

Island slopes and jumbled shell beds

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Shell beds pose questions of provenance, but determining degree of transport of bioclasts before deposition can be speculative. Bioclastic beds deposited on a shallow shelf may consist of a minimally transported accumulation (Meldahl, 2001, p. 263). In contrast, islands may have steep shelves and accumulate disharmonious bioclastic assemblages in deeper water. The latter are a signature of the stratigraphic record on many islands. Although their identification is easier in Neogene successions, they can be recognized in the Palaeozoic. Herein, we contrast differing examples of such jumbled shell beds *sensu lato* preserved around islands.

Early Permian Mengkarang Formation, Jambi Province, Sumatra. Deep-water facies occur at the base of a volcanic section. An association including nekctic cephalopods overlies a fine-grained ash containing a diverse association of terrestrial pollen representing hydrophytic, hygrophytic and mesic to xeric plants (Van Waveren *et al.*, 2005).

Early Miocene Montpelier Formation, Jamaica. At Duncans Quarry, parish of Trelawny, allochthonous packstones and slide blocks of reef limestone are embedded in Miocene chalk. These blocks include abundant hermatypic scleractinians, yet the chalk ichthyofauna indicates deposition in 500+ m water depth (Underwood & Mitchell, 2004).

Middle Miocene Grand Bay Formation, Carriacou, the Grenadines. Deposition occurred in a deep-water turbidite basin flanking a volcanic island (Donovan *et al.*, 2003). Diverse, deeper water taxa are preserved in association with land snails, hermatypic scleractinians, algal balls and planktic pteropods. Minimum depth of deposition was 150-200 m.

Late Pliocene Bowden shell beds, Jamaica. This famous site preserves terrestrial, shallow-water, deep-water and planktic taxa (Donovan, 1998). This association, like Duncans, was formed where the island shelf is narrow and the slope steep, deposition occurring in 100+ m water depth (Pickerill *et al.*, 1998)

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