

Famennian climates based on palynomorph quantitative analyses and the question of Late Devonian glaciations

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According to quantitative palynomorph analyses, climatic changes may explain the characteristics of land plant vegetation in Euramerica and Western Gondwana from the late Frasnian to the latest Famennian crisis. Detailed miospore stratigraphy dates accurately the successive steps of these changes. They become most obvious in high latitude regions and demonstrate that the development of an ice cap reaching sea-level only occurred by the end of latest Famennian. The scarcity or absence of vegetation, probably corresponding to very cold climates without perennial snow, characterized high latitude areas during most of the early-middle Famennian, in contrast to the normal diversity of palynofloras in low latitudes during the same period. This conspicuous latitudinal climatic gradient attenuated towards the late and latest Famennian. During that time, periods of cold climate without perennial snow cover and with rare vegetation may have alternated with less cold but wetter climates, thus giving rise to the development of mountain glaciers in high latitudes and explaining the jerking character of the global marine regression of the end-Famennian. In low latitudes the frequency of climate oscillations probably allowed less wet-dependent vegetation to penetrate deeper into equatorial regions. For the plant kingdom, the latest Famennian crisis was far more severe than the late Frasnian crisis.