

FROM ORDOVICIAN SEAS TO JURASSIC DESERTS – THE GEOLOGICAL RECORD OF THE PARANÁ BASIN, S BRAZIL

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The Paraná basin of about $1,1 \times 10^6$ km² is one of the remnants of a vast sedimentary basin of SW Gondwana that preserves a Phanerozoic stratigraphic record of almost 400 million years, ranging from Late Ordovician to Late Cretaceous times, with a maximum cumulative thickness – including Mesozoic igneous rocks – of about 7 km. Six supersequences (major unconformity-bounded, second order allostratigraphic units) record successive phases of sediment accumulation that alternated with substantial times of erosion in the Paraná basin during the Phanerozoic. The two lower supersequences, Ordovician-Silurian and Devonian in age, document two Early Palaeozoic transgressive-regressive marine cycles. A substantial period of erosion – up to 50 Ma long – preceded the deposition of the third supersequence that spans the range Carboniferous to Lower Triassic. This is a sedimentologically complex package holding glacial deposits, coal measures, bituminous shales and a thick section of Permian red beds, grouped together according the classical definition of “Gondwana sequence” from India. The three upper supersequences in the Paraná basin are Mesozoic continental sedimentary packages associated with abundant igneous rocks.

The evolution of the Paraná basin can be summarized in a simple form as follows. First, throughout the Palaeozoic, outward growth of continental lithosphere, within the Gondwanides along the southern margin of Gondwana, was an important process through which the Paraná and correlated areas became progressively isolated from their once conterminous ‘south’ facing continental-margin position open to the Panthalassa Ocean throughout much of the pre-Carboniferous Palaeozoic times. This evolving tectonic framework resulted in progressive hinterland migration of the depocentres to finally become trapped as an intracratonic basin within the heartland of Gondwana by Late Permian times.

Mesozoic deserts followed, and sedimentation in the Paraná basin was terminated by the large igneous event – the Serra Geral lavas – that heralded the initiation and progressive opening of the South Atlantic Ocean.