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The Control of the Multiple Geomorphologic Breaks on Evolution of Gravity Flow Dynamics in Deep-Water Environment

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Abstract

Gravity flow is active at shoal slope in Taiwan and this resulted in deposition of spectacular sedimentary system. It becomes an ideal area for studying gravity flow processing. At least three geomorphologic breaks including one shelf break and two slope breaks exist from shelf front to abyssal Manila Trench. These breaks control the initiation and entire evolution of the gravity flow and affect the distributing framework of gravity-flow-deposited system. Among them the shelf break controls the initiation of the mass waste, and the first and second slope break control transformation between slump, debris flow and turbidity flow, respectively. After utilizing the parameters of waveform of sediment wave, the corresponding rheology of gravity flow was reconstructed, demonstrating the existence of the active gravity flow. The multiple breaks mark the evolution of slope system from disequilibrium to equilibrium, while effect of erosion-deposition of gravity flow manifests the adjustment of the slope system.

Key words: the South China Sea; Taiwan Shoal Slope; gravity flow; geomorphologic break; rheology