

## Upper Devonian Elemental Chemostratigraphy of the Lennard Shelf, Canning Basin, Western Australia – Indications of Global-to-Local Environmental Changes & Utilization as a Correlation Tool

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The Canning Basin Chronostratigraphy Project (CBCP) aims at developing alternative methods for high-resolution chronostratigraphic correlation to address problems such as subsurface data limitations and poor biostratigraphic resolution. One type of constraint is ‘Elemental Chemostratigraphy’, and has been widely applied and successful in siliciclastic settings. Its use in carbonate settings, however, is infantile, reflecting a lack of understanding in how elemental parameters respond in carbonate settings. Whether carbonate chemostratigraphic correlations can be viewed as lithostratigraphic or chronostratigraphic, and the nature in which base level fluctuations are detected, are examples of remaining challenges.

To address these uncertainties, elemental data have been obtained for ca. 50 elements on nearly 7000 plug and hand samples collected from outcrops and shallow cores along the Upper Devonian (Givetian Frasnian and Famennian) Lennard Shelf, Canning Basin, Western Australia. Elemental data are well-constrained within a regional framework developed from the integration of magnetostratigraphy, stable isotope chemostratigraphy, biostratigraphy, and sequence stratigraphy.

Phase 1 of the study focused on platform top settings from the Windjana Gorge area. The results show clear high-frequency trends in Cr/Al<sub>2</sub>O<sub>3</sub>, K<sub>2</sub>O/Al<sub>2</sub>O<sub>3</sub> and Zr/Al<sub>2</sub>O<sub>3</sub>, which infer changes in heavy metal compositions, clay mineralogy and siliciclastic input. Phase 2 will introduce samples from other carbonate environments [such as the slope], and when combined with Phase 1 results, highlight local elemental trends that vary with respect to palaeogeography and depositional environment versus regional signals that appear in all settings. These elemental signals, especially those of regional significance, will offer correlation constraints that were not previously utilized and/or recognizable in traditional sequence stratigraphic practices.