



Quantifying possible overestimation of maximum warmth during the Last Interglacial Period

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Numerous studies have shown that climate models are not capable of reproducing the magnitude of warming that has been reconstructed for the warmest part of the Last Interglacial Period (LIG). The timing of the LIG thermal maximum is, however, highly uncertain because of uncertainty in dating and synchronization of the temperature records. For this reason, the assumption is made that LIG maximum temperatures occurred synchronous across the globe. Though this is known to be an oversimplification, the impact of this assumption on reconstructed maximum temperatures has yet to be quantified. We combine transient LIG simulations performed by 9 different climate models to assess whether the synchronicity assumption results in a sizable overestimation of the LIG maximum warmth. The overestimation proves to be small and strongly model-dependent for annual mean temperatures (global mean $0.43^{\circ}\text{C} \pm 0.30^{\circ}\text{C}$) and cannot explain the recently published 0.67°C model-data difference of LIG maximum warmth. However, if temperature proxies would prove to be biased towards the summer season, a calculated overestimation of LIG maximum temperatures based on warmest month temperatures (global mean $1.11^{\circ}\text{C} \pm 0.35^{\circ}\text{C}$) is non-negligible and can at least partly explain the 0.67°C global model-data difference.