

Styles of soft-sediment deformation on a Namurian (Carboniferous) delta slope, Western Irish Namurian Basin, Ireland

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Summary

Soft-sediment deformation features from a delta-slope succession exposed in the Western Irish Namurian Basin, Ireland, are described and related to three main styles of deformation: (i) slumping, (ii) sliding and (iii) water-escape structures. While (i) and (ii) were formed by near-surface gravitational gliding of sediment, (iii) was formed by mainly vertical motion of sediment and escaping pore fluids. Deformation structures formed by slumping include slump folds and large- and small-scale faults, internal shear surfaces, deformation of early calcareous concretions and boudinage. The slumps were initially dominated by plastic deformation, whereas brittle deformation dominated the late stages. Deformation structures formed by sliding are mainly macroscopic faults, but microfaults and slide folds also formed locally. The slides were at all stages dominated by brittle deformation. Water-escape structures include mud and sand dykes and volcanoes, collapse depressions, mud diapirs and small-scale loading. These structures can be either related to or independent of slumping and sliding. While slumps are not restricted to any particular part of the delta slope, the occurrence of slides is, to a large degree, dependent upon grain size. Mud slides only occur on the muddy upper delta slope, while sand slides are only found on the lower delta slope. Water-escape structures tend to be more common on the lower delta slope.