**Supplementary material 1: U-Th dating of calcite**

**Method and results**

The protocol used for the U/Th dating of calcite is described in Pons-Branchu et al., (2014). Ages of calcite corrected for inherited 230Th are 8300 ± 137 and 4288 ± 260 yr BP (Table 1).

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Lab****Code** | **Sample**  | **[238U]ppm** | **[232Th]ppb** | **234UM(‰)** | **(230Th/238U)** | **(230Th/232Th)** | **Age (ka BP)** | **234UT(‰)** | **Age (ka BP) corr. Det** |
| 5695- | Cosquer 30 # 2N | 0.202 | ±0.0001 | 0.760 | ±0.001 | 26.042 | ±0.83 | 0.077 | ±0.0003 | 62.56 | ±0.22 | 8.497 | ±0.039 | 26.664 | ±0.849 | 8.300 | ±0.137 |
| 5694- | Cosquer 27 # 1N | 0.169 | ±0.0001 | 1.431 | ±0.005 | 23.607 | ±1.00 | 0.044 | ±0.0004 | 16.49 | ±0.15 | 4.711 | ±0.048 | 23.899 | ±1.010 | 4.288 | ±0.260 |

Table 1: isotopic ratios and U-Th ages for the two speleothems sampled in Cosquer cave.

238U/230Th, 234U/238U are expressed as 234U. Ages are corrected for inherited 230Th, assuming 238U–234U–230Th at secular equilibrium and value of 232Th/238U=1.5 +/- 50%. They are expressed as year before 1950.

234U = ((234U/238U) – 1) x 1000 and 234UT is the initial value, calculated using the 230Th-U age.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Lab****code** | **Sample**  | **[238U]ppm** | **[232Th]ppb** | **234UM(‰)** | **(230Th/238U)** | **(230Th/232Th)** | **Age (ka BP)** | **234UT(‰)** | **Age (ka BP) corr. Det** |
| 5695- | Cosquer 30 # 2N | 0.202 | ±0.0001 | 0.760 | ±0.001 | 26.042 | ±0.83 | 0.077 | ±0.0003 | 62.56 | ±0.22 | 8.497 | ±0.039 | 26.664 | ±0.849 | 8.300 | ±0.137 |
| 5694- | Cosquer 27 # 1N | 0.169 | ±0.0001 | 1.431 | ±0.005 | 23.607 | ±1.00 | 0.044 | ±0.0004 | 16.49 | ±0.15 | 4.711 | ±0.048 | 23.899 | ±1.010 | 4.288 | ±0.260 |