

New perspectives on the carbon isotope chemostratigraphy of the late Ediacaran Corumbá Group, Brazil, from GRIND-ECT drill cores and their links to biological innovations

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The Ediacaran-Cambrian transition marks the rise of multicellular complex life on Earth along with global-scale paleoenvironmental changes. Carbon isotope chemostratigraphy stands out as one of the main correlation tools between sedimentary successions, with recent advances in high-resolution Ediacaran chemostratigraphy achieved through correlation of $\delta^{13}\text{C}$ data from successions worldwide. Carbonate rock drill core samples from the GRIND-ECT project (Geological Research through Integrated Neoproterozoic Drilling – Ediacaran-Cambrian Transition) were analyzed for carbon and oxygen isotopes. These cores encompass the Bocaina (~570 – 555 Ma) and Tamengo (~550 – 540 Ma) formations; key units of the upper Corumbá Group, Brazil. In both units, the $\delta^{13}\text{C}$ trends correlate with sequence-stratigraphic data. The Bocaina Formation $\delta^{13}\text{C}$ values rise from around 0 to +2 ‰, and at the Bocaina-Tamengo limit, there is a minor $\delta^{13}\text{C}$ excursion down to ca. -2 ‰. In the Tamengo Formation $\delta^{13}\text{C}$ values prominently rise to +6 ‰, reaching a peak coincident with the maximum flooding surface, before gradually decreasing to +3 ‰, whereafter they remain at characteristic plateau values throughout the upper Tamengo Formation. This chemostratigraphic trend fits in the Ediacaran $\delta^{13}\text{C}$ global curve and is strikingly similar to the record of the coeval Nama Group (Namibia), which suggests the influence of eustatic sea level and/or equivalent basin subsidence histories on opposing sides of a gradually closing seaway during the amalgamation of Western Gondwana. Furthermore, $\delta^{13}\text{C}$ trends coupled with shifts in acritarch and *Cloudina* relative abundances, are also linked to sea-level variations, which in turn control the areal extent of the

shallow shelf for macrobenthos dwellers, nutrient delivery, and organic carbon burial. The links between sequence-, bio-, and chemostratigraphy reinforcing an intimate connection between the coevolution of biota and environment during the terminal Ediacaran.