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Modern Geomorphic Processes along the Taquari River in the Pantanal : A Model for Development of a Humid Tropical Alluvial Fan.

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Wetland management within the alluvial fan of the Taquari River in the Pantanal of Brazil requires understanding the channel-floodplain geomorphology. The alluvial fan of Taquari has an area of about 50,000 km² of lowlands of quaternary origin.

Analyses of hydrologic, geomorphic, grain size distribution, and remote sensing data allowed the development of a conceptual model that accounts for the identification of two distinct sections of the alluvial fan of the Taquari River, a meandering section and an anastomosing section.

The meandering section is located in the region of the fan head. Temporal variability of discharge in this reach is due to seasonality of precipitation. Channel and active floodplain are entrenched within walls of older terrace deposits. There is a predominance of coarse material (>63 μm) in the river, river margins, and floodplain. Temporal variability of suspended sediment concentration indicated that the fine sediment (<63 μm) is source limited and the coarse sediment (>63 μm) is transport limited.

The anastomosing section begins at the intersection point of the fan, approximately 100 km down the fan head. The unconfined character of the floodplain in the distal region of the fan is due to lower bank heights and progressive decrease of floodplain elevation in relation to river water level. Decreasing downstream discharge is due to overbank flow. The decrease in suspended sediment concentration downstream reveals that almost all the sediment load is deposited along the distal region of the

alluvial fan. Decreasing grain size within sediments of the river, river margins, and floodplain indicates vertical deposition in the floodplain, while coarse material remains as lateral deposits within or near the channels. This modern depositional character of the fan indicates that the system is still active and comprising a geomorphological evolution.

Spectral mixture analysis of Landsat TM imagery, using sediment-laden water, clear water and vegetation as endmembers, revealed changes in the hydrological behavior of the Taquari River. Floodplain flooding in the enlarging floodplain area of the distal fan is in direct response of a combined effect of changing geomorphology of the alluvial fan and river hydraulic adjustment to variation in both discharge and sediment load.