



## **Age dating of speleothems in Killavullen Caves, County Cork, Ireland.**

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The Killavullen Cave system is located underneath the townland of Killavullen in the Blackwater Valley of County Cork, Ireland. The cave entrance is located 50m above current sea level on the northern slopes of the Nagle Mountains inside the village of Killavullen and it extends between 0.5m and 5.0m below the surface. Several entrances to a series of caves can be seen c.10m above the present course of the Blackwater River. Killavullen Cave 1 is a collection four chambers of varying dimensions that are connected by narrow passageways, the total length of these chambers and passageways is approximately 200m. Killavullen Cave 2 and Killavullen Cave 3 are small caves that extend only 5m into the cliff face.

This cave system was investigated to determine the processes that controlled its formation and using the sediments and speleothems within the cave system to provide a history of the external environment in the Blackwater Valley. Both sediment and speleothems were sampled at this cave system and the stratigraphy of the deposit was determined from trenches and other excavations within the caves. The basic stratigraphy of the cave system is flowstone unit in contact with the bedrock floor overlain by sediments, then another flowstone unit, further sediments and a top layer of flowstone capping the top of the sequence. The total depth of sediment/flowstone is c.1.0-1.2m depending on what section of the exposure is measured.

The lower flowstones are c.30cm in thickness with the middle and upper units c.3cm in thickness. The lower most flowstones are coarse elongate crystals, while the middle and upper units are distinctly different and are very fine grained with a large amount of blackened woody material preserved within them. The age dates for the

flowstones here have been provided by radiocarbon AMS dating and they are as follows:  $>47000\text{BP}$  for the lowest unit,  $9710\pm 60\text{ BP}$  for the middle unit and  $9030\pm 60\text{ BP}$  for the upper most unit of flowstone. A large stalagmite, which has been denoted as KVL1, was also collected from this site. This stalagmite is c.87cm in height with a diameter at its base of 12cm. Radiocarbon dating and U/Th has also been carried out on a stalagmite from the Killavullen caves and this data will also be presented.

Analysis of the sediment in the interbedded units show that 98% of the sediment in each horizon is in the  $\leq 64\mu\text{m}$  grain fraction and the layering within the sedimentary units is only 1-2mm on average. This suggests that at least part of the intervening periods between the formation of the flowstones had silt and mud laden waters entering the cave and settling out there. The contact between the sediments and the flowstones is not sharp. Sands indurated with a calcite cement form a zone of 2-3cm at the bases and tops of the flowstones.