Delayed beginning of the Eemian in Central Europe due to a reduced AMOC

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We present precisely dated high-resolution speleothem $\delta^{18}O$ and $\delta^{13}C$ profiles from western Germany for MIS 5. During Greenland Stadials (GS), the records exhibit growth interruptions showing that stalagmite growth is a sensitive proxy for cool and dry conditions. Stalagmite $\delta^{18}O$ values are interpreted as a proxy for supra-regional temperature changes in the North Atlantic realm, which is paticularly evident from the close resemblance with the $\delta^{18}O$ values of the NGRIP and NEEM ice cores. Speleothem $\delta^{13}C$ values primarily reflect changes in (local) hydrological balance and vegetation and are a proxy for terrestrial climate change in central Europe.

During the Eemian, the evolution of the speleothem $\delta^{18}O$ and $\delta^{13}C$ values is decoupled. The $\delta^{18}O$ values progressively increase from 130 ka, peak at 125 ka and subsequently show a gradual decrease. The $\delta^{13}C$ values, in contrast, start to decrease at 123 ka, show a negative peak at 120 ka and an aprupt increase at 114 ka. This suggests that the Eemian *sensu strictu* in Central Europe lasted from 124 to 114 ka, in agreement with a pollen sequence from eastern Germany.

The timing of the Eemian in Central Europe is, thus, substantially later than the timing of Termination II recorded in marine, ice core and monsoon records as well as the beginning of the Eemian in southern Europe. Comparison with a marine record from the Nordic Seas suggests that the beginning of the Eemian in Central Europe was delayed due to the prolonged presence of meltwater and the corresponding reduction on the Atlantic Meridional Overturning Circulation (AMOC) transferring warm water masses into western Europe and northern Eurasia. This highlights the strong influence of the AMOC on the evolution of terrestrial European climate on orbital and millennial time scales.