Quaternary Trace Fossil Assemblages on the Eel River Shelf, Northern California

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The Eel River Shelf of northern California is a dynamic region with episodic, fine-grained flood deposits from the Eel River. The trace fossil association and related ichnofacies were analyzed using x-radiographs of mid-shelf cores collected from 1993 to 2005 as part of the STRATAFORM project. Eel River flood events create hyperpycnal flows that deposit mud layers averaging 2-3 cm thick, with larger events depositing layers up to 10 cm thick over much of the shelf. These rapid depositional events influence a change in organism bioturbation behaviors that can be seen in digital x-radiographs from box cores. The STRATAFORM cores, often collected within a week of large flood events, allowed organisms to be observed in-situ during their response to the deposition. The background Cruziana association commonly composed of Chondrites, Planolites, Rhizocorallium with rare Scolicia and Thalassinoides, is recoded in layers from 10 cm to 30+ cm thick. During and post deposition the background Cruziana association ceases when fugichnia, Skolithos and Arenicolites dominate the new event deposit. As normal deposition resumes the event deposit is obscured by the return of the Cruziana type traces. The episodic, high-volume, fine-grained depositional environment caused by the Eel River floods creates a mid-shelf assemblage of Cruziana ichnofacies grading into Skolithos ichnofacies during and immediately after deposition, before reverting to the background, pre-event Cruziana ichnofacies. This temporary shift to a Skolithos association during event deposits and eventual overprinting may create a modified Cruziana ichnofacies in the rock record.