



Katerloch Cave (southern Austria): preliminary results of fast-growing Holocene and Eemian stalagmites

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Katerloch cave in the Styrian Karst Province near Graz is one of the most beautiful and abundantly decorated dripstone caves in Austria. The Fantasy Hall contains some 3,700 stalagmites alone, many of them several meters in length. Because of its location on the southern fringe of the Alps the climate of the area is characterized by a pronounced influence of Mediterranean air masses in addition to the prevailing Atlantic influence from the northwest.

The cave's speleothem decoration shows a clear dominance of stalagmites over stalactites. The overwhelming majority of stalagmites are of the candle-stick type, suggesting fast growth. Four (inactive) stalagmites were recovered and U/Th dated using MC-ICP-MS. Despite low U concentration (40-120 ppb), an improved chemical separation procedure resulted in age measurements with 2-sigma precisions of 1-2 %. Two Holocene speleothems of 73 and 139 cm length yielded ages between 10.28 ± 0.17 and 7.75 ± 0.10 kyr and 9.80 ± 0.24 to 7.88 ± 0.09 kyr, respectively. Preliminary age models suggest growth rates of 0.2 to 0.6 mm/yr, which are very high compared to Holocene stalagmites from other caves in the perialpine region.

We also obtained first results from two stalagmites of Last Interglacial age. From stalagmite K2 only the uppermost 55 cm were analyzed so far and yielded ages between 127.6 ± 1.9 and 125.3 ± 1.9 kyr. A fourth stalagmite (K4, 126 cm long) grew between 129.3 ± 2.0 and 127.6 ± 1.8 kyr. Age models inferred from these dating results suggest growth rates similar and even slightly higher than those of Holocene stalagmites.

Finally, U/Th dates measured on cores drilled near the base of clearly active stalagmites support the inferred high grow rates in Katerloch cave: a 3 m tall stalagmite

showed a basal age of 9.57 ± 0.16 kyr, and a 5.2 m high stalagmite yielded an age of 11.15 ± 0.13 kyr.

This preliminary set of internally consistent U/Th dates proves the existence of fast growing speleothems in Katerloch cave and opens the door for high-resolution palaeoenvironmental studies of interglacial climates in this region. One aspect that is of immediate interest is the small percentage of currently active dripstones in this cave hinting toward a major change in rainfall during the Holocene.