

A 18,000-year high-resolution record of atmospheric convection and temperature from the Indo-Pacific Warm Pool

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There is still scant spatial coverage of long, continuous and high-resolution paleoclimate records from the ‘heat engine of the world’, the Indo-Pacific Warm Pool (IPWP). This hampers insight in and understanding of climatic and dynamical changes that occurred during the last deglaciation as well as the Holocene period. Here we present a continuous 18,000 year-long, precisely dated and decadal-scale lacustrine multi-proxy record from Southern Thailand, using a combination of leaf wax hydrogen isotopes (δD_{wax}), branched glycerol dialkyl glycerol tetraethers (brGDGTs), plant macrofossils, and leaf wax carbon isotopes. We conclude that the amount of incoming solar radiation during the wet season – ruled by the precessional cycle - exerts a primary control on both temperature and convective activity; this wet season-solar irradiance (WSI) control on convection is also apparent from other IPWP and tropical water isotope-based records. Rising atmospheric CO₂ levels were the primary control on changes from C4- to C3-dominated vegetation over the deglacial period, not humidity. The inundation of Sundaland played a critical role in IPWP hydroclimate dynamics. Our record provides a direct sampling of the isotopic composition of Indian Ocean and IPWP moisture exported to Monsoonal SE Asia, which further aids in the interpretation of the latter.