

ABSTRACT

Development of a Tool for the Rapid Assessment of Morphodynamics of Headland-Bay Beaches in the Caribbean

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Coastal development is very important to the socio economic well-being of the Caribbean. However, there is often too little knowledge and insufficient data to guide marine science practitioners and decision makers on the morphodynamics of its coastal zone. This holds also for the headland-bay beaches. Various methods are used to undertake coastal studies, but these require resources that are not always available. This research addresses these challenges by developing a Rapid Assessment Tool (RAT) for assessing the morphodynamics of headland-bay beaches that is simple, without requiring the level of resources needed by the established models. The RAT was applied to a headland-bay in Trinidad called Las Cuevas Bay. The tool accurately matched the bay's morphodynamic indicators generated using MIKE 21 suite of Spectral Wave (SW), Hydrodynamics (HD) and Sediment Transport (ST). Further validation on this tool's accuracy was confirmed when the RAT results accurately matched physical characteristics observed at 29 other headland-bay beaches across the Caribbean. The efficiency of RAT in its current configuration was surveyed, using a cross section of selected marine science practitioners. The results revealed that the tool is simple to use, provides quick results and requires little experience to be properly utilized. The respondents suggested measures to improve its efficiency, even though it achieved their usage threshold in its current state. These will be the subject of further research. Based on the verification of the results when compared to the well-established MIKE 21 model, their match with observed physical features in 29 Caribbean beaches and its endorsement from a cross section of regional marine science practitioners, this study concludes that the RAT is a sufficiently adequate alternative to the established models and may be used by marine scientists, planners and decision makers to research and manage the dynamic coastal systems in the Caribbean.

Keywords: Charmaine O'Brien-Delpesh; headland-bay beach; morphodynamics; planform parameter; Caribbean; rapid assessment tool; Las Cuevas Bay.