

SEQUENCE STRATIGRAPHY AS A TOOL FOR EXPLORATION OF WAULSORTIAN-TYPE CARBONATE BUILDUPS

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Deeper water Waulsortian carbonate buildups of Kinderhookian age are known from four localities in Montana. These buildups are situated within rhythmically bedded carbonate mudstones in the Paine Member of the Lodgepole Formation. These buildups are mud-rich, bryozoan-crinoid mounds which contain abundant stromatoloid-like spar-filled cavities.

The buildups are located along downdropped blocks on bounding faults of the Central Montana trough related to reactivation of a middle Proterozoic intracratonic rift margin (aulacogen). Sequence stratigraphic analysis of the Lodgepole throughout central Montana forms the basis for interpretation of buildup development and demise. Opening of the trough coupled with sea level rise formed three distinct members of the Lodgepole, including (1) a transgressive surface marked by shallow-water deposits of the Cottonwood Canyon Member, (2) a transgressive systems tract of the Paine Member which can be separated into two distinct facies—a condensed section of deeper water carbonate mudstones to wackestones and the Waulsortian buildup facies which are encased within these rhythmically bedded deposits, and (3) a high-stand systems tract characterized by high-energy, cyclic, shoaling-upward crinoidal grainstones and oolites of the Woodhurst Member.

Rapid eustatic rise and syntectonic subsidence during the transgressive systems tract outpaced buildup development and led to subsequent drowning. The lack of rapid reef building metazoans during the Mississippian is also suspect in explaining Waulsortian buildup demise.