

High-Frequency Climatic Cyclicity Expressed in Deep-Marine Turbidites: The Santa Barbara Basin, California

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The aim of this presentation is to use a superbly dated, Holocene deep marine sediment core from the Santa Barbara Basin, California to highlight the link between terrestrial storminess, river flooding and turbidity current deposition.

Sedimentary and X-ray diffraction (XRD) analyses have been used to show two distinct turbidite types, distinguished on mineralogy, grain size, fossil and clay content. Type 1 turbidites are interpreted as remobilized shelf sediments of probable seismogenic origin, whilst Type 2 turbidites are thought to be linked to river-flood events, either directly as hyperpycnal flows or indirectly via remobilization from the shelf shortly after flooding ceased.

Analysis of Holocene sediments from the last 7 kyrs reveals that river-flood generated muddy turbidites form an integral part of the deep marine Santa Barbara Basin record. The distribution of river-flood generated turbidites is characterised by distinct clustering of events lasting for approximately 800 years. Intervening periods are completely devoid of such events. This suggests that during the last 7kyrs, southern California has been prone to sub-millennial periods of intense terrestrial storminess, river flooding and linked turbidity current generation punctuated with periods of apparent quiescence.

Comparison of the distribution of Santa Barbara Basin flood-generated turbidite clusters to other climate proxies reveals an uncanny correlation with submillennial North Atlantic cycles and implies a climate link between the East Pacific and North Atlantic.