

Rock-barred deltas –an addition to the types of coastal deltas with examples from eastern Australia

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Modern delta classification has addressed that deltaic sedimentation and landform building is dependent on fluvial delivery of sediment to the coast and the building of deltaic coastal landforms by the interplay of oceanographic and fluvial processes resulting in a ternary classification that recognises wave-dominated deltas, tide-dominated deltas, and fluvial-dominated deltas. Granulometry and delta asymmetry also recently have been addressed in expanding the initial ternary delta classification. This paper explores a type of delta that currently is not captured by the classification of the present ternary system, nor by the partitioning of deltas according to their dominant granulometry. It is one where river flow has been prevented from forming one of the coastal landforms of deltas (digitate, lobate, or current-aligned shoals/islands) because they have been barred by barriers such as rock islands. These delta-lands *are still deltas*. This we term a “rock-barred delta”. The Queensland coast as the sedimentary receptor for a range of rivers deriving from a 3500 km long highland (the Great Dividing Range) forms the framework for rock-barred deltas in that 1. the Great Dividing Range is continental-scale watershed; 2. numerous short rivers arise from this watershed; 3. the region has a high-rainfall climate; 4. the geological grain of the coast is comprised of N to NNE-trending rocky coastal strike-ridges and N to NNE-trending near-shore rocky coastal islands that form the obstructions to delta development; and 5. the Great Dividing Range as source material for riverine and coastal sediments yields sand and mud, and often mud > sand. The characteristics of rock-barred deltas are: 1. a triangular delta-plain that represents a valley tract almost to wholly filled with sediment; 2. a partial barrier of bedrock islands and peninsulae that bar the fluvial accumulations from the open ocean and perturbate oceanic waves; and 3. a tidal zone of low-tidal sand and/or mud flats, mangrove-vegetated mud flats, and high-tidal saline mud flats. In many aspects, the rock-barred deltas have features in common with traditional deltas, with the main difference being the seaward geometry because of the barriers, peninsulae, and nearshore islands. Bedrock island obstructions, however, do not stop tide-dominated delta landforms being developed in the interior of the delta-land, nor fluvial processes influencing development of fluvial landforms in the interior of the delta-land.

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