Wordian (Middle Permian) U-Pb CA-IDTIMS isotopic ages from the Lightjack Formation, Canning Basin, Western Australia

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Coal exploration coreholes in the Permian of the Fitzroy Trough (Canning Basin, Western Australia) have intersected thin (<15 cm) ash-fall tuffs in seams from the 30–300-m thick Lightjack Formation. Four of these tuffs within the Didicitriletes ericianus spore-pollen zone have yielded high-precision U-Pb zircon CA-IDTIMS ages of 268.63–270.14 Ma, consistent with a Wordian age.

The formation is dominated by siltstone and sandstone, with minor coal and fossiliferous beds near the base, and extends along the major depocentre of the basin (Fitzroy Trough - Gregory Sub-basin), and its margins. The unit spans the Roadian-Wordian-Capitanian based on ammonoids (Daubichites goochi and Banyaniceras australis), brachiopods (Neochonites (Sommeriella) afanasyevae zone), and palynomorphs (Dulhuntyispora granulata to D. parvithola zones). Rare conodont genera from the formation include Vjalovognathus, Mesogondolella and Hindeodus.

Tuffs at 57.1 and 58.8 m in exploration corehole Rey-D16C1 on the eastern limb of the Mt Wynne anticline yielded isotopic ages of 268.86 Ma and 269.10 Ma, with permil and sub-permil errors, indicating an early Wordian age (currently 265.8–270 ± 0.7 Ma). A third tuff sample from 77.4 m in a nearby corehole (Rey-LR12C) yielded a 268.63 Ma age. The fourth tuff sample from 210 m in Blackfin Liveringa P01 (∼64 m above the base of the formation; next to Petaluma 1, ∼30 km SW of the other coreholes) is dated at c. 270.14 Ma, essentially at the Roadian-Wordian boundary.