Geophysical Research Abstracts,
Vol. 10, EGU2008-A-05940, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-05940
EGU General Assembly 2008

Towards a new radiometrically dated North Atlantic palaeoclimate record covering the last million years: preliminary results from Corchia Cave speleothems, Italy

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Continuous, well-dated palaeoclimate records extending beyond the limits of uranium-thorium dating ($\sim$500 ka) are now possible from speleothems following recent advances in uranium-lead (U-Pb) dating. Corchia Cave (NW Italy) contains some of the cleanest, high-uranium-concentration speleothems available (2-25 ppm), making them ideal for U-Pb dating. The speleothems grow in a region that lies in the path of mid-latitude westerlies crossing from the North Atlantic. Late Pleistocene speleothems from the cave show that stable isotope variations respond to changes in sea-surface temperatures, which are strongly controlled by the strength of meridional overturning circulation.

We present new multi-proxy data from several Corchia Cave speleothems which grew during the last 1 Ma. The longest and potentially most complete record is preserved in a 23-cm core recovered from an actively forming subaqueous calcite mound growing from the floor of a cave pool. Stable oxygen and carbon isotope ratios of this speleothem preserve every glacial-interglacial cycle back to 1 Ma. To supplement this

relatively low-resolution record, a stacked sequence of Corchia Cave stalagmites spanning virtually the entire 400 ka – 1 Ma period provide higher-resolution detail on palaeoclimate. Prominent stable isotope variations, anchored by U-Pb ages, provide new data on the timing of orbital-scale climate shifts (particularly glacial terminations and the progression of the Mid-Pleistocene Transition) and suggest the presence of DO- and Heinrich Event-like millennial-scale climatic oscillations during Early-Middle Pleistocene glacial stages.

These older Corchia speleothems are amongst the most promising terrestrial archives yet available for investigating long-term changes in North Atlantic palaeoclimate.