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Mesozoic Rift Sedimentation and its Relationship with Climatic Belts Along the Brazilian Atlantic Margin

Significant fluctuations of climatic belts during the Late Jurassic through Aptian can be inferred from lithological and palynological data from Brazilian Atlantic Marginal rift basins. Seven major climatic fluctuations have been recognized. Four represent changes from arid to semi-arid conditions (1- Dom João stage; 3- Aratu and Early Buracica stages; 5- Latest Jiquiá stage; 7- Late Alagoas stage), and three represent changes from semi-humid to humid conditions (2- Rio da Serra and Early Aratu stages; 4- Late Buracica and Early Jiquiá stages; 6 - Early Alagoas stage). These climatic changes have been strongly linked to higher frequency Milankovitch oscillations. The sedimentary record of the rifts is composed of fluvio-deltaic to eolian sandstones and red beds deposited in ephemeral lakes. Associated rimulate gymnospermous pollen indicates an arid climate. The succeeding phases are characterized by deep lake sedimentation, including dark gray to black shales, and turbidities. Associated pteridophytic trilete spores and gymnospermous bisaccate pollen imply more humid conditions. As the rift was filled by extensive fluvio-deltaic sedimentation, the diversity of inaperturate, polyplicate, and rimulate pollen and subordinate trilete spores recorded a semi-arid environment. After another humid period, an important semi-arid phase represented by coquina beds and black shales, with rimulate pollen grains, deposited in shallow lakes, took place. Overlaying the coquina beds is a regional unconformity covered by a transgressive succession with conglomerates at the base, followed by black shales and thick evaporites.