Impressive Slump Structures in Permo-Carboniferous Limestone at Sg. Siput, Perak, Malaysia

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Summary

Slump structures may be created by submarine sediment slides with a rotational mode of failure. The limestone hills in Sg. Siput display impressive slump structures, especially in the upper section of a sequence exposed in an abandoned quarry, near Bt. Kemuning, NW of the town of Sg Siput. The sequence is mainly dominated by thinly laminated dark grey mudstone to wackestone with occasional turbidite beds and is part of the Kinta Valley limestones which are relicts of thick Paleozoic carbonate deposits, mainly Carboniferous to Permian in age. Intense slumping is mainly observed in the upper part of the section, where it is enhanced by thin beds of light grey chert and of dark grey to black shaley limestone, interbedded with medium-grey micritic limestone. Various types of slumping structures can be observed at the outcrop, especially on the cut slabs and walls of the abandoned quarry. Close-up observation shows that the slump folds are syn-sedimentary structures; even though they have superficial geometric similarities to tectonic folds, fractures, veins and cleavages are obviously missing in the slump structures. They are generally tight to isoclinal folds or ptygmatic folds. The fold axes are commonly dispersed in the planes of the slump sheets where recumbent folds are dominant. Axial planar cleavages are faintly developed, particularly in the hinge regions not by compressional forces, but rather due to compaction. In general, slumps are subjected to an extensional stress at the rear whereas the front will have localized compression, thus resulting in the formation of folds, thrust faults and imbrications. A preliminary interpretation indicates that the slump structures were formed through plastic-ductile deformation on a slope in a deep marine environment. The slump features displayed in the Sg Siput limestone hills enhanced their scientific, educational and environmental value, and the hills should be protected and conserved for educational and geoscientific purposes.