ACTA PALAEONTOLOGICA POLONICA

Mammalian evolution during the Cretaceous-Tertiary transition; evidence for gradual, non-catastrophic patterns of biotic change

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Acta Palaeontologica Polonica 28 (1-2), 1983: 55-61

Hypotheses invoking catastrophic causal factors for terminal Cretaceous extinctions call for, 1) instantaneous, global extinctions, 2) resulting from a single or dominant causal factor. Currently available methods of correlation are not
precise enough to test the first element of these hypotheses. Patterns of mammalian extinction and survival in northeastern Montana, USA - as well as records of other organisms - argue against the second element. In Montana
most of the lineages of marsupials were decimated. Extinction of multituberculates was not as severe, while only one lineage of eutherians appears to have become extinct. Groups that apparently immigrated into northeastern Montana
just prior to the end of the Cretaceous had a greater probability of survival than the residents. The probability of extinction was independent of individual body size. Different patterns of mammalian extinction in different environments also appear to defy explanation in terms of one common, catastrophic causal factor.

Key words: Mammalia, Cretaceous, Tertiary, extinction, Montana, USA.

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