

## **Forebulge Influence on Deposition of the Cretaceous Castlegate Sandstone, Book Cliffs, Utah, USA**

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Late Cretaceous non-marine to marine strata exposed in the Book Cliffs, Utah provide unique insights to the influence of the foreland basin topography on depositional patterns on the western edge of the Cretaceous Western Interior Seaway (KWIS). The Sevier Foreland Basin was situated on the western margin of the KWIS and during extreme lowstand events basin geometry may have heavily influenced sediment distribution along the western margin of the KWIS.

Lowstand sequences of the Late Cretaceous Desert Member (Blackhawk Fm) and Castlegate Sandstone can be traced west of Green River, Utah for over 30 miles. Strata are interpreted to be deposited in braided stream complexes within a large incised valley; multiple incised valleys are present in both the Desert and Castlegate. While the incised valleys should show drainage eastward into the Western Interior Seaway, paleocurrent direction suggests a parallel-to-basin, south-southeast flow. This study expands on previous stratigraphic studies (e.g., Van Wagoner and co-workers). In this study, the Castlegate Sandstone and Desert Member were mapped from Tuscher Canyon, Green River, Utah to their furthest extent. Abundant paleocurrent data were gathered, and sections from 26 canyons along the extent of the Castlegate Sandstone were measured and correlated. Detailed correlation of the fluvial to marginal-marine facies of the Castlegate Sandstone and Desert Member suggests these lowstand events accompanied major drops in relative sea-level. Such a large relative fall allowed the foreland bulge to influence flow direction: the sea-level drop may have been large enough to expose the foreland bulge. Partial or complete exposure of the foreland bulge would cause a decoupling of the foredeep from the KWIS. Because the foreland bulge paralleled the north-south paleoshoreline, the fluvial systems were diverted southward during lowstand events. Cretaceous strata south of Book Cliffs are not preserved. Therefore, paleodrainage patterns of the Castlegate Sandstone and Desert Member provide key information on the character of significant lowstand events within the KWIS. Combined with sequence stratigraphic interpretations, paleocurrent analysis provides a powerful tool for understanding basin topography and subsequently drainage. Recognizing the impact of the foreland bulge on drainage patterns during the Cretaceous may influence current knowledge of foreland basins.