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A summary of the Brazilian Paraná Basin Ordovician

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ABSTRACT

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The study of the Ordovician of Paraná Basin culminated on the three-fold lithostratigraphic subdivision of the Rio Ivaí Group as follows: Alto Garças, Iapó and Vila Maria formations. The history of deposition of these rocks is linked to the transition from a marine fluvial environment into the glacial diamictites and shales with dropstones, overlain by post-glacial transgressive shales, siltstones and sandstones. The Ordovician–Silurian transition is marked by a glacial and an extinction event that impacted the marine diversity of life and the permanence of the first land plants. At least three sections, designated as the sections 1, 2 and 3 below, had their sedimentary facies, taphonomy, organic carbon content and thermal maturation analysed as well as their macro- and microfossil assemblages recognized.

All studied sections were productive for macro- and microfossils, although the section 1 has limited occurrence and lower preservation of palynomorphs. The greatest fossil diversity was recovered from the section 2. To date, the diversity recovered from the Ordovician–Silurian of the Paraná Basin comprises 12 fossil groups, namely ostracods, brachiopods, bivalves, gastropods, cryptospores, fungi, acritarchs, chitinozoans, prasinophyte algae, scolecodonts, a possible graptolite and, more recently, a trilobite of the order Dalmanitidae. 51 species of palynomorphs of terrestrial and marine origin were recognized. This is the highest diversity reported from the glacial–postglacial transition in the Ordovician–Silurian boundary interval of Brazil. 18 species of cryptospores, acritarchs and fungi occur in the basal diamictites (the Iapó Formation) as well as the discinoid *Kosoidea australis*. In the upper part of these diamictites, the palynomorph assemblage comprises 26 taxa, most of which persist also in the postglacial shales. Still, in the shales with dropstones of the Iapó Formation, brachiopods (*K. australis*, infaunal lingulids, *?Palaeoglossa* and rhynchonelliformeans), endemic ostracods such as *Satiellina paranaensis* and pyritized specimens of a widely common Hirnantian index species *Harpabollia harparum* occur together with indeterminable ostracod species. At least two different species of bivalve mollusks were also found as well as a gastropod species (*Bucanella* sp.).

Observing the palynomorph assemblage, it was possible to record also chitinozoans restricted to the lowermost portion of the Vila Maria Formation. This part of the formation was observed in the outcrops 2 and 3 and contains postglacial chitinozoan assemblages that are not younger than the earliest Rhuddanian. Some centimeters above this interval but still in the lower part of the Vila Maria Formation, the occurrence of *Spinachitina debbajae* followed by *Spinachitina silurica* refer to the Silurian in the Paraná Basin. In the section 1, the recovery of a trilobite thorax configures the oldest record of this group in Brazil and shows that this ancient sea was also thriving with life even after the glaciation-related Hirnantian extinction event.

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