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WET PEPERITES OF PARANÁ-ETENDEKA LIP: A SNAPSHOT OF MICROFOSSILIFEROUS LIFE DURING THE EARLY CRETACEOUS

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The fossil record is almost exclusively recovered from sedimentary rocks. Recognized as a reliable guide to understand the rise and evolution of life on Earth, fossils and microfossils are a result of certain conditions that allow the preservation of biological matter (e.g., anoxia, rapid burial, and others), which are sporadically available in sedimentary deposits. Over the last decades, several reviews have emphasized the abundance of life in uncommon environments as in deep igneous rocks and associates (e.g. extreme conditions of pH, temperature and others), encouraging studies on igneous and metamorphic rocks which may be suitable for retain fossil remains. In this work, we investigated the fossiliferous content of wet peperites recovered from the Paraná-Etendeka Large Igneous provinces (PELIP), Early Cretaceous, South Brazil. Wet peperites can be defined as a volcaniclastic rock formed by an intruding-mingling interaction of a lava flow with a wet unconsolidated sediment. Therefore, aiming to recover fossil remains, we performed a modified palynological preparation (1 kg of triturated rock/each) on samples from six outcrops of peperite distributed along the Paraná (PR), Santa Catarina (SC) and Rio Grande do Sul (RS) states. PR and SC samples are related to the Paranapanema Formation, while RS is related to the Esmeralda Formation. The recovered organic walled microfossils (OWM) comprise spores (1), fungal spores (2), sporomorphs (12), Unidentified bissacates (pollen grain - 2), non-opaque phytoclasts pitted (2), degraded (6), cuticle (2), unidentified (3) and amorphous organic matter (2). Even with limited presence, most of them showed an expected pale yellow to dark color, and at least two degrees of preservation (low-grade of preservation potential). Ornamentations as ridges or saccis were observed. The recovered of OWM allowed to suggest the presence of wetter conditions as postulated by other researchers. Results obtained by non-volcanic sedimentary and volcaniclastic rocks interbedded with PE lava flows have suggested a transition from dry to more humid conditions during the volcanism emplacement. This paleoenviromental change was probably related to the SO2 degassing which led to climate cooling and significant precipitation redistribution, resulting in wetter paleoenvironments, perhaps isolates ponds. Moreover, our findings not only propel further investigation related to the paleoclimatic change induced by PELIP emplacement, but also establish a microfossiliferous potential to wet peperites, which are usually considered devoid of evidence of life. In this sense, our work highlights that several other igneous/volcaniclastic units (often underestimated for its paleontological potential) throughout the geological time may be hiding important evidence for past paleoenvironments. This has great implications for understanding life in deep time (e.g., Archaean and Proterozoic eons), since fossils in such ancient rocks are often scarce.

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