

Tectonostratigraphy of foreland basins: the Upper Cretaceous in the Greater Green River Basin, southwestern Wyoming

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Previous stratigraphic studies in foreland basins mainly focused on the foredeep depozone with a two-phase wedge-shaped stratigraphic model, ignoring the other parts of a complete foreland basin. The load caused by the formation of triangle zones has never been involved in flexural analysis and modeling. In this project, I attempt to establish a stratigraphic model for a complete foreland basin including wedge-top, foredeep, forebulge and backbulge depozones, including how the effects of the triangle zones influence the stratigraphy. Flexural numerical modeling will produce a synthetic stratigraphic record to support the new model, which will demonstrate that different sub-basins may have different sequence stacking patterns in a same time-stratigraphic interval.

The stratigraphic model will be tested against the tectonostratigraphy of the Upper Cretaceous foreland basin in front of the Sevier fold-and-thrust belt in western Wyoming. Detailed outcrop control, subsurface well log correlations and 2-D seismic reflection profiles will be used to document the sequence stratigraphic framework along three 2-D profiles across the Greater Green River Basin. The well log correlation and seismic data interpretation will be done using Landmark StratWorks and SeisWorks software.

When completed, this project will establish a complete stratigraphic model for a foreland basin caused by one thrusting cycle. The established model can be used to restore the tectonic controls, and predict the prospective areas and formations for the exploration and development of economic minerals.