



FIGURE 15.3. Effects of the relative density of river water and basin water on the nature of mixing and deposition at river mouths. In cases (A)–(C) the densities of river water and basin water are similar (*homopycnal*). In (A), the basin is shallow relative to the river, and river water is decelerated by bed friction in addition to turbulent mixing. The characteristic mouth bar bordered by bifurcated channels is common in crevasse splays prograding into lakes and interdistributary bays. (B) A numerical simulation of the evolution of a middle-ground bar. From Edmonds and Slingerland (2007). Bathymetric contours and velocity vectors are shown. In (C), the basin is deep relative to the river, and the river water is decelerated by turbulent mixing rather than bed friction (inertia-dominated). Rapid deposition of coarse sediment gives rise to mouth-bar fronts at the angle of repose, as in Gilbert-type fan deltas. (D) River water less dense than saline seawater (*hypopycnal*). The river water is buoyantly supported, allowing the river water to extend considerable distances into the basin as a narrow plume. Subaqueous levees result from rapid deceleration and deposition at the edges of the plume. This is typical of Mississippi River distributaries. Figures (A), (C), and (D) from Leeder (1999), based on Wright (1977).