

The Colorado Group (Upper Albian to Santonian) in Southeastern Alberta: faunal and floral response to varying sea-level

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ABSTRACT

Recent revisions of the Upper Colorado Group stratigraphy in southern Alberta and Saskatchewan. has resulted in the Turonian Carlile Formation and Coniacian to Santonian Niobrara Formation (Nielsen, 2002). This study is based on a composite section to address response of foraminifera and nannofossils to paleoenvironments of the Upper Albian Westgate to Niobrara formations in southeastern Alberta. This interval encompasses the global Greenhorn and Niobrara sea- level cycles.

The Westgate Formation is characterized by fining upward sequences containing abundant agglutinated foraminifera indicating a well oxygenated seafloor. A relative sealevel fall at the Albian/Cenomanian boundary caused a bioclastic conglomerate followed by a long lasting anoxic event occupying this part of the basin throughout the Fish Scales and Belle Fourche formations prohibiting benthic assemblages to develop. Appearance of planktic foraminifera in the overlying Second White Specks Formation indicates warm, saline Tethyan waters. Planktic species, which are more tolerant towards unfavourable marine conditions appear first followed by a diversity increase towards the top. Nannofossils of Turonian age occur, showing, however, the opposite trend by gradually decreasing towards the formation top. The regressive phase of the Greenhorn cycle is expressed in the Carlile Formation characterized by lack of foraminifera in its basal part that indicates continued depleted bottom oxygen conditions. Nannofossils continue to occur, but have undergone a floral change resembling now the Santonian First White Speckled assemblage. The narrow basin during upper Carlile time with increased vertical circulation allowed benthic foraminifera to return. Faunal abundance increases in the basal Niobrara Formation coinciding with renewed transgression. In southern Alberta planktic foraminifera never flourished during the Niobrara highstand as they have done in to the east or during Turonian time.