Geophysical Research Abstracts,
Vol. 10, EGU2008-A-05960, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-05960
EGU General Assembly 2008

A multi-proxy study of an active subaqueous speleothem containing a 1 Ma palaeoclimate record

I. Couchoud (1), R.N. Drysdale (1); J.C. Hellstrom (2); G. Zanchetta (3); J. Woodhead (2); S. Frisia (1); A. Greig (2)

(1) Environmental and Climate Change Research Group, The University of Newcastle, Callaghan NSW 2308, Australia; (2) School of Earth Sciences, The University of Melbourne, Victoria 3010, Australia; (3) Department of Earth Sciences, University of Pisa, via Santa Maria 53, Pisa 56100, Italy

A 23-cm long core has been extracted from a subaqueous calcite mound growing on the floor of a pool in Corchia Cave (Italy). A low-resolution (1 mm-increment) stable isotope record from this core, coupled with six preliminary ^{234}U/^{230}Th and ^{234}U/^{238}U ages, suggests a continuous, or near-continuous, record of glacial-interglacial cycles extending back to $\sim$1 Ma. Here we present preliminary data on the petrographic, trace element and organic fluorescence composition of the calcite, which can be used to help support the interpretation of its δ^{18}O and δ^{13}C signal.

Due to its very slow mean growth rate (mean: $\sim$230 μm ky^{-1}), a particular focus is to assess its growth continuity. We attempt to evaluate the nature and origin of discontinuities (e.g. growth hiatuses, abrupt textural changes or detrital layers) through petrographic analysis and trace element mapping, and to differentiate these discontinuities from very slow growth episodes. In the case of hiatuses, we aim to find clues that may shed light on the duration of no-growth periods.

At the macroscopic scale, the core shows obvious cyclic variations of colour which broadly match oscillations in δ^{18}O and δ^{13}C. The texture appears relatively homogeneous except for the oldest ca. 6 cm of the deposit, where many alternations are present. Trace element mapping reveals vivid elemental variations in P, Sr, Ba, Mg and U, which more or less match visible lamination patterns on the polished section.

Organic UV-fluorescence data demonstrate a consistent pattern with $\delta^{13}C$, indicating strong control by variations in the flux of organic material associated with glacial-interglacial climate shifts.