



Supplementary Figure 1. Cross plot of C/N and $\delta^{13}\text{C}_{\text{COM}}$ data from Lagoa Gaíva core 2A, divided by Unit. Note the breadth of C/N and enriched $\delta^{13}\text{C}_{\text{COM}}$ values in Units IV – III, which are suggestive of mixed source organic matter (OM) and oxidation in a shallow lake system. Units II and I exhibit lower C/N, more negative $\delta^{13}\text{C}_{\text{COM}}$, and much narrower data clouds, which are consistent with a transition to algae-dominated OM accumulating in a deeper lake.