AN ANALYSIS OF LATITUDINAL PATTERNS IN DINOSAUR DIVERSITY

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In modern terrestrial ecosystems one can observe a decrease in the diversity of most groups of organisms as one moves away from the equator. This inverse correlation of latitude and diversity has been documented for both animals and plants around the world. Potential explanations for this phenomenon have included such factors as competition, predation, productivity, energy, climate, evolutionary history, land area and spatial heterogeneity. Latitudinal climatic gradients in the Mesozoic appear to have been less pronounced than those of today, therefore, one would expect to see an amelioration of diversity gradients if climate was/is an important determinant of diversity. In order to gain insights into potential causes of this pattern in modern ecosystems I examined latitudinal gradients in dinosaur diversity.

The modern locations of dinosaur fossils were corrected to their proper geographic position for the time at which the dinosaur lived using "PGIS/Mac." This information was used to determine geographic diversity patterns at global and continental scales for six time periods of the Mesozoic. Three different measures of dinosaur diversity were used (number of species, number of genera, and average number of species per site). These patterns were analyzed with respect to a number of confounding variables (number of sites, land area, outcrop area) which could affect the apparent diversity of fossil ecosystems.

Normal Latitudinal gradients that are typical of contemporary terrestrial vertebrates were not observed for dinosaurs. Upper Cretaceous North America displayed an inverse diversity gradient while all other analyses showed random distributions of diversity. However, geographic variation in dinosaur diversity, outcrop area and number of sites were intercorrelated, while other variables showed no relation to diversity. It seems likely that the warmer, more uniform global climate during the Mesozoic is responsible for the difference between modern and Mesozoic diversity patterns.