

## **Insect Ichnofossils in Palaeosols as a Diagnostic Feature**

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Paleosols represent key elements in the analysis of non-marine sequences. They yield valuable information on stratigraphic discontinuities and unconformities, they can be utilized as marker beds for correlation and, finally, they are one of the most reliable paleoclimatic evidences indicating landscape stability. In cases where pedofabric is not evident or root traces are absent, insect trace fossils are powerful tools for recognizing paleosols and the subaerial exposure of deposits. Even when land arthropods colonized paleosols since the Ordovician, reliable insect trace fossils have been recorded in paleosols from the Cretaceous to the Recent. During the early Cretaceous appeared ecological key groups of insects, such as bees, aculeate wasps, ants, termites and different groups of beetles. In contrast with older ones, these insects construct or line the walls of their breeding or pupation chambers with organic matter, hence contributing to their cementation, early diagenesis, and their later preservation as trace fossils. In addition, these insects produced more complex structures, which can be compared in detail with modern ones, resulting in reliable attributions. Four ichnofamilies including ichnogenera attributed to breeding and pupation chambers of bees, wasps, ants, beetles, and termites were recognized until now in Cretaceous to Recent paleosols: *Coprinisphaeridae*, *Celliformidae*, *Pallichnidae*, and *Krausichnidae*. In older paleosols, the attribution to insects of trace fossils that are morphologically simple, and as such that can be produced by a wide range of invertebrates, or that are not comparable with insect modern ones may be a misleading procedure that may result in false paleoenvironmental interpretations.