Paradigms and Problems in the Interpretation of Marine Conglomerates

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Because the accumulation of marine conglomerates generally involves special conditions of sourcing, transport, and concentrating mechanism, their correct interpretation can provide unique insights to tectonics, delivery systems, processes, and sequence stratigraphy. Our understanding of these deposits derives largely from studies during the last half of the 20th Century. Paradigms arose that guide our interpretation of marine conglomerates in diverse settings. Numerous problems, however, demonstrate the limitations to our understanding. This paper examines some of the paradigms and notes problems that impede our interpretation of many of these deposits.

In a shallow marine setting, upper shoreface and beach foreshore conglomerates within progradational successions are fairly well understood, although questions remain regarding implications of energy regime, the influence of storms, and the extent of longshore transport of gravel. In settings of low wave energy, conglomerate accumulates in the foresets of "Gilbert deltas". In many interpretations these are mistakenly referred to as fan deltas. Although Gilbert deltas can form at an alluvial fan shoreline, they may also be totally unrelated to alluvial fans.

Shallow marine conglomerate can also accumulate under conditions of transgression (transgressive lags above ravinement surfaces and tidal inlet deposits) or aggradation. Aggradational marine conglomerates commonly fall under no paradigm and are particularly challenging.

Deepwater conglomerates result from sediment gravity flows, particularly debris flows, characterized by matrix support and lack of internal organization. Disorganized conglomerates, however, that are grain supported and matrix-supported conglomerates with well-defined gravel fabrics lie outside the paradigm and indicate gaps in our understanding of transport processes.