

A Snapshot of Secular Variation Near the Start of the Kiaman Superchron

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Glacial varves at Abercrombie Quarry in the Hunter Valley of New South Wales, Australia, afford an opportunity to examine secular variation from the Kiaman (Permo-Carboniferous) Reversed Superchron on a yearly to centennial time-scale. This high-palaeolatitude record from the early part of the Kiaman provides a valuable counterpoint to red-bed studies from the low-palaeolatitude Dome de Barrot site in France, which were dated to late in the Kiaman. Thermal and AF demagnetisation thoroughly remove the Cretaceous normal overprint that is problematic in many Palaeozoic sequences in eastern New South Wales; the low permeability of these very fine grained, siliceous varves appears to have minimised invasion of fluids responsible for the CRM that carries this overprint. Rock-magnetic parameters indicate magnetite in its pseudo-single to single domain state as the magnetic carrier in the varves, qualifying them as likely to preserve a stable depositional magnetisation. Although a fold test is not available, the characteristic remanence averages close to the expected late Carboniferous pole after removal of bedding tilt, supporting the inference that the remanence is depositional.

A series of ten sites, each grouped over about 10 to 50 yearly varves, and spanning a total of about 600 varves, yield VGPs. These form a systematic arcuate track around the late Carboniferous palaeopole, similar to historic secular variation records. Inferences about the geodynamo, specifically the support for active outer core convection during superchrons, can now be extended into the early phases of the Kiaman superchron.

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