± 0.2 (101) | 1.76 | >110°C, 305-215 Ma89-103°C, 230-164 Ma60-74°C, 85-21 Ma |
| GC361-75 | 59.049/6.578 | Precambrian basement | >542 | 440 | 1.527 (2351) | 0.644 (600) | 0.849 (791) | <1(20) | 197.3 ± 17.1\* | 13.0 ± 0.1 (106) | 1.33 | >110°C, 259-209 Ma69-96°C, 231-81 Ma42-65°C, 39-0 Ma |
| GC361-76 | 59.049/6.578 | Precambrian basement | >542 | 990 | 1.536 (2351) | 2.644 (1674) | 3.226 (2042) | 2(20) | 220.3 ± 10.3\* | 13.5 ± 0.2 (116) | 1.63 | >110°C, >234 Ma82-104°C, 244-177 Ma45-63°C, 102-0 Ma |

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| GC970-31 | 59.882/8.452 | Precambrian basement | >542 | 1227 | 1.413 (2221) | 0.735 (560) | 0.781 (595) | 76(20) | 251.4 ± 16.0 | 14.4 ± 0.1 (99) | 1.14 | >102°C, 305-227 Ma49-81°C, 263-151 Ma<50°C, 151-0 Ma |
| GC970-32 | 59.902/8.497 | Precambrian basement | >542 | 1046 | 1.416 (2221) | 1.422 (1013) | 1.680 (1197) | <1(20) | 230.0 ± 15.0\* | 13.3 ± 0.1 (111) | 1.21 | >102°C, 274-231 Ma59-83°C, 248-38 Ma10-63°C, 73-0 Ma |
| GC970-33 | 59.888/8.586 | Precambrian basement | >542 | 866 | 1.419 (2221) | 0.857 (349) | 1.203 (490) | 70(14) | 191.9 ± 14.2 | 13.8 ± 0.1 (106) | 1.21 | >104°C, 252-178 Ma48-72°C, 172-32 Ma10-62°C, 116-0 Ma |
| GC970-34 | 59.883/8.588 | Precambrian basement | >542 | 656 | 1.422 (2221) | 1.545 (909) | 1.992 (1172) | 23(20) | 209.1 ± 10.5 | 13.3 ± 0.1 (109) | 1.26 | >110°C, 257-216 Ma69-90°C, 227-122 Ma39-57°C, 40-0 Ma |
| GC970-35 | 69.882/8.594 | Precambrian basement | >542 | 433 | 1.425 (2221) | 0.836 (429) | 1.396 (716) | 4(20) | 163.8 ± 13.1\* | 13.2 ± 0.1 (105) | 1.25 | >103°C, 217-159 Ma59-70°C, 59-10 Ma |
| GC970-71 | 58.383/6.058 | Precambrian basement | >542 | 5 | 1.506 (2265) | 0.129 (24) | 0.177 (33) | 100 (20) | 205.1 ± 55.3 | 13.8 ± 0.2 (2) | 0.28 | >100°C, 435-37 Ma |
| GC970-72 | 58.341/6.347 | Precambrian basement | >542 | 152 | 1.516 (2265) | 0.649 (109) | 0.863 (145) | 94(20) | 213.2 ± 27.6 | 13.5 ± 0.2 (49) | 1.08 | >110°C, 297-183 Ma40-100°C, 183-40 Ma46-64°C, 67-0 Ma |
| GC970-73 | 58.226/7.010 | Precambrian basement | >542 | 225 | 1.299 (2048) | 1.807 (407) | 1.980 (446) | 100 (20) | 221.6 ± 16.3 | 13.3 ± 0.1 (101) | 1.34 | >110°C, 286-218 Ma69-93°C, 236-79 Ma31-65°C, 66-0 Ma |

