

Where Does the Mud Go? The Dispersal of Mud from Rivers and the Stratigraphic Implications

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ABSTRACT

Many people have misconceptions about the dispersal of mud after it leaves a river mouth, believing that most of the suspended load disperses widely, accumulating in “deep water” (*i.e.*, below storm wave base) by slow settling from suspension. Recent work in modern environments, supported by numerical modeling, suggests that most (but not all) fine-grained material accumulates relatively close to the coast (*i.e.*, within 40-50 km of the shoreline or the outer edge of the subaqueous delta platform) as a result of two factors: the generation of fluid mud by a variety of processes that extract material from the surface plume and concentrate it near the bed, which in turn promotes deposition close to the river mouth; and the Coriolis Force, supplemented by coastal winds, which causes the buoyant surface plume to flow parallel to the coast. Mud escapes to deeper water in significant amounts only by means of density flows on steep slopes, for example on shelf-margin delta fronts, or by means of offshore-direct plumes at headlands. These findings imply that: 1) most mud is deposited above storm wave base; 2) the presence of mudstones in outer shelf and/or basinal settings may require larger excursions of the shoreline than might be expected; 3) mudstone successions need not represent a large-scale sea-level rise and transgression; 4) most muddy successions should contain clinofolds that downlap onto a condensed horizon; and 5) mudrocks deposited near the coast probably accumulated more rapidly than those deposited in distal, deep-water setting, causing the two deposit types to display different facies characteristics.