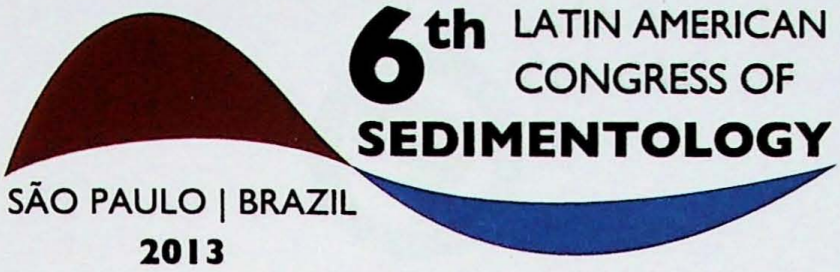

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In search of the ancestors of meandering rivers: models and examples

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It is widely accepted that the dominance of meandering rivers in areas of low slope gradient is related to bank stabilization by vegetation, and recent extensive compilation of published data indicate that this fluvial style was almost absent before the Silurian. One of the main questions arising from this hypothesis is whether there was a particular style of fluvial channels in areas of low slope gradient in pre-vegetation times. Comparison of the results of diffusion-based numerical modeling with descriptions of selected intervals of fluvial successions of Neoproterozoic (Santa Bárbara Group, southern Brazil) and Mesoproterozoic (Tombador Formation, Northeastern Brazil) age suggest that a two different non-actualistic fluvial styles occurred in conditions of slope gradient, water discharge and sediment flux similar to those of post-Silurian meandering streams:

(I) Low gradient braided rivers with sand-rich flood-plains. These style differs from the sheet-braided style expected in higher slope settings due to the presence of a few meters deep and hundred meters wide channels filled by fine sandstone with compound cross stratification of unit and compound bars.

(II) Mud-rich fluvial systems in which a great proportion of the bed load is composed of mud aggregates.

This two systems are expected to occur respectively at higher and lower slope gradients, but both within the range of modern meandering rivers.