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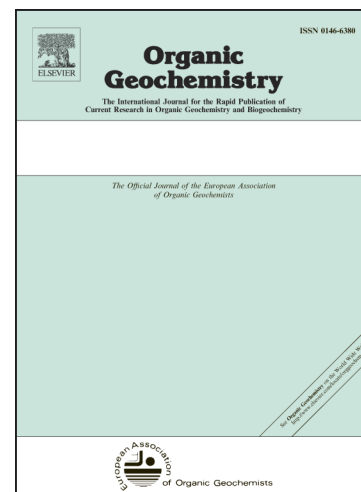
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Choosing a suitable  $\varepsilon_{w-p}$  by distinguishing the dominant plant sources in  
sediment records using a new Pta index and estimating the paleo- $\delta D_p$   
spatial distribution in China

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# ABSTRACT

The hydrogen isotopic composition of plant wax ( $\delta D_{wax}$ ) inherits the isotopic values of the source water and isotopic fractionations that take place in lipid biosynthesis. The  $\delta D_{wax}$  values of *n*-alkanes or *n*-acids in sediment records are considered to be effective paleo- $\delta D$  for precipitation proxies for different timescales. However, the vegetation effect also contributes substantially to the apparent fractionation values ( $\varepsilon_{w-p}$ ) between the precipitation and plant. Therefore, a method for evaluating the dominant plant source in the sediment records is key for reconstructing a reliable paleo- $\delta D_p$  record. In this study, based on field data from the extremely arid Qaidam Basin and the semi-arid central Chinese Loess Plateau (CLP), a plant type index (Pta), based on the traditional  $P_{aq}$  and *n*-alkane  $C_{31}/C_{29}$  index, was used to evaluate the dominant plant type that contributed to the sediments. In the arid and semi-arid region, the Pta values of the aquatic plants were  $< 90$ , while the shrub Pta ranged from 90 to 180 and the grass Pta was  $> 180$ . A test on contemporary soils and surface lake sediments also showed that the Pta index could estimate the regional vegetation distribution in modern environments. We also evaluated the dominant *n*-alkane source for four sediment records in China during the last millennium and reconstructed a regional paleo- $\delta D_p$  by choosing a different  $\varepsilon_{w-p}$ . The estimated paleo- $\delta D_p$  values showed a good correlation

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