Supplementary information for:

Flow regime evolution of a major cave system in the Eastern Alps (Hirlatzhöhle, Dachstein)

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Speleothem dating

Dating of A flowstone (HI-2) overgrowing a ceiling scallop was selected for U/Th dating to provide a maximum age for the phreatic speleogenetic phase of Hirlatzhöhle. Sixty mg of calcite was drilled in a laminar flowhood. The sample was chemically prepared at the Xian Jiaotong University (China). Chemical separation of U and Th was done following procedures adapted from Edwards et al. (1987). The separated U and Th fractions were analysed on a multi-collector inductively coupled mass-spectrometer following the procedure described in Cheng et al. (2013). 2σ uncertainties for U and Th isotopic measurements incorporate offline and incorporate corrections for blanks, multiplier dark noise, abundance sensitivity, and contents of the same nuclides in the spike solution. Decay constants used for ^{230}Th and ^{234}U are reported in Cheng et al. (2013).

Supplementary Table S1. ^{230}Th dating results of HI-2. $\delta^{234}U = ([^{234}U/^{238}U]_{activity} - 1)\cdot 1000$. $\delta^{234}U_{initial}$ was calculated based on ^{230}Th age (t). i.e. $\delta^{234}U_{initial} = \delta^{234}U_{measured} \cdot e^{\lambda 234 \cdot t}$. Ages are reported as ka (thousand years) BP. i.e. before the year 1950. The errors are 2 sigma.

Sample	**^{238}U (ppb)**	**^{232}Th (ppt)**	**^{230}Th/^{232}Th (atomic x10^{-6})**	**δ^{234}U (measured)**	**^{230}Th/^{238}U (activity)**	**^{230}Th age (ka) (uncorr.)**
HI-2	43.3 ± 0.1	17140 ± 344	44 ± 1	37.8 ± 2.5	1.0514 ± 0.0049	> 600

References

Cheng, H., Lawrence Edwards, R., Shen, C.-C., Polyak, V.J., Asmerom, Y., Woodhead, J., Hellstrom, J., Wang, Y., Kong, X., Spötl, C., Wang, X., Calvin Alexander, E., 2013. Improvements in ^{230}Th dating, ^{230}Th and ^{234}U half-life values, and U–Th isotopic measurements by multi-collector inductively coupled plasma mass spectrometry. Earth Planetary Science Letters, 371–372, 82–91. https://doi.org/https://doi.org/10.1016/j.epsl.2013.04.006

Edwards, R.L., Chen, J.H., Wasserburg, G.J., 1987. ^{238}U–^{234}U–^{230}Th–^{232}Th systematics and the precise measurement of time over the past 500,000 years. Earth Planetary Science Letters, 81, 175–192. https://doi.org/https://doi.org/10.1016/0012-821X(87)90154-3