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MINERALOGICAL PHASES OF PLANT TRACE FOSSILS FROM THE DEVONIAN OF BRAZIL (SÃO DOMINGOS SHALE, PARANÁ BASIN) —ANTÔNIO CARLOS JACOME DE CASTRO¹, ISMAR DE SOUZA CARVALHO¹, JOSÉ HENRIQUE GONÇALVES DE MELO² AND ANTÔNIO CARLOS SEQUEIRA FERNANDES^{1,3} — ¹*Instituto de Geociências, Universidade Federal do Rio de Janeiro*; ²*PETROBRÁS, CENPES, DIVEX, SEPIBE, Ilha do Fundão* e ³*Museu*

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This article concerns tubular biogenic structures, parallel or not to the bedding plane, interpreted as plant trace fossils. They occur within an interval, one meter thick, of light-grey shales. The outcrop is a railway cut near the airfield of Ponta Grossa city (State of Paraná), and exposes the lower part of the Middle Devonian São Domingos Shale.

The ichnofossils are variable in length (up to 10 cm) and diameter (up to 1 cm). They are coated with a violet-colored weathering film of hydrated iron oxides that surrounds a dark grey argillo-arenaceous core material.

The X-ray analysis of the filling mass revealed an outer layer in which kaolinite, pyrite, gibbsite and quartz are the main constituents, and an innermost layer made up of minute monoclinic crystals of calcium sulphate. These minerals were probably formed by distinct processes at different times. First, reducing condition in a humid-semiarid transition climate favored kaolinite stability and the preservation of iron sulphide (pyrite). Subsequent degradation of the kaolinite gave rise to gibbsite, whereas more oxidizing conditions turned part of the sulphides into sulphates originating gypsum crystals.

Glennie & Evamy (1978, *Palaeogeogr., Palaeoclimatol., Palaeoecol.*, 4: 77-87) reported some examples of sediment cementation on a concentric pattern around former plant root structures, in which gypsum can be the cementing agent. This was inferred to result from selective concentration of ions due to the limited capability of salt absorption by plant roots. Nonabsorbed ions would tend to concentrate around the roots and promote cementation of the sediments. Similarly, the Brazilian materials studied herein may also represent rhizolitic structures developed in lagoonal or littoral environments during a Middle Devonian progradational event in the Paraná Basin.

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