# Tertiary Stratigraphy of the Papuan Basin: Insights from Strontium Dating

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During thirteen years of exploration in the Papuan Basin, strontium isotope dating has provided a facies independent stratigraphic tool with sufficient resolution to correlate microfacies and biostratigraphy in the Tertiary section. Based on this work, we correlate foraminiferal biozones and carbonate sedimentation history to sequence development.

Three regressive cycles are identified in the Oligocene-Miocene “Darai Limestone” in the western Papuan Basin. Each cycle ends with shallow water limestone units for which the cycles are named: the Mid Darai Cycle (28.5 – 17.5 Ma), the Mala Cycle (17.5 – 14 Ma), and the Warre Cycle (14.0 - 7.1 Ma). The Warre Cycle marks the top of the Darai Limestone. Shallow water limestones in each cycle are interbedded with marine clastics in the north and eastern Papuan Basin, suggesting reef plays analogous to those in the Papuan Gulf. Early Oligocene is widespread in the basal Darai Limestone, with significant Eocene reworking, and recycling of quartz sand from the Cretaceous into both Eocene and Oligocene units.

Last appearances of index foraminifera marking T-Letter stage boundaries coincide with the lower Mid Darai and lower and upper Warre Cycle boundaries. In the Papuan Foreland, these cycle boundaries are correlated with 3rd order seismic sequences, including major off-platform Miocene erosional events. A eustatic component to sea level fall is a possible factor in major faunal “turnovers”, but, irrespective of the cause(s), a demonstrable link between sequence and biostratigraphic events shows the utility of biostratigraphic and strontium analysis in constraining sequence ages throughout the Papuan Basin.