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MIOSPORES FROM LATE FAMENNIAN VARVES AND TILLITES OF BRAZIL

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In large intracratonic basins of northern Brazil, diamictites with striated, faceted and polished pebbles, rhythmites with dropstones, erratic boulders and striated pavements indicate the existence of an ice age in the Famennian time. The sediments laid down under glacial and periglacial conditions make up the upper Cururi Formation in the Amazonas Basin and the uppermost Cabeças Formation in the Parnaíba Basin. Formerly dated by the presence of the fucaleal alga Protosalvinia (Foerstia), known in the middle Famennian (marginifera conodont Zone equivalent) of eastern USA, these sediments are now dated by miospores (LE = lepidophytus-explanatus and LN = lepidophytus-nitidus) as equivalent to the praesulcata conodont Zone which underlines the D/C limit. These sediments containing also a few reworked miospores from older deposits contrast with the palynological content of a rhythmite with dropstones which was sampled in the Cabeças Formation of a borehole (1-TM-1-MA) in the Parnaíba Basin.

In this rhythmite, 95 % of the specimens (not of the species!) of miospores are reworked from almost all Eifelian to Famennian miospore zones, except from those of the conodont crepida to marginifera equivalent time interval. The preservation state of the material is excellent. There are between one and eight thousands palynomorphs (miospores, spiny acritarchs and chitinozoans) per gram of sediments in this sediment.

The rhythmite is composed of an alternance of sandy-silty (A) and silty-clayed (B) layers, about 0.5 mm thick, each. Both types of layers contain evidences of lateral influx rather than purely vertical sedimentation. Palynomorphs are almost as abundant in A than in B. It seems therefore that the dark part of the rhythmite (B) is not sedimented vertically during winter when the surface of the lake is covered by ice (like in near-glacier varves of the Pleistocene) but is a result of periodic change in the transport capacity of the melted waters entering the lake (like in periglacial varves known in the Holocene).

Amongst the fifteen species of uppermost Famennian (equivalent to the middle and late praesulcata) only three are regularly in A and B, the other twelve being only found in B (the dark layer!). Plants (unknown) corresponding to the 12 species must produce their spores during the season of influx of silty-clayed. A consequence is that this rhythmite is probably a true varve and that these 12 species represent the contemporaneous flora of the varves rather than being also reworked from older sediments.