

Hydrogen isotopic compositions of leaf wax *n*-alkanes along an East Asian Monsoon gradient capture precipitation effectiveness

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The hydrogen isotopic compositions of long-chain plant leaf waxes (δD_{lw}) have been increasingly used for quantitative paleohydrological studies. One of the challenges in interpreting δD_{lw} data with respect to ancient precipitation is how to account for the effect of evapo-transpiration. We systematically investigated δD of modern precipitation, soil water, and soil and individual plant leaf waxes in the Chinese Loess Plateau (CLP) and its surrounding areas along a precipitation gradient with mean annual precipitation (MAP) varying from 140 mm to 676 mm. While the variation of precipitation δD has no significant correlation with MAP, soil water δD , soil and individual plant δD_{lw} exhibit negative correlations with MAP. δD values of soil water and plant leaf waxes in dry areas are significantly more positive, suggesting that precipitation effectiveness (P-E ratio) has played a crucial role in the D-enrichment of soil and plant leaf waxes in this region. A parallel decreasing trend with similar slopes in δD_{lw} is found among dominant plants in the region along with the increase of precipitation effectiveness, suggesting that plant type is an important factor in controlling plant hydrogen isotope fractionations, a key factor that needs to be constrained for study of paleohydrology.