

Allostratigraphy of the Cenomanian Belle Fourche Formation in Southern Alberta and Reconstruction of Mid-Cretaceous Foreland Basin Systems in the Northern Western Interior Seaway

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Summary

Using widely-distributed flooding surfaces as the boundaries of allomembers, the Belle Fourche Formation is subdivided into five allomembers A-E in southern Alberta. Allomember A and allomembers B-E are of Middle and Late Cenomanian age respectively. These allomembers coarsen upward from dark shale to bioturbated or laminated shaly siltstone. The Allomember A has a north-northwest trend, decreasing in thickness from the Alberta/Saskatchewan border westwards to southwestern Alberta. The allomembers B-E have northwest trending prismatic geometries thinning from central thick zone southwestwards and northeastwards, and thin zones and thick zones shift progressively northeastward from the allomember B to E.

By combining isopach data of the allomembers A-E from the study area with previously published research on mid-late Cenomanian stratigraphy in adjacent areas of northern Alberta and Montana, it is possible to define the position of the proximal foredeep, forebulge and backbulge depozones in the northern Western Interior Seaway. The reconstructed Middle Cenomanian foreland basin system developed with a north-northeast trend in southern Canada and a north-northwest trend in northern United States, and the reconstructed Late Cenomanian foreland basin system with a north-northwest trend extended through southern Canada and the northern United States. However, the foredeep depozone and part of the forebulge depozone of the foreland basin in the present Rocky Mountains in southern Canada and northern United States have been uplifted and cannibalized by post-depositional thrusting and shortening during the Late Cretaceous-Paleocene. The change in trend of the foreland basin system at the end of the mid-Cenomanian may reflect the change of convergence vectors along the western margin of North America during the mid-Cretaceous.