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## Quantifying the Australian monsoon since the Last Glacial Maximum using downscaled models

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The Australian continent spans tropical to extra-tropical latitudes with corresponding variety of temperature and precipitation. In the tropical north of Australia, the monsoon and resultant precipitation is critical for agriculture and human habitation. The timing of monsoon onset and duration of the monsoon season is therefore an essential piece of information for understanding the hydroclimate of northern Australia. The present-day monsoon onset, defined as the reversal of lower tropospheric winds, occurs on 24 December  $\pm$  15 days, and the average duration of the monsoon season is 80 days. The areal extent of the monsoon is also a critical aspect of the hydroclimate, with a poleward penetration of monsoon precipitation improving agricultural and habitation conditions.

The present day northern Australian monsoon has been widely studied. The palaeo-monsoon, however, has rarely been studied and never using downscaled climate models. Here we present the first results from such modelling of the timing of monsoon onset, duration, and extent for three time slice simulations: 6000 BP, 12000 BP, and 21000 BP. These results are compared to a pre-industrial control simulation (1850) and NCEP data for 1991 – 2021. The simulations were performed using the Weather Research and Forecasting (WRF) model, with initial and boundary conditions taken from the Community Earth System Model (CESM). Both models were adjusted for the appropriate greenhouse gas concentrations, insolation, and land-sea distribution.