

Early Cretaceous surface current system and ammonite distribution patterns: a key to distant correlations

BARABOSHKIN, E.J. AND VOLKOV, Yu.V.
Moscow State University, Moscow, Russia

Ammonites is one of the orthostratigraphic groups of cephalopod mollusks for the Lower Cretaceous. Their main method of the distribution was planktic, during the larval stage (for all ammonites), for the mature animals (for the planktic forms) and in post-mortal condition. Their areals were limited by the (1) temperature, (2) paleobathymetry and the ecological position, and (3) paleogeography. One of the most important factors of (3) was the existence of seaways and the surface current system.

A surface current model was realised for the whole Early Cretaceous interval. The mathematical model is based on the resonance hypothesis and depends from the time interval.

During the Berriasian – early Hauterivian (the warm climate) the zones of high pressure took a high – latitude position and the ammonite endemism was controlled additionally by the strong passat currents of the middle latitudes.

Late Hauterivian – Barremian (cool climate) zones of high pressure shifted to the middle latitudes. It caused cool water mass movement from Boreal Realm into the Tethys, boreal ammonite areals expansion and increasing of heteromorph ammonite diversity in the lower latitudes.

The Aptian (cool climate) was characterised by the back shift of the zones of high pressure to the poles and their stabilisation around 60 parallel. It resulted in the Tethyan fauna expansion and splitting of planktic heteromorph ammonite areals into the northern and southern branches.

During the Albian (warmer climate) zones of high pressure progressively moved to the equator, which caused expansion of climatic zones and the prevalence of the warm Tethyan fauna.