



Gondwana 12

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The ichnofossils from the Brazilian Permian varvites

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The rhythmites from the Brazilian Permian have shown a characteristic ichnofauna related to glacial environments. These rhythmites, considered as varvites, occur in two sedimentary basins located in Central (Sanfranciscana Basin) and Southern (Paraná Basin) Brazil. The classical exposure is the varvite of Itararé Group (Paraná Basin, Permian) nearby the city of Itu (central-eastern of São Paulo State). These rhythmites consist of thin laminae of sandstone and siltstone overlaid by siltstone and mudstone. In these can be observed an abundant ichnofauna represented mainly by *Isopodichnus* and *Diplichnites* (Fernandes et al., 1987), *Umfolozia*, *Gordia* and *Scolicia* (Carvalho and Fernandes, 1989). The trackways of *Isopodichnus* and *Diplichnites* were attributed to the activity of benthic invertebrates, possibly notostracans. The tracks of these crustaceans are related to feeding search or crawling traces. These ichnofossils, with *Umfolozia*, are considered as produced in shallow periglacial lakes, which were partially or temporarily in contact with the glacier border. The rhythmites of the Mafra and Rio do Sul Formations (Itararé Group) nearby Mafra and Rio Negro counties, Santa Catarina State and Paraná State, show a wide ichnodiversity (Balistieri et al., 2002) comprised by *Cochlichnus*, *Cruziana*, *Diplichnites*, *Diplopodichnus*, *Gordia*, *Hormosiroidea*, *Lockeia*, *Protichnites*, *Protovirgularia*, *Rusophycus* and *Treptichnus*, which were produced by arthropods, mollusks and wormlike animals, in a shallow low-energy brackish, poor-oxygen conditions, in a marginal to shallow marine context. In the rhythmites of the Rio do Sul Formation in Trombudo Central and Anitápolis, also from the Santa Catarina State, the ichnocoenoses is composed by *Isopodichnus*, *Umfolozia*, *Gordia*, *Gyrochorte*, resting traces and escape structures, suggesting a sedimentation in a freshwater glacial lake (Marques-Toigo et al., 1989). These ichnofossils are also present in the rhythmites of Rio do Sul Formation in Rio Grande do Sul State (Dias-Fabricio and Guerra-Sommer, 1989; Netto, 2000). *Isopodichnus*, *Diplichnites* (Sgarbi et al., 2001) and *Undichnia* are found in the rhythmites of Santa Fé Group (Permo-Carboniferous) in northwest of Minas Gerais State, Sanfranciscana Basin. This last ichnogenus is probably a swimming fish trail. Despite the regional differences of sedimentation among these localities, all ichnocoenoses indicate an intense bioturbation by arthropods and wormlike organisms in fine sediments. The environment comprises shallow waters of glacial lakes during the Permian and the ichnofossils are related to ichnocoenoses of same age of those from South Africa (Dwyka Series).

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