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| GC970-74 | 59.893/73274 | Precambrian basement | >542 | 47 | 1.299 (2048) | 0.874 (116) | 1.039 (138) | 100 (20) | 204.5 ± 26.3 | 13.5 ± 0.1 (100) | 1.21 | >106°C, 296-158 Ma??? , ???49-62°C, 66-0 Ma |
| GC970-75 | 58.201/7.93 | Precambrian basement | >542 | 32 | 1.300 (2048) | 0.433 (147) | 0.515 (175) | 90(20) | 204.4 ± 23.5 | 12.6 ± 0.2 (86) | 1.56 | >110°C, 317-201 Ma86-100°C, 258-132 Ma55-65°C, 32-0 Ma |
| GC970-76 | 58.339/7.811 | Precambrian basement | >542 | 229 | 1.300 (2048) | 2.046 (354) | 2.074 (359) | 38(20) | 239.3 ± 19.0 | 12.8 ± 0.1 (100) | 1.26 | >110°C, 325-243 Ma69-94°C, 281-33 Ma28-69°C, 48-0 Ma |
| GC970-77 | 58.537/7.777 | Precambrian basement | >542 | 199 | 1.300 (2048) | 3.528 (957) | 4.332 (1175) | 33(20) | 198.3 ± 10.1 | 12.8 ± 0.1 (100) | 0.99 | >103°C, 260-205 Ma62-82°C, 250-0 Ma62-70°C, 30-0 Ma |
| GC970-78 | 57.717/7.825 | Precambrian basement | >542 | 197 | 1.301 (2048) | 0.914 (188) | 0.894 (184) | 97(20) | 247.9 ± 26.5 | 12.7 ± 0.2 (101) | 1.51 | >110°C, 351-235 Ma68-82°C, 198-38 Ma20-67°C, 50-0 Ma |
| GC970-79 | 58.853/7.740 | Precambrian basement | >542 | 220 | 1.301 (2048) | 0.731 (232) | 0.741 (235) | 76(20) | 239.7 ± 23.1 | 12.9 ± 0.1 (100) | 1.39 | >110°C, 335-234 Ma71-92°C, 284-88 Ma40-67°C, 59-0 Ma |
| GC970-80 | 59.018/7.553 | Precambrian basement | >542 | 229 | 1.301 (2048) | 0.712 (240) | 0.934 (315) | 93(20) | 185.8 ± 16.7 | 13.0 ± 0.1 (99) | 1.40 | >110°C, 256-183 Ma73-97°C, 226-74 Ma42-70°C, 72-0 Ma |
| GC970-81 | 59.129/7.512 | Precambrian basement | >542 | 297 | 1.301 (2048) | 0.096 (29) | 0.146 (44) | 98(20) | 161.1 ± 38.8 | 12.4 ± 0.6 (15) | 2.36 | >110°C, >133 Ma81-105°C, 270-43 Ma38-91°C, 153-0 Ma |
| GC970-82 | 58.580/8.156 | Precambrian basement | >542 | 197 | 1.302 (2048) | 0.739 (207) | 0.843 (236) | 100 (20) | 213.6 ± 21.1 | 13.4 ± 0.2 (38) | 1.54 | >110°C, 294-201 Ma74-100°C, 262-136 Ma38-68°C, 123-0 Ma |
| GC970-83 | 58.507/8.564 | Precambrian basement | >542 | 79 | 1.302 (2048) | 2.169 (628) | 3.043 (881) | 28(20) | 174.1 ± 10.2 | 12.5 ± 0.1 (103) | 1.34 | >110°C, >189 Ma68-112°C, 222-19 Ma65-75°C, 40-0 Ma |
| GC970-84 | 58.850/9.397 | Precambrian basement | >542 | 26 | 1.302 (2048) | 3.766 (647) | 4.272 (734) | 98(20) | 214.7 ± 12.9 | 14.0 ± 0.1 (100) | 1.05 | >130°C, 263-200 Ma??? , ???48-70°C, 93-0 Ma |

\*1 All numerical values for stratigraphic ages assigned following Gradstein et al. (2012).

\*2 s = spontaneous track density. i = induced track density. D = glass dosimeter track density. Numbers in parentheses show the number of tracks counted. Numbers in parentheses show the number of tracks counted in determining all track densities.

\*3 Probability that all single grain ages belong to a single population (Galbraith, 2005).

\*4 Central age (Galbraith, 2005), used for samples containing a significant spread in single grain ages (P(2)<5%), otherwise the pooled age is quoted. All ages were calculated using the zeta calibration approach of Hurford & Green (1983), using zeta values for CN5 glass of 385.5±4.3 (samples GC970-21 to 35); 392.9±7.4 (samples GC970-36); 380.4±5.7 (samples GC970-71 to 84). All errors quoted at ± 1. All analytical details are as described by Green (1986), with the exception that thermal neutron irradiations for this study showed a significant flux gradient, and the appropriate value of D for each sample was determined by linear interpolation through the stack of grain mounts. Cl contents were determined as described in the text.

\*5 Numbers in parentheses show the number of track lengths measured.

\*6 Standard deviation of the track length distribution.

\*7 Thermal history solutions derived from AFTA data based on assumed heating and cooling rates of 1°C/Ma and 10°C/Ma, respectively. Quoted ranges correspond to correspond to ±95% confidence limits on maximum/peak paleotemperature and onset of cooling in discrete episodes of heating and cooling. Text colour is coded to regional cooling events in Figure 9 (Orange: Palaeozoic event. Blue: Middle Triassic event. Green: Middle Jurassic event. Brown: early Miocene event). Constraints that are not consistent with the preferred timing for the major regional events are highlighted with a yellow background.

**References**

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