

RECALIBRATING AUSTRALIAN TRIASSIC PALYNOSTRATIGRAPHY TO THE
INTERNATIONAL GEOLOGIC TIMESCALE USING HIGH RESOLUTION CA-IDTIMS
DATING

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The Triassic is an important interval for Australian petroleum exploration, with Middle to Upper Triassic Mungaroo Formation reservoirs in the Northern Carnarvon Basin, and recent Lower Triassic discoveries in the Roebuck Basin. The chronostratigraphic understanding of Triassic petroleum systems is underpinned by biostratigraphic dating using palynological zonations. The numerical ages of these zones are usually assigned through inference and interpolation, often via tenuous correlations to the international geologic timescale using scattered marine biota, (primarily foraminifera, and rare ammonites, conodonts and/or dinoflagellates). In contrast, we tie Australian biozones to the timescale through Chemical Abrasion-Isotope Dilution Thermal Ionisation Mass Spectrometry (CA-IDTIMS) dating of interbedded volcanic tuffs. Such ashfalls are reasonably common in Australian basins, and can provide high-precision CA-IDTIMS ages if they contain magmatic zircons. We recently recalibrated Australian middle and late Permian palynozones using this approach and preliminary results suggest that Triassic biozone ages are likewise in need of considerable revision.

We have targeted Triassic tuffs across Queensland, (Tarong beds, Brisbane Tuff, Moolayember Formation, Rewan Group), New South Wales (Garie Formation, Coal Cliff Sandstone, Milligan Road Formation), and Tasmania (upper Triassic coal measures) to provide numerical ages for palynozones. Additional dates in New Zealand (Murihiku Supergroup) and Timor-Leste (Wailuli Formation) will allow international correlation of dinocyst and spore-pollen zones. Numerical constraints for Triassic biozone boundaries facilitate correlation of Australian biozones with the international geologic timescale. This can impact burial history models used in petroleum exploration anywhere these biozones are used, often far beyond the basins from which the samples were collected.