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Lacustrine expansion and carbon drawdown during the early Toarcian Oceanic Anoxic Event

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The early Toarcian Oceanic Anoxic Event (T-OAE; ~183 Ma) was marked by persistent marine anoxia–euxinia and globally significant burial of organic matter, accompanied by a major global carbon cycle perturbation likely linked to Karoo-Ferrar volcanism [1, 2, 3]. Although the T-OAE is well studied in the marine realm, accompanying climatic and environmental change on the continents is poorly understood. Here, we present radiometric, palynological and geochemical data from lacustrine black shales in the Sichuan Basin, China. We demonstrate that a major lake system developed on land coeval with the T-OAE, likely due to enhanced hydrological cycling under elevated atmospheric $p\text{CO}_2$. Increased lacustrine organic productivity from elevated riverine nutrients supply caused massive burial of organic carbon in the Sichuan Basin alone, presenting an important negative feedback in the global exogenic carbon cycle.

References:

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