

### Climate, Fire, and Vegetation Control on Peat Carbon Accumulation in Borneo

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Currently, large swaths of peatland on Borneo are drained and burned for agriculture, releasing significant amounts of carbon to the atmosphere and creating public health emergencies due to smoke from peat fires. 2015 Fire Season was particularly destructive due to strong positive El Niño–Southern Oscillation (ENSO), which further dries out Borneo’s peatlands. Precipitation amount, driven by West Pacific Warm Pool temperature, is strongly correlated with  $\delta D$  of precipitation and also peat accumulation rate. It is assumed that tropical peatlands in Borneo did not burn before human contact. We aim to test this assumption in one of the last undisturbed peat domes on the island. To accomplish this, we constrained peat carbon accumulation with radiocarbon, measure factors that impact accumulation: precipitation (using  $\delta D$  of leaf waxes), vegetation (using leaf wax alkane distribution), and fire. We compared these measurements to understand factors influencing carbon accumulation rate. We find that  $\delta D$  of precipitation becomes enriched by  $\sim 20\text{--}30\%$ , consistent with nearby speleothems (Partin et al., 2007), but carbon accumulation does not vary significantly. We do, however find a significant episode of burning. The charred layer represents  $\sim 3.85$  Mt of peat carbon lost and, just as in 2015, coincides with increased frequency of strong ENSO events. We conclude that fire is an important driver of fire in Borneo’s tropical peat, even in pre-anthropogenic periods, and is strongly associated with high ENSO variability.