Geophysical Research Abstracts,
Vol. 10, EGU2008-A-10441, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-10441
EGU General Assembly 2008

A 9,200-year δ^{18}O record of a stalagmite from NW Romania

T. Tamas (1, 2), A.-V. Bojar (3), S. Constantin (4) and S.-E. Lauritzen (5)

(1) Dept. of Mineralogy, Babes-Bolyai University, Cluj-Napoca, Romania, (2) Emil Racovita Institute of Speleology, Cluj-Napoca, Romania, (3) Dept. of Geology and Paleontology, Karl-Franzens University, Graz, Austria, (4) Emil Racovita Institute of Speleology, Bucharest, Romania, (5) Dept. of Geology, University of Bergen, Norway (tudort@bioge.ubbcluj.ro/ Fax: +40 264-595954)

Uranium series dating and stable isotope analyses on a 20 cm long stalagmite from V11 cave (NW Romania) provide climate information for the last 9,200 years. The isotopic record partly overlaps two other stalagmite records from the same cave, but from a different passage and with different depositional features. V11 is a 1.2 km cave located in Bihor Mountains at 1,250 m asl, in an area with high average precipitation and low mean annual temperature. The present-day climate is predominantly influenced by west-northwest air masses.

The S139 stalagmite was active at the time of sampling, growing at about 20 m below the surface and at 30 m from the present cave entrance. Uranium series dating on relatively high-U samples (3.5 to 5 ppm) have shown a growth record from 9,257 $\pm$ 23 yr to present, with an age of 52 $\pm$ 3 yr BP obtained for a sample just under the top. A corrosional hiatus is recorded between 2,178 and 929 yr BP. The average growth rate for the stalagmite is 22 mm/kyr, with faster growth in the intervals 9,200 – 8,400 yr BP and 7,200 – 6,400 yr BP.

Samples for stable isotope analyzes were taken at 1 mm along the growth axis. δ^{18}O values range between -6.40 per mill and -8.25 per mill PDB, while δ^{13}C values vary between -3.5 per mill and -7.14 per mill PDB. Tests for equilibrium deposition show little correlation between δ^{18}O and δ^{13}C along the same “growth layers” and along most of the stalagmite growth axis, except for the uppermost 2 cm.

A comparison of the δ^{18}O values recorded in S139 with the two other stalagmite records from the same cave shows very similar values over the common growth period (9,200 – 5,600 yr BP). In the basal part of the stalagmite, colder periods indicated by lower δ^{18}O are recorded at 9,100, 8,200, 7,600 and 6,900 yr BP. Between 6,400 yr and 2,178 yr BP the δ^{18}O values show less variation, but this part also has the lowest growth rates recorded. In the upper part of the stalagmite (929 yr BP to present), a rapid increase of both δ^{18}O and δ^{13}C occurs at $\sim$700 yr BP and a strong co-variation exists between the two records. Calcite was deposited in disequilibrium on this interval most probably because of changes in the drip water route. This is supported by present-day flow-rate conditions, very high during rainy periods.