



Late Jurassic fluvial-aeolian depositional system in Paraná Basin: implications for the early stages of the Gondwana break-up

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Late Jurassic-Early Cretaceous sedimentary rocks of Paraná Basin recorded the environmental and geotectonic changes of the early stages of Gondwana break-up. In this basin, the Late Jurassic is represented by Guará Formation, which is preceded by Pirambóia Formation, whose age is unknown, and followed by Early Cretaceous Botucatu Formation. Four vertical sections in the central portion of the Paraná Basin allow the expansion of the areal distribution of Guará Formation to the north and the evaluation of this new understanding of basin evolution. Nineteen lithofacies were grouped in five facies associations, through the classical method of facies analysis. In Pirambóia Formation deposits, the relation between aeolian dunes, aeolian sand sheets and interdunes with water table level points to a wet aeolian system. The interference of ephemeral fluvial deposits in aeolian sedimentation characterize the Pirambóia Formation succession as a fluvial-wet aeolian depositional system. The multistorey, unidirectional and highly erosive features of fluvial deposits of the Guará Formation indicate an amalgamated perennial braided fluvial system, with paleocurrent patterns to SW. In Botucatu Formation there is a dominance of dune deposits without interdune preservation, indicating that these deposits are part of a dry aeolian system. Regional unconformities separate these stratigraphic units by a shift in facies and depositional systems, reflecting climatic changes. The Guará Formation model, established in correlation with southern sections, represents a broad fluvial system with aeolian interaction deposited in a vast endorheic basin with more than 800 km, flowing from the northeast to the southwest. The fluvial architecture and the average of grain-size change from proximal to distal portion of the system, suggesting a distributive fluvial model with aeolian interaction. The Late Jurassic record of Guará Formation represents a particular stage on the long depositional history of Paraná Basin, in which the depocenter is located in the southwestern portion of the basin. Other two regions of southwestern Gondwana show environmental similarities with Guará Formation in Upper Jurassic: the Afro-Brazilian Depression, between northeastern South America and Central Africa, and the record of Huab Basin, the African counterpart of Paraná Basin. These three depositional paleoenvironments should represent the early tectonic stages of Gondwana break-up.