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Enhanced organic carbon remineralization associated with *Cloudina* parautochthonous accumulations in the late Ediacaran Tamengo Formation

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The advent of biomineralization of skeletal parts in early metazoans during the Ediacaran is meant to require sufficient oxygen levels in benthic environments, yet bottom water oxygenation was complex and spatially variable within predominantly anoxic continental platforms. We analyzed paired carbon isotopes from three sections of the late Ediacaran Tamengo Formation (Brazil) to investigate isotope variation across different *Cloudina* occurrences along inner to mid-ramp environments. A distinct $\delta^{13}C$ shift in the mid-ramp deviates from stable values observed in inner and other mid-ramp settings. Decoupled C_{carb}-C_{org} isotope trends and higher magnitude of variation align with parasequence cyclicity and *Cloudina*-dominated parautochthonous deposits displaying early Fe-oxyhydroxide cementation. This suggests localized disturbances in the dissolved inorganic carbon (DIC), likely driven by enhanced oxic organic carbon mineralization in more oxygenated mid-ramp environments inhabited by metazoans. We propose a scenario in which balanced bioproductivity and respiration prevented eutrophication from high continental nutrient input, as envisaged for more proximal areas, while sustaining benthic oxygenation above the basin chemocline. These findings, supported by spatially distributed paired carbon isotope trends, provide new insights into the complex redox architecture of Ediacaran seas and their role in shaping early metazoan habitats.