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The consistency of high-resolution trace-elements records for the mid-Holocene period from Qadisha cave, Lebanon.

Carole Nehme (1), Tobias Kluge (2), Sophie Verheyden (3), Hai Cheng (4), Lawrence Edwards (5), and Fadi Nader (6)

(1) University of Rouen, IDEES Laboratory UMR 6266 CNRS, Department of Geography, France (carole.nehme@univ-rouen.fr), (2) Heidelberg University, Institute of environnemental Physics, Heidelberg, Germany, (3) Department of Earth and History of Life, Royal Institute of Natural Sciences (RBINS), Brussels, Belgium, (4) Institute of Global Environmental Change, Xi'an Jiaotong University, Xi'an, China, (5) Department of Earth Sciences, University of Minnesota, Twin Cities, Minneapolis, Minnesota, USA, (6) IFP Energies Nouvelles, Rueil-Malmaison, France,

Since 2005 studies on speleothems have been undertaken in Lebanon, aiming at reconstructing the paleoclimate in this special location of the Levant region. Lebanon is located in Central-Levant and presents a strong topographical & microclimate variability between the coast, the Mount-Lebanon range & the inner Bekaa plain. Paleoclimate studies published in the last years (Nader et al, 2007; Verheyden et al, 2008) on Jeita cave (l100 m asl) cover the Holocene period on a centennial scale (Cheng et al, 2015). The Jeita speleothem shows that northern Levant climate variability is dominated by a 500 year periodicity and that a persistent out-of-phase climate variability between the northern and southern Levant exists on a wide range of timescales when compared with other regional proxy records. To verify this interpretation, investigations were undertaken recently on speleothems from Qadisha cave located at 1720 m asl in northern Lebanon and conditioned by a high-mountain climate regime. Two stalagmites from Qadisha cave were retrieved in 2011 and 2014. Stalagmites Qad-1 covers the period from 6.482 $\pm$ 32 ka to 3.247 $\pm$ 127 ka BP 1950. The Qad-2 stalagmite is pre-dated and covers the period from 9.145 $\pm$ 21 to 5 $\pm$ 7 a BP 1950. Both Stalagmites were pre-screened using laser-ablation ICPMS to evaluate if periodic cycles (e.g. annual layers) are visible. Periodic variations of Mg/Ca, Sr/Ca, Ba/Ca and P/Ca suggest a climatic imprint that can be related to the layer thicknesses on the order of a few 10 μm to 100 μm. First U/Th dating together with the synchronicity of the elemental signals with the speleothem layering suggest an annual origin of the layering. This will be tested by further lamina counting combined with the U-Th dating. The elemental cycles can be used in the future to establish a yearly-resolved chronology with key ages provided by additional U/Th measurements and thus compared to the Jeita stalagmite record and other regional speleothem records (Palestine/Israel, Cyprus).