Geophysical Research Abstracts,
Vol. 11, EGU2009-12721, 2009
EGU General Assembly 2009

First results of precisely dated Last Glacial stalagmites from the northern part of the Alps: Chronological and regional considerations

R. Boch (1,2), H. Cheng (2), C. Spötl (1), R. L. Edwards (2), X. Wang (2), and P. Häuselmann (3)

(1) Institut für Geologie und Paläontologie, Universität Innsbruck, Austria (ronny.boch@uibk.ac.at), (2) Department of Geology and Geophysics, University of Minnesota, Minneapolis, USA, (3) Swiss Institute of Speleology and Karst Sciences SISKA, La Chaux-de-Fonds, Switzerland

In contrast to other sites on the European continent speleothems from the Alps match the oxygen isotope profile of Greenland ice cores precisely (Spötl & Mangini, EPSL 2002), thus offering the opportunity to compare and potentially refine the absolute chronology of this prominent high-latitude record using a common proxy. Key to success are samples with high U and low detrital Th contents. Stalagmites from three such cave sites in Austria (Klaus-Cramer Cave, Baschg Cave) and Switzerland (Siebenhengste cave system) are currently being studied using petrography, high-resolution stable isotope, and state-of-the-art U-Th techniques.

Results show that the time interval between Dansgaard-Oeschger (D-O) events 25 and 18 is well represented in these speleothems. Some growth phases of individual stalagmites overlap in time providing a test for internal reproducibility. The O isotope profiles show several pronounced shifts of up to 4 permil during these rapid D-O shifts which mimic those in Greenland, underscoring the common climate forcing of Greenland and the Alps by the North Atlantic. Greenland Interstadials (GIS) are well represented, reflecting the favourable climate conditions for speleothem growth during these times. Major Greenland Stadials (GS), however, are also recorded (e.g., GS 22, GS 19, GS 18), demonstrating that these caves were not frozen during these cold episodes. Even the fine structure of the O isotope profiles of Greenland on centennial to decadal time scales are recorded in remarkable detail in some of these samples.

Typical 2-sigma errors are in the range of 0.3 to 0.8 %, i.e. D-O events during the first half of the Last Glacial cycle can be dated to within a few hundred years. Implications for the absolute chronology of D-O events recorded in Greenland will be discussed.