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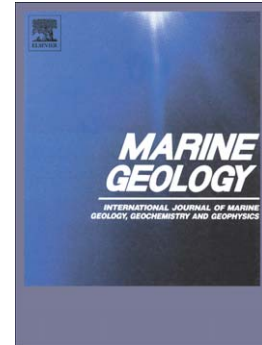
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Holocene sedimentary systems on continental shelves

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Abstract: The present knowledge of Holocene continental shelf deposits in relation to the processes for their formation, from the prospective of marine sediment dynamics, is examined. Over the last 50 years, various innovative techniques have been developed to measure and calculate currents, waves and suspended sediment concentrations. Thus, sediment transport rates can be defined by *in situ* observations, or numerical modeling. At the same time, sediment dynamics has been applied to morphodynamics, such that deposition rate and seabed morphological change can be predicted. On the continental shelf, tide-wave action, residual circulation and sediment gravity flow are the major sediment dynamic forcing mechanisms. The tidal current is responsible often for landward transport, waves can cause landward transport of sand and gravel but seaward transport of fine-grained sediment, and shelf circulation and sediment gravity flow favour the dispersal of suspended sediment towards offshore or even across the shelf. For the various types of the shelf, wide or narrow, sediment starved or supply abundant, prediction on the basis of processes is consistent with the observed spatial distribution of Holocene sedimentary systems, e.g., river deltas, beaches, barrier islands, lagoons, tidal ridges, tidal inlets, tidal flats and shelf muds. The sedimentary records associated with these systems consist often of high-resolution slices, i.e., each record tends to have a resolution within 10¹ years, but covers only a relatively short period of the Holocene. Nevertheless, if different records are connected, according to their chronological order, then the overall period covered by the records will be extended. In order to achieve this objective, a modeling approach to the formation of sedimentary records should be developed. Based upon an understanding of process-product relationships, simulation can be undertaken for: the formation of early Holocene reworking-induced deposits, during sea level rise;

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