# THE MARINE INGRESSION IN THE NE BRAZIL DURING THE EARLY CRETACEOUS RECORDED IN THE ROMUALDO FORMATION, ARARIPE BASIN

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**ABSTRACT**: The genesis and sedimentary infill of the Araripe Basin occurred in the early Cretaceous meanwhile tectonic events led to the break-up of Gondwana and the associated opening of the South Atlantic Ocean. One of the earliest consequences of the South Atlantic evolution was a regional-scale marine transgression in the interior of the northeastern Brazil. The Romualdo Formation, the uppermost stratigraphic unit of the Santana Group, Araripe Basin, records this marine ingression during the late Aptian. The major debate on the marine nature of the Romualdo Formation concerns the Aptian paleogeography and the exact extent of the flooding. The timing and stratigraphic architecture of this unit are crucial to understand the paleogeography of Gondwana as well as how the proto-Atlantic Ocean reached the interior of NE Brazil during the early Cretaceous. This contribution comprises the first detailed stratigraphic analysis of the Romualdo Formation, and focuses on surface data collected in the eastern part of the Araripe Basin. By using a sequence stratigraphy approach, we interpreted lateral facies changes and the stratigraphic sequence geometry, as well as we identified key stratigraphic surfaces and facies associations of the unit. The correlation of measured sections resulted in a stratigraphic framework that displays a transgressive-regressive cycle composed by two depositional system tracts. This transgressive-regressive cycle corresponds to the marine ingression and is characterized by a facies-cycle wedge bounded by two regional unconformities. In the eastern part of the basin, the Romualdo depositional sequence comprises coastal alluvial and tide-dominated deposits followed by marine transgressive facies characterized by two fossil-rich intervals: a lower fossil-rich interval of black shales with carbonate fossiliferous concretions (*Konservat-Lagerstätte*), and an upper level with mollusc-dominated shell beds and shelly limestones. Following the marine flooding, an incomplete regressive succession of marginal marine facies records the return of continental environments to the basin. Contrasting paleogeographic reconstructions in the literature suggest various different directions for the marine ingression. Our data, based on the facies-cycle wedge-geometry and paleocurrent data, show depositional dip towards southeast, decreasing thickness towards north and northwest, with source areas located at the northern side of the basin. Contrary to several paleogeographic scenarios previously proposed, the marine ingression would have reached the western part of the Araripe Basin from the SSE. Our data lead to accurate regional paleogeographic interpretations that have profound impact on the path of the marine ingression into the interior of northeastern Brazil during Aptian times.

**KEYWORDS**: MARINE INGRESSION; STRATIGRAPHIC ARCHITECTURE; CRETACEOUS PALEOGEOGRAPHY