PALEOWILDFIRES DURING THE DEPOSITION OF THE CRATO MEMBER (SANTANA FORMATION, ARARIPE BASIN) DETECTED BY THE PRESENCE OF MACROCHARCOAL

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The occurrence of charcoalified plant remains in the geological record has been reported as wildfire evidence and used as a proxy to infer paleoatmospheric oxygen levels. In Cretaceous sediments from Europe and North America, the widespread occurrence of charcoal suggests that O_2 levels were above present atmospheric levels throughout the period and reached a peak during the Mid-Cretaceous. The main goal of the present study is to present preliminary results through analysis of charcoal from upper Aptian rocks of the Araripe Basin (Crato Member of Santana Formation), northeastern Brazil. Fragments of wood charcoal (up to 2 cm) come from microcrystalline limestones deposited under bacterial action in evaporite lagoon environment, associated to arthropods, fishes and plant impressions typical from the Crato Member, considered as a fossil Lagerstätte. Cretaceous paleoclimate maps based on climate sensitive sediments and fossils included the basin in the Tropical Equatorial Hot Arid Belt. Charcoal is considered as 'instantly fossilized remains', with insignificant chemical and morphological changes once burial of the charred remains takes place. Its presence attests for the occurrence of wildfires in the Crato paleoflora, which is composed mainly by conifers of the families Araucariaceae and Cheirolepidiaceae, Gnetales and less commonly by angiosperms represented by magnoliides, monocots and dicots. Charcoalified wood remains were analyzed under Field Emmission Gun-Scanning Electron Microscopy (FEG-SEM) to observe anatomical details and homogenized cell walls. Small pieces were sampled with aid of dissecting needles under a Leica S8 APO stereoscopic microscope. The fragments were then mounted on standard stubs with double-sided carbon tape, gold coated, examined and photographed. The homogenization of the cell walls detected under FEG-SEM agreed with the typical features showed by macroscopic charcoal fragments (black color, silky luster, well-preserved anatomical details and homogenized cell walls). For petrographic analysis the material was embedded in epoxy resin and polished to obtain a reflective surface allowing observing the occurrence of inertinite. The impact of wildfires in the environment during the deposition of the studied stratigraphic horizon has yet to be established, but the present results expand the global database for the Aptian estimate paleoatmospheric oxygen levels of around 28%.(Sponsored by FAPERJ, CNPQ).

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