

OSL Chronology of sandy cheniers in French Guiana

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Cheniers are beaches formed from periodic wave reworking of sand, shells and gravel, and are generated by landward translation of these coarse-grained facies over a muddy substrate. Although the 1500 km-long coast between the Amazon delta in Brazil and the Orinoco delta in Venezuela is the most important chenier coast in the world, little is known of the time frame of formation of these deposits, their phases of development, their relationship to sediment sources and links with rivers between the Amazon and the Orinoco, and their intrinsic morphosedimentary structure. As they are the only rare beaches on this stretch of the South American coast, cheniers serve as major sea turtle nesting sites at the world scale for critically endangered marine turtles. Cheniers also offer various ecosystem services on the muddy Amazon-Orinoco coast. They play a major role in protecting wetlands, numerous villages and towns. Cheniers are also the most advantageous sites as far as human settlements and infrastructure on the muddy Guianas coastal plain are concerned. This last point is particularly interesting in terms of tracing historical patterns of human occupation of the French Guiana coastal plain. As cheniers become abandoned by muddy coastal progradation, they isolate from the sea, and from marine resources, the indigenous populations. 28 optically stimulated luminescence dates were obtained on the French Guiana cheniers with the aim of addressing the chronology and spatial patterns of shoreline progradation and reworking, chenier relationship to fluvial sediment source systems, and the way the shoreline changes associated with chenier development have affected the timing and modes of human occupation of the coastal plain of French Guiana. The results show that old inland cheniers characterized by fine white sands (podzols) are Late Pleistocene in age. Holocene cheniers show two age clusters: mid Holocene for the inner ridges and late Holocene for outer ridges. However, the spatial distribution of the ages shows, locally, a complex pattern of progradation determined mainly by: (1) the alongshore diversion of river mouths by muddy progradation, and (2) long-term river-mouth liquefaction of mud banks. The latter condition, which contributes to limited muddy progradation, explains the presence of relatively old (> 1000 yrs BP) cheniers near the present shoreline. The relationship between these phases of chenier growth and pre-Columbian settlement patterns on the French Guiana coast is currently being investigated.