

Characterization and classification on erosion patterns generated by sediment-gravity flows

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The head of a sediment-gravity flow eroding the sea floor creates small-scale topographies called sole marks. In previous hydraulic studies, the association between such topographies or erosion patterns and the action of flows has been clarified by performing flume experiments. Although the results of the studies suggest that the patterns is mainly controlled by factors such as flow velocity, properties of bed sediments, and duration action to the bed, it is difficult to apply these results to outcrop studies because of the complexity of the above factors, especially in when a sediment-gravity flow generated the patterns. In this study, we attempted to characterize and classify the patterns by using FFT and Hausdorff measures assuming the patterns to be wave forms. According to the results, the patterns can be classified into three types: (1) large-scale patterns containing small-scale roughness, (2) small-scale patterns, and (3) patterns with variable depth. The results suggest that the type of the patterns is controlled by the action or type of the sediment-gravity flows.

Keywords: sediment-gravity flow, FFT, Hausdorff measures, erosion patterns