



Palaeoclimate reconstruction in the Levant region from the petrographic and growth rate of a MIS 5 stalagmite from the Kanaan cave, Lebanon

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Mount Lebanon consists mainly of carbonate rocks which contain numerous caves with an abundance of well-preserved speleothem deposits. A 23 cm long stalagmite (K1-2010) was obtained from Kanaan cave, situated just north of Beirut within the western flank of central Mount Lebanon at 100 m altitude. To develop an age model for the speleothem, a suite of uranium series (U-Th) dates was performed in the NERC Isotope Geosciences Laboratory at the British Geological Survey.

The speleothem displays two main segments: The lower segment (segment 1) is 8.2 cm long and displays a general growth axis varying from 8.5 cm diameter in the lower part to 6 cm in its middle part. This segment grew from at least 129.7 ± 0.8 ka to 111.8 ± 0.7 ka. Several hiatuses are observed and are probably linked to detrital layers. The higher segment (segment 2) is 12.3 cm long and displays a thinner diameter varying from 6.5 to 4 cm at its topmost part. This segment grew continuously from 102.5 ± 0.96 to 85.3 ± 0.8 ka. The lower segment, deposited during S-5 event in the Eastern Mediterranean (128-117 ka) shows growth rates reaching 0.15 cm/100 yr coinciding with enhanced rainfall events in speleothem records from the Southern Levant during the S-5 event as suggested by Frumkin (1999) and Bar-Mathews (2003). Speleothem growth stopped between 103.5 and 109 ka and the growth axis rotated. The higher segment shows a more moderate growth rate (0.09 cm/100 yr) until 100 ka, corresponding to low $\delta^{18}\text{O}$ values in speleothems from Peqiin and Soreq caves and thus to enhanced rainfall events. Very low growth rates (0.03 to 0.06 cm/100 yr) from 100 to 85 ka are associated with colder climates during the latter part of MIS5 subsequent to the S-5 event. This stalagmite demonstrates the palaeoclimatic potential of speleothem records in the northern Levant region.