

Evolution of climatic zonality during Cretaceous greenhouse epoch

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Palaeoclimatic maps of all twelve Cretaceous stages were reconstructed and the major climatic belts reconstructed using numerous lithologic, paleontologic and geochemic paleoclimatic indicators. The reconstructions allow the study of the evolution of climatic zonality during Cretaceous. Climatic zonation of the Cretaceous Earth was radically different from the present. In the first half of the Cretaceous (Berriasian-Aptian) the Earth's low and, partly, middle latitudes were occupied by a vast arid belt that stretched in the western hemisphere from 45° N to 45° S. In the Albian this belt was split by a narrow equatorial humid belt in two arid belts. This event was coeval and probably a result of the breakup of Western Gondwana and the opening of the South Atlantic Ocean. The equatorial humid belt developed and broadened up to the Maastrichtian along with the broadening of the Ocean. The middle latitudes in the Cretaceous featured a warm and rather humid or variably humid climate. The high latitudes were occupied by belts with temperate humid climate. No undisputable glacial deposits have been found in the high latitudes of the both hemispheres. Only very sporadic beds with traces of seasonal ice rafting are known in the high latitudes of Valanginian-Albian stages. This points to very rare and short episodes of sea freezing in spite of long winter seasons in the high latitudes only during Valanginian-Albian stages. The temperate climate of high Cretaceous latitudes differed of course from modern in that it had alternating long polar nights and days and, consequently, sharp seasonal fluctuations in insolation and temperature. Palaeoclimatic maps made for the stages averaged climates on a time of some millions years. Short climatic fluctuations can be recognized by detailed lithologic or isotopic investigations of sections, as reconstructed for the Cretaceous of Italy and deep oceans.