

Decoupled evolution of temperature and precipitation in Western Germany during the Last Interglacial reconstructed from a precisely dated speleothem

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We present high-resolution $\delta^{18}\text{O}$, $\delta^{13}\text{C}$ and trace element profiles for stalagmite HBSH-1 from Hüttenbläterschachthöhle, western Germany. The major part of the sample grew between 130 and 80 ka providing a climate record with decadal to centennial resolution for Marine Isotope Stage (MIS) 5. The record shows three growth interruptions during this period coinciding with the Greenland Stadials suggesting that stalagmite growth in this area is a very sensitive proxy for cool and dry conditions in the northern hemisphere.

We interpret stalagmite $\delta^{18}\text{O}$ as a proxy for past temperature changes, whereas stalagmite $\delta^{13}\text{C}$ rather reflects changes in the hydrologic balance. The $\delta^{13}\text{C}$ record shows three pronounced negative peaks during MIS 5, and the timing of those is in agreement with MIS 5e, 5c and 5a. This suggests warm and relatively humid climate in western Germany for these phases.

During the Last Interglacial, the evolution of $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$ is opposite. Whereas the $\delta^{18}\text{O}$ signal suggests the warmest conditions around 125 ka followed by a gradual decrease, the $\delta^{13}\text{C}$ signal indicates wetter conditions towards the end of the Last Interglacial. This 'decoupling' of temperature and humidity during MIS 5e is also visible in a series of snapshot simulations performed using the general circulation model FAMOUS. The decoupling is probably related to the change in solar insolation, which influences the atmospheric dynamics and storm activity in the region.

Mumia vera – vera mumia?

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The drug *mumia vera* has a long tradition not only in Arabian but also in ancient European medicine. The knowledge in antiquity of the curativeness of asphalt combined with the belief in the magics of death made *mumia vera* a precious ingredient of medications with a very broad spectrum of indications. Since the 16th century it was even used as paint pigment. The export of mummies is supposed to have started in the 12th century and the drug was still available in 1924. Because the export of mummies was banned by the Arabs since the 17th century a more or less macabre market of substitutes developed.

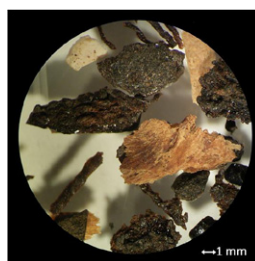


Figure 1 Reflected-light microscopy of the sample analysed

A small amount of ground *mumia vera* from a pharmaceutical vessel of the early 18th century was analysed on a molecular level. A number of diverse particles were hand-picked under the microscope and analysed separately via CP-pyrolysis GC-MS. Extracts were analysed by GC-MS. The ingredients of all particles exhibited a close relation to authentic ancient mummy material and published data in this field [1, 2, 3]. Besides fibres of linen and wood as well as embalming material (cedrium, pistacia turpentine, beeswax, Dead Sea asphalt) pieces of most probably human tissue and a wax-like substance (possibly a kind of adipocere) were found. Some inconsistencies in the data point to a mixture of material most plausibly due to occasional refilling of the vessel. Genuine mummy material milled as a whole obviously was used as medicine in the present case.

[1] Koller *et al.* (2005) *Archaeometry* **47**, 609–628.

[2] Buckley & Evershed (1999) *Analyst* **124**, 443–452.

[3] Rullkötter & Nissenbaum (1988) *Naturwissenschaften* **75**, 618–62.