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The biotic and chemostratigraphic (δ13Corg) record of the Smithian–Spathian succession in Peary Land, North Greenland

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In the aftermath of the end-Permian mass extinction, the Early Triassic (252–247 Ma) was a time of high ecological stress, which hampered the recovery of marine faunas through ocean acidification, euxinia, and extreme seawater temperatures. Terrestrial floras also indicate highly unstable conditions on land, with marked compositional changes between spore- and gymnosperm dominating floras. A highly fluctuating carbon cycle expressed by both carbonate and organic C-isotope records globally, as well as repeated mercury loading suggest that Siberian Traps volcanic activity continued during the Early Triassic. Here, we present a new organic δ13C record from the Early Triassic succession of the Wandel Sea Basin in Peary Land, North Greenland. The record encompasses a cored succession and several outcrop localities that are biostratigraphically well contrained by ammonoids and palynology. Smithian strata exhibit highly depleted δ13C values around –30 to –31 ‰ succeeded by a ~6 ‰ shift to more positive values around –25 ‰ at the Smithian-Spathian boundary (SSB). The SSB is in Peary Land associated with a marked shift in the terrestrial vegetation, from spore-dominated floras in the late Smithian to gymnosperm-dominated floras in the Spathian. The Spathian is characterized by a gradual return to more depleted δ13C values culminating around –30 to –29 ‰ in the middle Spathian, with increasingly more enriched values to ~26 ‰ in the upper Spathian. This new organic δ13C record from North Greenland can be correlated with other Smithian-Spathian records globally and allows new insights into this biotic events.