**Supplementary Table 3: OSL dating dose rate data, equivalent dose (De), overdispersion (OD) values, and ages.**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sample name** | **Moisture content** | **Dose rates (Gy/ka)** | | | **Total dose rate** | ***D*e** | **Number of aliquots or** | **Age model** | **OD** | **OSL age** |
|  | **(%)** | **Betaa** | **Gammab** | **Cosmicc** | **(Gy/ka)d** | **(Gy)** | **grains** | **(%)** | **(ka)e** |
| **Crevice Cave** | | | | | | | | | | |
| 46608 | 5 ± 2 | 0.41 ± 0.01 | 0.39 ± 0.01\* | 0.04 ± 0.01 | 0.87 ± 0.02 | 77 ± 2 | 90/1000 | CAM | 17 ± 3 | 88 ± 3 |
| 46618 | 5 ± 2 | 0.36 ± 0.03 | 0.30 ± 0.01\* | 0.02 ± 0.01 | 0.72 ± 0.03 | 104 ± 3 | 35/48 | CAM | 16 ± 3 | 144 ± 7 |
| 46617 | 5 ± 2 | 0.38 ± 0.01 | 0.32 ± 0.02\* | 0.04 ± 0.01 | 0.77 ± 0.02 | 96 ± 3 | 118/800 | CAM | 16 ± 3 | 124 ± 5 |
| 46619 | 5 ± 2 | 0.48 ± 0.01 | 0.42 ± 0.03\* | 0.02 ± 0.01 | 0.96 ± 0.02 | 139 ± 5 | 18/24 | CAM | 5 ± 6 | 145 ± 6 |
| 46621 | 5 ± 2 | 0.38 ± 0.01 | 0.33 ± 0.02\* | 0.03 ± 0.01 | 0.78 ± 0.02 | 99 ± 5 | 24/24 | CAM | 14 ± 3 | 127 ± 6 |
| 46606 | 5 ± 2 | 0.38 ± 0.01 | 0.36 ± 0.01\* | 0.02 ± 0.01 | 0.80 ± 0.02 | 102 ± 3 | 24/24 | CAM | 9 ± 3 | 127 ± 5 |
| 50103A | 5 ± 2 | 0.32 ± 0.02 | 0.27 ± 0.01\* | 0.02 ± 0.01 | 0.64 ± 0.03 | 81 ± 4 | 24/24 | CAM | 18 ± 4 | 126 ± 8 |
| 50103B | 5 ± 2 | 0.32 ± 0.02 | 0.27 ± 0.01\* | 0.02 ± 0.01 | 0.64 ± 0.03 | 83 ± 3 | 24/24 | CAM | 11 ± 3 | 130 ± 7 |
| 20702 | 5 ± 2 | 0.38 ± 0.03 | 0.30 ± 0.03$ | 0.06 ± 0.01 | 0.78 ± 0.04 | 73 ± 2 | 24/24 | CAM | 12 ± 3 | 94 ± 6 |
|  |  |  |  |  |  |  |  |  |  |  |
| **PP29** |  |  |  |  |  |  |  |  |  |  |
| 46744 | 10 ± 3 | 0.25 ± 0.02 | 0.26 ± 0.01# | 0.05 ± 0.01 | 0.59 ± 0.03 | 65.5 ± 2.4 | 24/24 | CAM | 14 ± 3 | 110.8 ± 6.8 |
| 142824 | 5 ± 1 | 0.90 ± 0.03 | 0.64 ± 0.03# | 0.16 ± 0.02 | 1.72 ± 0.05 | 146.1 ± 7.3 | 21/24 | CAM | 16 ± 5 | 85.0 ± 5.2 |
| 142825 | 5 ± 1 | 0.50 ± 0.02 | 0.41 ± 0.02# | 0.11 ± 0.02 | 1.04 ± 0.04 | 95.7 ± 6.6 | 22/24 | CAM | 26 ± 6 | 91.8 ± 7.3 |
| 142826 | 5 ± 1 | 0.42 ± 0.02 | 0.42 ± 0.02# | 0.14 ± 0.02 | 1.01 ± 0.04 | 74.0 ± 4.7 | 21/24 | CAM | 25 ± 5 | 73.4 ± 5.5 |
| 353068 | 10 ± 3 | 0.71 ± 0.03 | 0.75 ± 0.04$ | 0.07 ± 0.01 | 1.56 ± 0.06 | 68.5 ± 3.3 | 23/24 | CAM | 23 ± 4 | 44.0 ± 2.8 |
| 62.7 ± 2.4 | 104/1000 | CAM | 27 ± 4 | 40.3 ± 2.3 |

a Measurements made on sub-samples of dried, homogenised and powdered samples by GM-25-5 beta counting. Dry dose rates calculated were adjusted for water content and corrected for grain size.

b Gamma dose-rates were derived from High resolution gamma spectrometry HRGS (\*), in situ gamma spectrometry (#) or TSAC ($). Dry dose rates calculated were adjusted for water content.

c Cosmic dose rates have been calculated using the equations provided by (Prescott and Hutton, 1994) taking into account the latitude (-34.1 °S), longitude (22.1 °E) and altitude (18 m). We have also accounted for the different densities of the overlying roof thickness (2.5 g/cm3; sandstone) and sediment (2.0 g/cm3) and for the cos2 *Φ*-zenith angle dependence (see (Smith et al., 1997)) as well as the changing overburden of dune sands through time. Dry dose rates calculated were also adjusted for the water content (expressed as % dry mass of sample) (see (Readhead M.L., 1987)). Assigned relative uncertainty of ± 10%.

d Includes assumed internal alpha dose rate of 0.03 ± 0.01 Gy ka-1.

e Weighted mean ± total uncertainty (68% confidence interval), calculated as the quadratic sum of the random and systematic uncertainties.