

Source, sea level and circulation effects on the sediment flux to the deep ocean over the past 15 ka off eastern New Zealand.

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Abstract

The last post-glacial transgression and present highstand of sea level were accompanied by a reduction in the terrigenous flux to the deep ocean bordering the active convergent margin off the eastern North Island of New Zealand. Although in accord with long-established models of highstand shelf deposition, new data from giant piston core MD97 2121 (2314 m depth) reveal that the flux also varied with terrigenous supply and palaeocirculation. Between 15 and 9.5 ka, the flux reduced from 33 to 20 g/cm²/ka as supply declined with an expanding vegetation cover, and mud depocentres became established on the continental shelf. An increase from 20 to 27 g/cm²/ka during 9.5–3.5 ka coincided with a strengthened East Cape Current which probably introduced sediment from fluvial and shelf sources in the north. The flux profile shows no immediate response to the establishment of modern sea level ¹/₄₇ ka. However, accumulation

decreased from 3.5 to 1 ka as more sediments were retained on the shelf, possibly under wind-strengthened, along-shelf currents. Over the last 1 ka, the flux decline halted under increased terrigenous supply during anthropogenic development of the land.

Despite the proximity of the North Island's Central Volcanic Region, major eruptions caused only brief increases (centuries duration) in the terrigenous flux through direct deposition of airfall and possibly fluvial redistribution of onshore volcanic deposits. Frequent earthquakes also had little short-term effect on accumulation although such events, along with volcanism, probably contribute to the long-term high flux of the region.

The other measured flux component, biogenic carbonate, reached maxima of 6 g/cm²/ka between 11 and 8.5 ka when nutrient-bearing waters of the East Cape Current dominated the palaeoceanography. After these peaks, carbonate accumulation declined gradually to modern levels of $\hat{a}^{1/43}$ g/cm²/ka.



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Keywords

Terrigenous flux; East Cape Current; Biogenic carbonate

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