

LATE PALEOZOIC TECTONICS, GLACIATION AND SEDIMENTATION IN THE PARANÁ BASIN: LATEST ADVANCES*

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ABSTRACT: In this contribution we explore recent advances from ongoing research on the interplay between tectonics and climate in the evolution of the Paraná Basin from the mid-late Carboniferous to the earliest Permian, a time characterized by intense climatic and tectonic instabilities in SW Gondwana. Latest Devonian to Pennsylvanian uplifting on the eastern border of the basin, including its African counterparts, is evidenced by the erosive and angular unconformity that increases in amplitude eastward. Such uplifted land probably nucleated ice centers in order to feed glacial lobes that first entered in eastern Paraná Basin flowing to the NW. Subglacial landforms and deposits are almost exclusive of the lowermost succession of the Itararé Group both in the eastern and in the southern sectors of the basin. The latter requires an additional ice source farther southward, which would have nourished ice lobes to the north through the Rio Grande shield and beyond. In the middle Itararé Group signs of glaciation are scarce or absent and the sandstone content increases, indicating more temperate conditions. During this time of extreme deglaciation deltaic progradations are recorded, some of them associated with aggradational fluvial systems that testify non-glaciated shorelines. Paleocurrents show sediment transport to the north and northwest during the Pennsylvanian, pointing to a main depocenter located in the central-northern sector of the basin where the Itararé Group as a whole reaches its maximum thickness. Glaciomarine mass-transport diamictites with striated/faceted clasts in the upper Itararé Group give evidence of a new phase of glaciation, which an early Early Permian age is supported by palynomorphs and other fossil groups, such as conodonts. Paleocurrents from associated outwash and fluvio-deltaic facies are towards the SW, indicating meltwater source to NE during the early Permian. This change in sediment dispersion patterns was probably triggered by tectonic uplifting in the northeastern part of the basin, an event that shifted the depocenter southwards and produced the prominent subaerial unconformity between the Itararé Group and the Rio Bonito Formation. The recognition of two main phases of strong glaciation separated by a phase of minor glacial activity indicates that previous stratigraphic models need revision in order to reevaluate the role of base level and ice-margin fluctuations as primary controls on stratigraphic architecture. The timing of the glacial to postglacial transition seems to be highly diachronous throughout the basin. Recently published ages from ash layers in glacial shale and postglacial coals in the southern edge of the basin (Rio Grande do Sul) place the end of glaciation near the Carboniferous/Permian boundary, whereas palynological dating of diamictite intervals in Paraná and São Paulo indicates glacial conditions up to the early Sakmarian, based on comparison with other Gondwana associations. Such evolving group of evidence seems to support the hypothesis of non-synchronous ice-spreading centers on tectonically-driven paleotopographic highs.

KEYWORDS: LATE PALEOZOIC ICE AGE; TECTONICS AND SEDIMENTATION; PALEOGEOGRAPHY

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