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ORIGINAL PAPER

On the status and mechanisms of coastal erosion in Marawila Beach, Sri Lanka

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Abstract

Coastal erosion remains a problem in many developing countries because of a limited understating of erosion mechanisms and management. Sri Lanka is one of the countries that recognized coastal erosion management as a governmental responsibility, in 1984. Nevertheless, erosion mechanisms have not yet been fully understood. We investigate the status and mechanisms of coastal erosion using empirically collected data and various techniques, such as Geographic Information System analysis of satellite images, drone mapping, bathymetric surveys, hindcasting of wind-induced wave climate, questionnaires, and semi-structured interview surveys. We identified wave climate change, reduction in river sand supply, interruptions from previous erosion management measures, and offshore sand mining as potential causes of erosion considering sediment flux and rates of erosion. Erosion of Marawila Beach began during 2005–2010 and has been continuing ever since, due to a lack of integration in the beach and the entire sediment system. It is necessary to identify the long-term, large-scale changes in the sediment system through data collection. This study highlights the importance of an integrated coastal erosion management plan and could facilitate better coastal erosion management in Sri Lanka, as well as in other developing countries.

Keywords Developing country · Coastline change · Wave climate change · Sand mining · Beach nourishment

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