Geophysical Research Abstracts Vol. 13, EGU2011-3905, 2011 EGU General Assembly 2011 © Author(s) 2011



## A first Last Glacial Maximum to Younger Dryas stalagmite record from southern Portugal

Cristina Veiga-Pires (1), Bassam Ghaleb (2), Jean-François Hélie (2), Delminda Moura (1), Joaquim Luis (1), and Claude Hillaire-Marcel (2)

(1) Universidade do Algarve, FCT-CIMA, Faro, Portugal (cvpires@ualg.pt, +351289800069), (2) GEOTOP-UQAM-McGILL, Montreal, Canada

A newly launched research program permitted the sampling of speleothem deposit in the Algarve area (Southern Portugal) with the primary objective of constraining the ages of past humid intervals in the area from U-series measurements. A first 180 mm-long stalagmite has been analyzed. It yielded very small amounts of U ( $\sim$  20 ppb). Adding to the presence of a detrital "contaminating" fraction labelled by 232Th contents around 10 ppb, the subsequent lack of precision on 230Th measurements resulted in relatively large uncertainties for the calculation of the accretion chronology of this stalagmite. 14C-data however provide some complementary information. With some caveat about impacts of climatic changes on the U- vs 232Th-series systematics of the contaminating fraction, ages ranging  $\sim 20$  to  $\sim 10$  ka are estimated from the base to the top of the stalagmite. The set of ages indicate deposition from the Last Glacial Maximum (LGM) until the end of the YD, but for a precipitation gap matching possibly the Bølling-Allerød interval. Information about paleoclimate conditions during the two precipitation intervals was investigated using stable isotope measurements, following satisfying Hendy tests performed at three levels in the stalagmite. Accordingly, the deglacial sequence may be interpreted in relation with paleoclimate/paleovegetation conditions in the overlying environment. Carbon isotope values range from -9 to -7 ‰ (vs VPDB), and suggest a recharge with a soil CO2 composition intermediate between those of C4 and C3 plant covers. Oxygen isotope delta values range from -2 \% (vs VPDB), at the bottom, to -3 \% near the top of the stalagmite. From this preliminary study, we conclude that if more humid conditions during the LGM and cold deglacial stages indeed led to carbonate deposition in caves, they were not necessarily accompanied with drastically lower temperatures than at present.

## A first Last Glacial Maximum to Younger Dryas stalagmite record from southern Portugal

Cristina Veiga-Pires <sup>(1)</sup>, Bassam Ghaleb <sup>(2)</sup>, Jean-François Hélie <sup>(2)</sup>, Delminda Moura <sup>(1)</sup>, Joaquim Luis <sup>(1)</sup>, and Claude Hillaire-Marcel <sup>(2)</sup> <sup>(1)</sup> Universidade do Algarve, FCT-CIMA, Faro, Portugal (cvpires@ualg.pt, +351289800069), <sup>(2)</sup> GEOTOP-UQAM-McGILL, Montreal, Canada



Introduction: The newly launched SIPCLIP research project permitted the sampling of a stalagmite from "Gruta da Senhora" cave in the Algarve area (Southern Portugal) with the primary objective of constraining the ages of past humid intervals in the area from U-series measurements. The geological regional setting is characterized by limestones from the Late Jurassic (Kimmeridgian).

**U-series systematics:** A first 180 mm-long stalagmite (GS) has been analyzed. It yielded very small amounts of U (20 ppb). Adding to the presence of a detrital "contaminating" fraction labeled by <sup>232</sup>Th contents around 10 ppb, the subsequent lack of precision on <sup>230</sup>Th measurements resulted in relatively large uncertainties for the calculation of the accretion age of this stalagmite. However, a <sup>14</sup>C- measurement on a sample from 17-18 cm below the top of the stalagmite provides a complementary information: 21880 ± 370 yrs cal BP. Assuming no significant dead carbon contribution, then the authigenic <sup>230</sup>Th/<sup>234</sup>U ratio corresponding to this age can be calculated: 0.183, and used to correct for the detrital contamination of all the others samples.

Sample	Mean depth	<sup>234</sup> U/ <sup>238</sup> U		<sup>230</sup> Th/ <sup>234</sup> U		<sup>230</sup> Th Ages (ka)	
	below top (cm)	Uncorrected	Corrected	Uncorrected	Corrected	Uncorrected	Corrected
GSC 6.5-8	7.25	1.35±0.01	1.35±0.02	0.14±0.01	0.13±0.01	16.50±0.87	14.95±0.26
GSC 9-11	10.00	1.36±0.01	1.39±0.02	0.23±0.02	0.20±0.01	28.46±2.24	23.70±0.66
GSC 11.5-12.7	12.10	1.38±0.01	1.39±0.02	0.15±0.01	0.14±0.01	18.10±0.88	16.30±0.30
GSB 17-18	17.50	1.32±0.01	1.34±0.02	0.22±0.01	0.18±0.01	26.57±1.34	21.90±0.48



**U-series chronology:** The observed inversion of ages in sample GSC 9-11 is probably due to the very low amount of measured <sup>230</sup>Th (~10 pg) and high quantity of detrital <sup>232</sup>Th as shown on the greyscale profile. Accordingly, and with some caveat about impacts of climatic changes on the U- vs <sup>232</sup>Th-series systematics of the contaminating fraction, ages ranging 20 to 10 ka are estimated from the base to the top of the stalagmite. The set of ages indicate deposition from the Last Glacial Maximum (LGM) until the end of the YD, but for a precipitation gap matching possibly the Bølling-Allerød interval.

Stable isotopes systematics : Information about paleoclimate conditions during the two precipitation intervals was searched using stable isotope measurements, following satisfying Hendy tests performed at three levels in the stalagmite.



Stable isotopes measurements: The deglacial sequence may be interpreted in relation with paleoclimate/paleovegetation conditions in the overlying environment. Carbon isotope values range from -9 to -7 ‰ (vs VPDB), and suggest a soil  $CO_2$  composition intermediate between those of C4 and C3 plant covers. Oxygen isotope delta values range from -2 ‰ (vs VPDB), at the bottom, to -3 ‰ near the top of the stalagmite .



Conclusions: From this preliminary study, we conclude that if more humid conditions during the LGM and cold deglacial stages indeed led to carbonate deposition in caves, they were not necessarily accompanied with drastically lower temperatures than at present.

Acknowledgments: This work was realized under the SIPCLIP project (PTDC/AAC-CLI/100916/2008), financed by FEDER and OE, through Fundação para a Ciência e Tecnologia.

