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Timing of a dry event around 41 ka derived from U-Th dated high resolution stable isotopes and trace elements records in a Bahamian stalagmite

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We present a high resolution stable isotopes and trace elements record of a stalagmite from Sagittarius Cave, Grand Bahama. A robust chronology for the the stalagmite (GB89-25-3) has been obtained using MC-ICPMS U and Th isotope measurements with high spatial resolution using sample sizes of 50 – 150 mg. The distance-age model was obtained using a spline fit. The bottom section of GB89-25-3 grew between 44 and 28 ka ago, so far we analysed the part from 44 ka to 34 ka B.P. for trace elemental composition and stable isotopes using high resolution LA ICPMS techniques.

The profiles of stable isotope and trace element variations are indicative of the changing climate and/or recharge. We find that the δ^{13}C record together with Mg-, P- and U-concentrations are likely to be a proxy for changes between wetter and drier conditions in the Bahamas and suggest a major dry event at around 41 ka. This is probably related to the Heinrich event H4. We compare our data to archives from other locations such as Cariaco Basin (Peterson et al., 2000), the subtropical North Atlantic (Sachs and Lehmann, 1999) and Greenland icecore data (NGRIP members, 2004). Our data indicate a difference of the timing of H4 of more than 1000 a. Spectral analysis of the δ^{18}O record of GB89-25-3 shows one significant cycle of 1480 a, similar to the proposed 1470 a Dansgaard-Oeschger cycle found in Greenland icecores. The δ^{18}O record of GB89-25-3 can potentially be used to improve the NGRIP chronology using

an approach similar to that of Spötl et al. (in press). However, timing and duration of events found in our records are highly dependent on accurate and precise dating. We will therefore present and discuss details of the calibration of our U-Th measurement procedures as well as the application of a spline fit to derive a continuous chronology model for a stalagmite.

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