18.1 Introduction

Buenaventura Bay at the Central Pacific Coast of Colombia is classified as a drowned valley (Fig. 18.1). The bay is located between two faults (NE-SW and NW-SE) on Tertiary consolidated rocky and sedimentary cliffs and on Quaternary mobile sediment platforms (Cantera 1991; Martínez 1993). The NE-SW fault is responsible for uplifting the northern shore of the bay, which is dominated by rocky cliffs, occasional rocky shores and intrusions of sand and silt (Gálvis and Mojica 1993). Many depositional beaches of northern shore embayments are formed by sediments which originated from cliff erosion and decomposing mangrove litter. Depositional fans around the mouth of the Dagua and Anchicayá rivers characterize the southern shore of Buenaventura Bay. The composition of the fans varies from silt to sand, depending on the origin of sediments and the balance between river discharge and tidal flow (Lobo-Guerrero 1993). The addition of sediments and their transport by rivers and tides also causes their continuous deposition in the navigation channel and leads to a prograding southern coast (CAE 1995; Univalle 1997).

18.2 Environmental Settings

Buenaventura Bay is located within the Inter-Tropical Convergence Zone (ITCZ). As the low pressure belt of the zone moves north and south between 10°N and 3°S, it passes over Buenaventura Bay and causes two rainy periods from September to November and April to June with mean monthly precipitation exceeding 567 mm, interrupted by periods with lower precipitation (mean 374 mm; Eslava 1993). Furthermore, the high (3,500 m)
mountains of the “Cordillera Occidental”, which run parallel and proximate (15–20 km) to the coast, cool the warm, wet air of onshore winds and cause intense precipitation. The effect of the ITCZ and orographic rain make Buenaventura one of the most humid places in the world, with a mean annual air temperature of 25.9 °C, 228–298 days of precipitation year\(^{-1}\), a mean annual precipitation of 6,508 mm and a relative humidity of 80–95 % (Lobo-Guerrero 1993). However, high evapotranspiration rates (approx. 20–30 %) prevent excessive runoff from the land and groundwater accumulation. Total river discharge into Buenaventura Bay is about 427 m\(^3\) s\(^{-1}\) (Dagua River 126 m\(^3\) s\(^{-1}\); Anicahaya River 112 m\(^3\) s\(^{-1}\)) with peaks between September and November when temperatures decrease and runoff increases (Lobo-Guerrero 1993). The freshwater discharge into the bay accounts for 8–16 % of the tidal flow (1,254 m\(^3\) s\(^{-1}\); CAE 1995). Semi-diurnal tides (3.7–5 m) generate high surface currents in the navigation