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Bioevents correlation of planktic foraminifers and radiolarians from the Cenomanian to Turonian, southeastern Mexico

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The correlation of extinction and diversification events of planktic foraminifers and radiolarians from the Cenomanian to the Turonian, in wells and outcrops of Southeastern Mexico, is related to the global Cenomanian-Turonian Oceanic Anoxic Event (OAE2). Patterns of diversification and extinction events of planktic foraminifers (*Rotalipora*, *Whiteinella*, *Hedbergella* and *Heterohelix*) and radiolarians were analyzed and correlated in wells of the Sonda de Campeche and outcrops of Southeastern Mexico. These events were identified within the *Rotalipora brotzeni*, *Rotalipora cushmani*, *Whiteinella archaeocretacea* and *Helvetoglobotruncana helvetica* zones from the Cenomanian to the Turonian. Based on the abundance patterns and the interpretation of gamma ray logs, maximum flooding surfaces and condensed sections were interpreted. The transgressive sequence from the Albian to the Turonian interpreted for this time caused changes in the sedimentation and the paleoecology of the area and consequently, the diversification and gradual and/or total extinction of planktic foraminifers and other microfossils.

During the upper Cenomanian, within the *Rotalipora cushmani* Zone in the *Rotalipora greenhornensis* Subzone, several abundance peaks of radiolarians and heterohelicids and hedbergelids were identified. These abundance peaks occurred during deposition of bituminous and argillaceous limestones containing pyrite and organic matter, possibly in low-oxygen conditions. The abundance peaks of radiolarians and heterohelicids are intercalated with abundance peaks of rotaliporids and praeglobotruncanids in more calcareous limestones. These changes are interpreted as a consequence of sea level changes.

In the upper part of the *Rotalipora greenhornensis* Subzone, an abundance peak of radiolarians with *Heterohelix moremani* and *H. reussi* represents a flooding surface and maybe a sequence boundary. In the uppermost Cenomanian within the *Rotalipora cushmani* Zone, in the lower part of the

Dicarinella algeriana Subzone, there is a diversification event of *Rotalipora cushmanni*, which then became extinct at the end of the Subzone. The extinction of *R. cushmanni* is considered to be a global event that preceded the global Cenomanian-Turonian Oceanic Anoxic Event (OAE2). The OAE2 is represented in southeastern Mexico by diversification and abundance events of silicified and calcified radiolarians deposited in black shales with a high organic matter content, pyrite and lenses of chert, deposited in low-oxygen conditions and belonging to the *Whiteinella archaeoecretacea* Zone.

The Cenomanian-Turonian event in this area was interpreted as a maximum flooding surface that represents a condensed sequence, characterized by an abundance peak of silicified radiolarians and fragments of fishes, as well as *Whiteinella*. For the lower-middle Turonian within the *Helvetoglobotruncana helvetica* Zone, more stable oxygen conditions are evident by the diversification of marginotruncanids and the presence of more calcareous limestones containing *Helvetoglobotruncana*, *Marginotruncana* and *Dicarinella*.