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Mercury concentrations in terrestrial fossil vertebrates from the Bauru Group (Upper Cretaceous), Brazil and implications for vertebrate paleontology

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ABSTRACT

In this study we determined total mercury concentrations (THg) in a set of fossils from the Upper Cretaceous Bauru Group, Brazil, and investigated how the incorporation of this element occurs in fossil organisms and in their paleoenvironment. The analyzed fossil specimens were collected from two different locations (Jales and Fernandópolis) of the Adamantina Formation and correspond to samples of teeth, bones, osteoderms, and crocodylomorph eggs (probably laid by Baurusuchidae), and their associated sediments. The samples were submitted to Zeeman atomic absorption spectrometry, showing concentrations ranging from approximately 5 $ng.g^{-1}$ to 77 $ng.g^{-1}$ in biomineral matrix. The results show mild fluctuations of Hg concentration in the different types of fossils analyzed, with teeth and bones retrieving more Hg than osteoderms, thus being the most suitable for this type of analysis. Adult specimens of Baurusuchidae showed ~30% more Hg than juvenile ones in their biomineralized tissues, which points to a continuous process of Hg accumulation throughout the individual's life history. As for the determination of Hg in sedimentary rocks, which has been previously claimed to be an indication of the relationship between volcanic activities and some mass mortality events (MMEs), the analysis of Hg in fossils can furnish additional information for future studies regarding the relationship