GEOMORPHOLOGY AND SEDIMENTOLOGY OF A LARGE QUATERNARY PALEOCHANNEL FROM SOUTHWESTERN MARAJÓ ISLAND, NORTHERN BRAZIL

Dilce F. Rossetti[a], Márcio M. Valeriano[a], Ana M. Góes[b] and Luís Rogério Mantelli[a]
[a]Instituto Nacional de Pesquisas Espaciais-INPE, OBT/DSR Rua dos Astronautas 1758-CP 515, 12245-970 São José dos Campos-SP rossetti@dsr.inpe.br;valerian@dsr.inpe.br
[b]Universidade de São Paulo-USP, Instituto de Geociências - Programa de geologia Sedimentar e Ambiental Rua do Lago, 562 Butantã 05508-080 São Paulo, SP goes@igc.usp.br

Marajó Island has been under continuous modification throughout the Quaternary due to tectonics promoted by reactivation of old fault systems, a process that would have affected sedimentation patterns even during the Holocene (e.g., Costa & Hasui, 1997; Bemerguy *et al*. 2002; Rossetti, 2007). A recent publication (Rossetti & Valeriano, 2006) has introduced a tectonic model for the establishment of a large paleovalley system in the lowest Amazon drainage basin, which would have been fed with sediment brought by a north to northward flowing river. According to this proposed model, the lowest reaches of the Tocantins River, one of the largest Amazonias tributaries, would have been captured from this direction into its modern northeast position, as a result of fault capture. In this process, which would have resulted in the detachment of Marajó Island from mainland, an impressive complex of paleochannels would have been left behind. Although the record of these paleochannels is not a novel, their presence in the western half of the island, where vegetation cover is dense, was suggested only recently with basis on analysis of digital topographic model obtained by interferometric synthetic aperture radar (InSAR) during the Shuttle Radar Topographic Mission (SRTM).

This study focuses the southwestern Marajó Island, where an exceptionally well-developed geomorphologic feature suggestive of a paleochannel network was recognized. The goal is to characterize this paleochannel system combining geomorphology, derived from SRTM data, and sedimentology, obtained with basis on outcrop and core data.

The SRTM processing revealed, with great precision, a palimpsest drainage system consisting of a large paleochannel characterized by a highly sinuous meander that averages 2.6 km wide and 30 km long, encompassing an of almost 80 km^2.This main meander continues following a straighter course southward through a distance of up to 15 km, where it bends slightly to the southeast, proceeding its track for more than 18 km until the margin of the island defined by the Pará River. The main paleochannel is connected to tributaries formed by a network of much narrower (>0,4 km wide) channels that are particularly well developed northward of the main loop to the north. Part of this paleodrainage is in the process or erosion by local modern rivers, which have in the main channel their headwaters.

The mapped paleochannel system was properly drilled in order to characterize their internal features. Two drills aimed to record the main channel, one located at the southern end of the main sinuous meander (Drill #1), and the other one in the straighter channel segment circa 6.4 km northeastward of the town of Breves (Drill #2). The third drill was plotted at the right margin of the Tucano Sul River (Drill #3), in an area corresponding to the floodplain of the paleochannel, as suggested by SRTM data.

The results show that drills #1 and 2 consist chiefly of overall fining and thinning upward sedimentary successions formed by very well to well sorted and well rounded sands, which grade upward into muds. The successions are internally characterized by smaller scale, sharply based cycles. Sands are cross-stratified, and locally display abundant reactivation surfaces marked by thin mud drapes, which define alternating thicker and thinner foreset packages. A trench on these sites revealed an assemblage of trace fossils dominated by *Thalassinoides*, *Ophiomorpha*, *Diplocraterion*, *Planolites*, and possibly *Teichichnus* (?) and rare *Skolithos* near the surface. Drill # 3, in contrast, consists of interbedded sands and muds, with the latter been thicker and locally rich in organic debris.

The recorded sedimentary successions in drills 1 and 2 are typical of channel deposits, being similar to many other documented channel successions (e.g., Cant & Walker 1976, Allen, 1982; Miall 1977, 1985). The cross sets with abundant reactivation surfaces marked by mud drapes suggest that the channel

deposits might have been locally reworked by tidal currents. In particular, the double mud drapes separating alternating thicker and thinner foresets packages, resemble structures formed by ebb/flood tidal fluctuation. The trace fossil assemblage in the channel deposit near surface confirms a coastal setting for channel location. Apparently, marine invasion might have been restricted to the confined flows within channel areas. A likely hypothesis is that after abandonment of main channels, a relative rise in sea level would have allowed marine inflows within the channel located nearest to the coast, causing momentous reworking. The results obtained from this analysis provided important information for discussing the possible correlation of the paleochannels system in southwestern Marajó Island with similar features mapped in the eastern part of this island, as well as discuss the possible influencing factor (s).

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