

Magnetostratigraphy as a correlation tool for carbonate environments: Examples from the Lennard Shelf, Canning Basin, Western Australia

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The margins of the Canning Basin of Western Australia were the loci for extensive carbonate accumulation throughout Middle to Late Devonian times. The irregular coastline of the Lennard Shelf produced a variety of depositional settings, including isolated structures that were detached from the main coastline. The diverse array of depositional environments (platform-top, reef, foreslope, and basin) presents some challenges for detailed correlation at local and regional scales. Correlation to global event stratigraphy, such as the carbon isotope record or the increased biotic turnover at the Frasnian-Fammenian boundary, requires an absolute chronostratigraphic time frame. In this contribution, we present the results of five magnetostratigraphic profiles from four different settings along the Lennard Shelf covering Givetian to end-Fammenian times including 1) Givetian-aged platform-top/reef flat to Lower Frasnian foreslope deposits at Guppy Hills; 2) upper Frasnian platform-top to slope deposits at Windjana Gorge; 3) upper Frasnian to upper Fammenian slope deposits at Casey Falls; 4) middle Frasnian to upper Fammenian slope deposits along the isolated South Oscar Range platform; and 5) lower-middle slope deposits from the middle Frasnian to lower Fammenian at Horse Spring. The high reversal rate in the primary magnetic polarity record observed in all environments provides a detailed template for correlation around the Canning Basin. Furthermore, the compiled results from this study will constitute the first systematic contribution to the construction of a Global Polarity Timescale for the Middle to Late Devonian, which can be used as a reference dataset for global correlation.