Sedimentology of the Belfast Member of the Brassfield Formation (Silurian, western Ohio and northern Kentucky, U.S.A.): Implcations for regional sea-level changes and tectonics

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Abstract
The coeval Stuarts Breast Formation, Cranmoor Area, records mid-latitude deposition on a carbonate ramp that stepped into the Devonian basin. The broad ramp is significant because it represents earlier Stuarts Breast deposition in the area receiving rapid sedimentation following the Late Devonian glaciation, and is therefore a step on what is traditionally considered an episodically subsiding tectonic basin. The inferred location of the ramp is consistent with the mid-latitude position of the Greenland/Scotland Ridge and its position relative to the basin. The mid-latitude location and previous placements of the basin support the idea that much of the mid-latitude ramp was extended across the ramp in a region where it was not influenced by tectonics. The ramp represents a significant step on the margin of the basin, and was probably not influenced by the Late Devonian glaciation, as previously suggested.

Discussion & Implications
The Belfast Member is a key stratigraphic marker between the Devonian and Carboniferous. The presence of the ramp in the upper Devonian is significant because it records a change in the sedimentary environment from a carbonate shelf to a ramp that was probably deposited on the margin of the basin. This change is important because it provides evidence for the development of a tectonic basin, which was probably not influenced by the Late Devonian glaciation.

Sea-Level Changes
The Belfast Member is a key stratigraphic marker between the Devonian and Carboniferous. The presence of the ramp in the upper Devonian is significant because it records a change in the sedimentary environment from a carbonate shelf to a ramp that was probably deposited on the margin of the basin. This change is important because it provides evidence for the development of a tectonic basin, which was probably not influenced by the Late Devonian glaciation.

Tectonics
Although the tectonics are not well constrained by the Belfast Member, it is possible to infer some tectonic implications. The presence of the ramp in the upper Devonian is significant because it records a change in the sedimentary environment from a carbonate shelf to a ramp that was probably deposited on the margin of the basin. This change is important because it provides evidence for the development of a tectonic basin, which was probably not influenced by the Late Devonian glaciation.

Primary Sedimentary Structures
The primary sedimentary structures are composed of the type and distribution of sedimentary structures that indicate that the Belfast Member was deposited in association with stormy to intertidal shelf type settings. Below fair-weather wave base, but above storms wave base. This is consistent with the study by Zaleha et al. (2018) who suggested that the early Aeronian storms are characterized by high order storm activity. These storms may have been associated with tectonic subsidence and rapid deepening. Such movements may reflect the far-field response to rapid deepening. The increase in subsidence also may have been a contributing process during the formation of the Illinois Basin. The increase in subsidence also may have been a contributing process during the formation of the Illinois Basin.

Synthesis
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Local Geology and Geologic Setting
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