Timing and dynamics of the last deglaciation from european and North African δ13C stalagmite profiles - comparison with chinese and South Hemiphere stalagmites

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Résumé:

The last deglaciation and its climatic events, such as the Bølling–Allerød (BA) and the Younger–Dryas (YD), have been clearly recorded in the δ13C profiles of three stalagmites from caves from Southern France to Northern Tunisia. The three δ13C records, dated by thermal ionization mass spectrometric uranium–thorium method (TIMS), show great synchroneity and similarity in shape with the Chinese cave δ18O records and with the marine tropical records, leading to the hypothesis of an in-phase (between 15.5 and 16 ka ±0.5 ka) postglacial warming in the Northern Hemisphere, up to at least 45°N. The BA tr ansition appears more gradual in the speleothem records than in the Greenland records and the Allerød seems warmer than the Bølling, showing here close similarities with other marine and continental archives. A North–South gradient is observed in the BA trend: it cools in Greenland and warms in our speleothem records. Several climatic events are clearly recognizable: a cooler period at about 14 ka (Older Dryas (OD)); the Intra-Allerød Cold Period at about 13.3 ka; the YD cooling onset between 12.7 and 12.9±0.3 ka. Similar to the BA, the YD displays a gradual climate amelioration just after its onset at 12.75±0.25 ka, up to the Preboreal, and is punctuated by a short climatic event at 12.15 ka. Even though the Southern Hemisphere stalagmite records seem to indicate that the postglacial warming started about 3 ka±1.8 ka earlier in New Zealand (41 °S), and about 1 to 2 ka earlier in South Africa (24.1 °S), large age uncertainties, e ssentially due to slow growth rates, make the comparison still perilous. The overall δ13C speleothem record seems to follow a baseline temperature increase controlled by the increase in insolation and punctuated by cold events possibly due to the N-America freshwater lake discharges.