



Speleothem record from Pentadactylos cave (Cyprus): high-resolution insight into climatic variations during MIS 6 and MIS 5

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An improved understanding of medium and short-term changes in temperature and rainfall in the East Mediterranean is necessary for a comprehensive description of the regional climate regime. In particular, it can help advancing current climate models and predictions. A new paleoclimate record from Cyprus gives new insights into climatic variations during MIS 6 and 5 for this region. A 66 cm long speleothem from Pentadactylos cave in the Kyrenia range (800 m asl) was extensively dated with the U/Th method and investigated for petrography, fluid inclusions, stable and clumped isotopes. The stalagmite grew from 174.6 ± 0.7 to 112.2 ± 0.5 ka BP. The growth rate varies from 31 to 5 mm/ka during the early-MIS6 and evolving from 123 to 18 mm/ka at the end-MIS6. The onset of MIS5e is marked by a high growth rate (125 mm/ka) until growth decreased drastically after 122 ka. Growth rate and stalagmite diameter as well as $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$ curves are positively correlated. We interpret the $\delta^{18}\text{O}_c$ signal as being controlled by effective infiltration and thus rainfall amount. Climate conditions during early-MIS6 were highly variable ($\delta^{18}\text{O}_c$) on a millennial-scale with several short-lived wet episodes during sapropel 6. From 141 to 132 ka, $\delta^{18}\text{O}_c$ suggests general dry/cold conditions with low bio-pedological activity, followed by a growth stop during H11. The $\delta^{18}\text{O}$ values during the Eemian wet period in Cyprus are driven by the source effect (sapropel 5). Stable conditions during MIS 5e were rather short: ~2 ka, as shown in the $\delta^{13}\text{C}$ signal. After 122 ka, a slow deterioration of the soil cover coupled with low rainfall amounts during the glacial inception period show rather a regional decoupling phase. Fluid inclusions show a clear shift (4-5‰) in $\delta^{18}\text{O}_w$ between end-MIS 6 and MIS 5e. Clumped isotopes measurements indicate kinetic effects between calcite and water of up to ~1‰. After correction for kinetics using Δ_{47} , an estimate for the MIS6-5 temperature shift in the East-Mediterranean is $>10^\circ\text{C}$.