



## **Geomorphic controls on organic matter distribution from plant to soil**

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Stable isotopes of carbon and hydrogen of plant lipids are widely used for paleo vegetation and climate reconstruction. But the role of geomorphology on vegetation is less studied. In this study, we would like to infer the role of geomorphology on distribution of organic matter in plants and soil. Fresh and mature leaves of deciduous trees (*Sal-Shorea robusta*) and their associated surface soil samples were collected from laterite alluvium deposits in West Bengal (India). Samples were collected at 500 meters interval starting from the bank of the river and stretched to 6 km from the river in a perpendicular direction. Carbon Preference Index (CPI) and Average Chain Length (ACL) values of n-alkanes in leaves depend on water availability in which high values corresponds to water-stressed conditions. CPI values vary from 1.4 to 2.1 and ACL varies from 29.2 to 29.9 in leaves in which the lower and higher values correspond to the proximal and distal part of the river respectively. It shows the variation in CPI and ACL values is controlled by the depositional conditions in the proximal and distal part of alluvial deposits. The  $\delta D$  values of leaf n-alkanes depends on the source of meteoric water.  $\delta D$  values of *Sal* leaves vary from  $-170\text{‰}$  to  $-109\text{‰}$ . These variations of  $60\text{‰}$  in  $\delta D$  values are due to the major contribution of river water in the proximal part and groundwater in the distal part. Bulk  $\delta^{13}C$  of leaves vary from  $-32.7\text{‰}$  to  $-26.8\text{‰}$ . These variations of  $6\text{‰}$  are mainly attributed to the combined effect of spatial variation in vegetation density, soil texture and water availability. Therefore, spatial variations in geomorphic condition from modern analog concludes that local factors like soil texture, water availability, elevation, vegetation density also plays a significant contribution other than the contemporaneous vegetation on the stable isotopic composition of the associated soil and thus warrants geomorphic consideration for paleo climate and vegetation reconstruction.