Supplementary information: Hopanoid distributions differ in mineral soils and peat: a re-evaluation of hopane-based pH proxies

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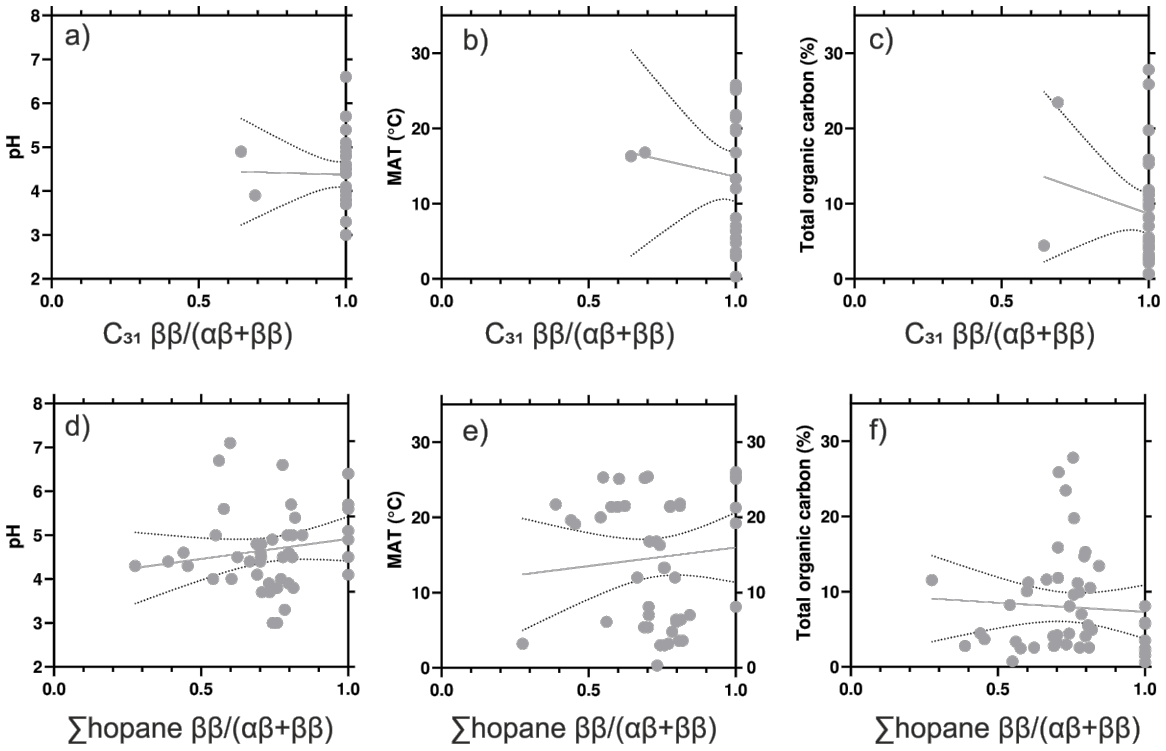

Figure S1: (a-c) Relationship between C_{31} ββ/(αβ+ββ) ratio and (a) pH, (b) temperature and (c) total organic carbon in mineral soils (n = 31) and (d-f) relationship between C_{27}-C_{31} ββ/(αβ+ββ) ratio and (d) pH, (e) temperature and (f) total organic carbon in mineral soils (n = 47). Environmental variables were obtained from De Jonge et al. (2024) and Haggi et al. (2023, 2024).

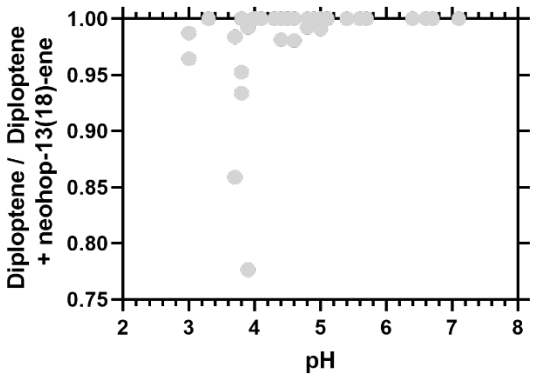

Figure S2: Relationship between hop-22(29)-ene (diploptene) to neohop-13(18)-ene vs pH in mineral soils (n = 49). pH estimates obtained from De Jonge et al. (2024) and Haggi et al. (2023, 2024).

