

Biomarker Stable Isotope Records of Paleomonsoon Variation in Response to the Last Glacial - Interglacial Transition in Southwestern Taiwan

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Located in the frontal of East Asian Monsoon System and the land-sea boundary, paleoclimate records from the Taiwan region are critical to understanding the tropical to subtropical environmental changes in response to glacial-interglacial transition in this area. We analyzed the hydrogen (δD) and carbon ($\delta^{13}C$) isotopic compositions of terrigenous leaf-wax biomarker *n*-alkane provided within a sediment core (MD178-3291) from off-shore southwestern Taiwan to reconstruct the late Quaternary paleoclimate variation over the past 26 kyr. Biomarker isotope data record an increase from -150‰ to -140‰ in the δD_{n-C29} of terrestrial leaf waxes preserved after 17 kyr, accompanied by a decrease from -30.5‰ to -31.5‰ in the $\delta^{13}C_{n-C29}$. The shift in $\delta^{13}C_{n-C29}$ may be associated with increased moisture and/or reduced evapotranspiration during the interglacial period, which supported by a decrease of average chain length (ACL). Changes in precipitation or moisture deficit may reflect the enhancement of East Asian Summer Monsoon and increased precipitation during the Holocene, as observed in the depletion of speleothem $\delta^{18}O$ records in China. However, the observed enrichment of δD_{n-C29} in leaf waxes after 17 kyr is inconsistent with expectations of isotopic changes related to an increase in the amount of precipitation (i.e. “amount effect”). We suggest that the δD_{n-C29} variation in Taiwan through the late Quaternary dominantly reflects isotopic change associated with the long-term regional temperature increase from glacial to interglacial period. This shift may reflect warming of source regions or a shift in the proportion of change in summer and winter monsoon intensity during deglaciation that affects the relative water vapor contributions from different regional sources. These results agree with new model predictions for precipitation isotopes over Taiwan during glacial-interglacial cycles, and highlight the complexity of climatic controls of hydrologic cycling over east Asia from the late LGM to recent.