

FAUNAL COMPOSITION, DEPOSITIONAL ENVIRONMENT AND BIOGEOGRAPHIC AFFINITIES OF MIDDLE CAMBRIAN SHELLY FOSSILS FROM THE SOUTHERN NEW ENGLAND FOLD BELT, NORTHEASTERN N.S.W, AUSTRALIA

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Middle Cambrian (Floran-Undillan Stages) allochthonous limestone clasts from the Murrawong Creek Formation, southern New England Fold Belt, northeastern NSW, Australia have yielded a diverse suite of silicified and phosphatic shelly faunas, including trilobites (23 species), lingulate (14 species) and articulate (3 species) brachiopods, molluscs (6-7 species), conodonts (c. 3-4 species), hyoliths (c. 4 species), hyolithelminthes (c. 3 species), coeloscleritophorans (c. 3 genera), poriferan spicules and echinoderm sclerites. Several bizarre forms including a new coniform brachiopod-like taxon, and the enigmatic coralomorph taxon *Tretocylichne perplexa* Engelbretsen have been documented.

Studies of cobble and pebble sized igneous (dominantly andesitic) clasts from the base of the Murrawong Creek Formation (Unit 1) reveals the clasts to be members of a low-K orogenic suite. This chemical composition, taken together with the absence of detritus characteristic of continental crust, is consistent with a derivation from an intra-oceanic island arc rather than a continental margin arc (Leitch and Cawood, 1987). The faunal content of the limestone clasts indicates the original environmental setting was probably a relatively shallow water carbonate platform, possibly fringing a volcanic island or islands east of the Gondwanan continental margin. The allochthonous material, incorporating large bioclastic limestone blocks and a mixture of smaller, coarse volcanic clasts, was deposited as periodic debris flow fans into deeper water, penecontemporaneous finer-grained volcanoclastic sediments.

The faunal assemblage, especially the trilobite, lingulate brachiopod, articulate brachiopod, and molluscan taxa, display strong regional affinities with cratonic Gondwanan carbonate sequences including the 'first discovery limestone' Member of the Coonigan Formation, western N.S.W., and the Current Bush Limestone in the Georgina Basin, northern Australia. Faunas recovered from allochthonous limestones in the Takaka Terrane, northwest Nelson in New Zealand also show strong affinities. Globally, the faunal assemblage displays affinities (at genus and species level) with sequences from the western margin of North America, Greenland, Bornholm (Denmark), Morocco, Kazakhstan, Russia, south China and Tarim.

REFERENCE

LEITCH, E.C., AND P.A. CAWOOD. 1987. Provenance determination of volcanoclastic rocks: the nature and tectonic significance of a Cambrian conglomerate from the new England Fold Belt, eastern Australia. *Journal of Sedimentary Petrology*, 57 (4): 630-638.