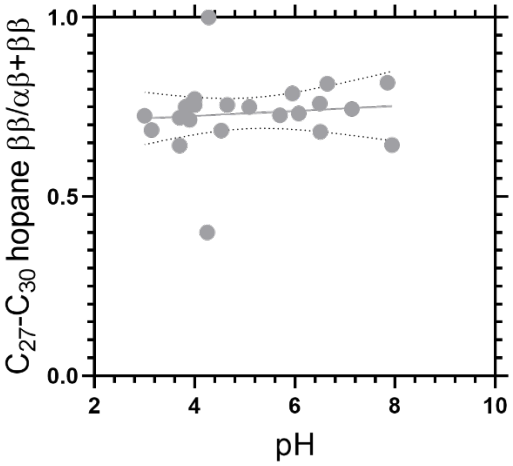

Figure S3: Relationship between C_{27}-C_{30} hopane ββ/(αβ+ββ) ratios and pH in a global peat dataset (n = 24; this study; see Table 2). pH estimates obtained from Naafs et al. (2017) and Inglis et al (2018).

References:

De Jonge C, Guo J, Hällberg P, Griepentrog M, Rifai H, Richter A, Ramirez E, Zhang X, Smittenberg RH, Peterse F, Boeckx P, Dercon G (2024). The impact of soil chemistry, moisture and temperature on branched and isoprenoid GDGTs in soils: A study using six globally distributed elevation transects. *Organic Geochemistry* **187**: 104706. doi:10.1016/j.orggeochem.2023.104706.

Häggi C, Bertassoli DJ, Akabane TK, So RT, Sawakuchi AO, Chiessi CM, Mendes VR, Jaramillo CA, Feakins SJ (2024). Using Mult Homolog Plant-Wax Carbon Isotope Compositions to Reconstruct Tropical Vegetation Types. *Journal of Geophysical Research: Biogeosciences* **129**(4). doi:10.1029/2023jg007946.

Häggi C, Naafs BDA, Silvestro D, Bertassoli DJ, Akabane TK, Mendes VR, Sawakuchi AO, Chiessi CM, Jaramillo CA, Feakins SJ (2023). GDGT distribution in tropical soils and its potential as a terrestrial paleothermometer revealed by Bayesian deeplearning models. *Geochimica et Cosmochimica Acta* **362**: 41–64. doi:10.1016/j.gca.2023.09.014

Inglis GN, Naafs BDA, Zheng Y, McClymont EL, Evershed RP, Pancost RD (2018). Distributions of geohopanoids in peat: Implications for the use of hopanoid-based proxies in natural archives. *Geochimica et Cosmochimica Acta* **224**: 249–261. doi:10.1016/j.gca.2017.12.029.

Naafs B, Inglis G, Zheng Y, Amesbury M, Biester H, Bindler R, Blewett J, Burrows M, del Castillo Torres D, Chambers F, Cohen A, Evershed R, Feakins S, Gałka M, Gallego-Sala A, Gandois L, Gray D, Hatcher P, Honorio Coronado E, Hughes P, Huguet A, Könönen M, Laggoun-Défarge F, Lähteenoja O, Lamentowicz M, Marchant R, McClymont E, Pontevedra-Pombal X, Ponton C, Pourmand A, Rizzuti A, Rochefort L, Schellekens J, De Vleeschouwer F, Pancost R (2017). Introducing global peat-specific temperature and pH calibrations based on brGDGT bacterial lipids. *Geochimica et Cosmochimica Acta* **208**: 285–301. doi:10.1016/j.gca.2017.01.038