The Marajó Island, located at the mouth of the Amazon River, is well known as the largest fluvio-marine island in the world, but so far there has been no efforts attempting to reconstruct its mode of formation. Previous publications have provided only general models proposing that tectonic activity, mostly taking place during the Quaternary, was crucial for its establishment (Igreja, 1992; Costa et al., 2002). These workers have stressed that northeast and east-west slip faults were crucial to the origin of the Tocantins and Pará rivers, ultimately leading to the establishment of the Marajó Island. Nonetheless, the details involved in this process remains to be understood. The present work combines sedimentologic and geomorphological data (the latter obtained from spatial analysis) in order to reconstruct the depositional systems prevailing through the Quaternary in this study area, and uses this type of information as evidence for discussing the separation of the Marajó Island from mainland. Morphologic features obtained from SRTM data, integrated with geologic information, are emphasized in order to provide the basis for understanding the development of the lowest Amazon drainage basin, focusing on the history of one of the largest Amazonian tributaries, the Tocantins River, throughout the Quaternary. This approach led to the recognition of a fan morphology recording a continuous sedimentation from the locality of Tucuruí to the south in the mainland up to the southwestern and central parts of the Marajó Island. The fan-like feature encompasses deposits of Pleistocene, and possibly also Plio-Pleistocene ages, being part of a sedimentary unit referred generically as the Post-Barreiras Sediments. These are sharply entrenched into rocks that vary northward from Paleozoic, to Cretaceous, and then Miocene ages.

The fan can be described, according to their occurrence, as the southern, mid and northern sectors. The southernmost and narrower tip of the fan configures a funnel shape ranging from 140 km long and 2-3 km wide upstream of Tucuruí, to 25 to 50 km in the mid and upper reaches, respectively. A few NNW/SSE orientated paleochannels up to 2 km wide were recognized in the Post-Barreiras Sediments located in the extreme western portion of the funnel, paralleling the basement.

The mid fan sector, which represents the point where the fan becomes the largest, includes a central area located between the Tocantins and the Jacundá rivers, and two lateral wings. The central sector extends for 90 km in the north/south direction, and 170 km in the east/west direction. The wing located to the west of the Jacundá River extends throughout almost 90 km northwestward, reaching the Caxiúna Bay. The wing to the east of the Tocantins River forms a NE/SW elongated belt that is 165 km long and up to 50 km wide, and displays few channels running mostly to NNE. Noteworthy in this sector is the eastward inflexion of a main paleochannel at the transition of the southern and the mid fan sectors, a pattern that is followed by the Tocantins River, which turns to east through a distance of almost 20 km at this same position.

The northern fan sector is the largest, encompassing great part of the Marajó Island, where it is characterized by mostly by the Post-Barreiras sediments. This unit extends throughout the Marajó Island, forming a continuous from the mid fan in the mainland. A typical feature of the northern fan sector is the abundance of paleochannels, which are particularly well developed in the western side of the Marajó Island. Some large channels from the southwestern margin of the Marajó Island are in continuity with the NNW-SSE orientated channels described in the southern and mid fan sectors.

The fan morphology characterized herein is attributed to the record of a tectonically controlled NNW/SSE orientated paleovalley incised into Miocene and older rocks. The incised valley was fed by a paleo-Tocantins River, which deposited its sediment load continuously to the north-northwest, reaching the Marajó Island and producing a display paleovalley morphology during the Plio-Pleistocene/Pleistocene. This channel system became abandoned due to capture by NE-SW orientated faults and establishment of the Pará River by W-E strike slip movements. It is proposed that this event, which probably took place sometime in the early to mid-
Holocene, was responsible for detachment of the Marajó Island from mainland. As the Tocantins River shifted into a northeastward direction, the north to northwest continental inflow into the area corresponding to the Marajó Island was cut off, resulting in the network of abandoned channels related to Plio-Pleistocene incised valley to the west. This process was accompanied by a slight subsidence of the eastern part of the Marajó Island, where a large estuarine system became established during the late Pleistocene to Holocene. With the opening of the Marajó Bay, the water supply in the head of this estuary was also cut off, causing stagnation of the depositional setting, with its consequent abandonment, a process that might have culminated with the development of the Arari Lake. This proposed paleogeographic reconstruction confirms a very young age, i.e., younger than the Pleistocene, for the detachment of the Marajó Island.

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References
