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# Tropical Land Temperature Change across Termination II and the Last Interglacial

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The general sequence of a late Pleistocene glacial termination has been well portrayed, where the high latitude regions of the Northern and Southern Hemisphere play essential but significantly different roles. The role of low latitude regions, however, is less well constrained. This is particularly true for time intervals prior to the last glacial period, and for glacial inceptions where our current understanding hinges on marine proxy records that are prone to uncertainties regarding the season and water depth the signals represent, as well as non-thermal influences. Additional, precisely dated and accurate temperature records from the tropics are therefore essential to constrain the amplitude and timing of tropical temperature change in comparison with the high latitudes.

Here we provide a new record for tropical land temperature from Northern Borneo across Termination II, the Last Interglacial, and the glacial inception between marine isotope stages (MIS) 5e and 5d, spanning approximately from 145 to 107 ka. The temperatures are based on nucleation-assisted fluid inclusion microthermometry (Krüger et al., 2011), currently considered the most precise paleothermometer for stalagmites. This approach has the advantage that it does not rely on empirical calibration and that the resulting temperatures are not seasonally biased.

Our record shows that the temperature, which was corrected for sea-level induced cave altitude changes, increased from 19.6 ± 0.4 °C (2SEM) to 24.0 ± 0.3 °C (2SEM) over Termination II. Similar to what has previously been found for Termination I (Løland et al., 2022), temperature over Termination II follows the timing of increasing atmospheric $CO_2$ concentration and Southern Hemisphere warming. However, our record decouples from $CO_2$ during glacial inception into MIS 5d, where the sea-level corrected temperature started to decrease to 21.0 ± 0.3 °C (2SEM) at around 122 ka whereas $CO_2$ remained stable for another 7 kyr. The amplitude and timing of this cooling is confirmed with a second stalagmite from another nearby cave. Our observation shows that early cooling into MIS 5d is not limited to the high southern latitudes (Jouzel et al., 2007) but instead appears to be a more global phenomenon that will be important to understand in order to shed light on the sequence of events leading to glacial inception.

**References**

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