Geophysical Research Abstracts
Vol. 12, EGU2010-10454, 2010
EGU General Assembly 2010

A Holocene speleothem record from Morocco, NW Africa

Jasper Wassenburg (1), Jan Fietzke (2), Detlev Richter (1), and Adrian Immenhauser (1)

(1) Ruhr - University Bochum, Germany (jasper.wassenburg@rub.de), (2) IFM – Geomar, Kiel, Germany (jfietzke@ifm-geomar.de)

A well dated Holocene speleothem (stalagmite) from the Middle Atlas Mountains in Morocco has been investigated for its continental climate record. The aim is to compile an improved understanding of the climatically complex triple point of the North Atlantic, Mediterranean and Saharan / Monsoonal climate realms in NW Africa. At present, only few studies concerning continental climate reconstructions from NW Africa have been published (Lamb et al. 1995, Cheddadi et al. 1998, Genty et al. 2006). Given the significance of this region, this lack of data forms a strong motivation for additional, well dated climate records.

The speleothem (GP2) was sampled in the "Grotte de Piste" (ca 800 m above sea level), mean annual precipitation is about 930 mm (mainly falling in the winter season) and the mean annual temperature is about 13˚C. GP2 is 60 cm tall and grew – based on U/Th MC-ICP-MS data – continuously between 11.5 kyr BP (early Holocene) and 2.9 kyr BP (late Holocene). X-Ray Diffraction data indicate a mainly aragonitic mineralogy. "Hendy tests" suggest that $CaCO_3$ precipitation was close to isotopic equilibrium with respect to oxygen isotopes, however kinetic effects might have influenced carbon isotopes.

Carbon and oxygen isotope data have been measured along a transect with increments of approximately 1 mm representing a resolution of about 15 yrs. Highly covariant oscillations in $\delta^{13}C$ and $\delta^{18}O$ with an average cyclicity of about 410 yrs. are observed. These oscillations coincide with macroscopically visible high density and low density layers, possibly reflecting a higher or lower amount of inclusions and perhaps higher and lower growth rates.

Geochemical analysis of speloan aragonite is accompanied by cave monitoring that has started in November 2009. Parameters quantified include: drip water parameters, cave air humidity, $_pCO_2$ and cave air temperature. Precipitation experiments using watch glasses will also be performed.

References

Cheddadi, R., Lamb, H. F., Guiot, J., van der Kaars, S. 1998: Holocene climatic change in Morocco: a quantitative reconstruction from pollen data. Climate Dynamics, 14, 883-890

Genty, D., Blamart, D., Ghaleb, B., Plagnes, V., Causse, Ch., Bakalowicz, M., Zouari, K., Chikr, N., Hellstrom, J., Wainer, K., Bourges, F. 2006: Timing and dynamics of the last deglaciation from European and North African delta C-13 stalagmite profiles – comparison with Chinese and South Hemisphere stalagmites. Quaternary Science Reviews, 25, 2118-2142

Lamb, H. F., Gasse, F., Benkaddour, A., El Hamouti, N., van der Kaars, S., Perkins, W. T., Pearce, N. J., Roberts, C. N. 1995: Relation between century-scale Holocene arid intervals in tropical and temperate zones. Nature, 373, 134-137