Paleozoic plutonism in the New Zealand sector of Gondwana

A.J. Tulloch
Institute of Geological and Nuclear Sciences, Private Bag 1930, Dunedin, NZ
D.L. Kimbrough
Dept of Geological Sciences, San Diego State University, CA 92182, USA
K. Faure
Institute of Geological and Nuclear Sciences, PO Box 30368, Lower Hutt, NZ
A.H. Allibone
School of Earth Sciences, James Cook University, QSLD 4811, Australia

Mid-Paleozoic granitic rocks intrude two distinct metasedimentary terranes (western Buller, eastern Takaka) in western New Zealand. Early and late Paleozoic granitoid rocks are volumetrically insignificant. Five mid-Paleozoic granitoid suites are defined on the basis of 27 new U-Pb ages, mineralogical and chemical characteristics:

Karamea Suite	382-369 Ma	S-type	Buller Terrane
Ridge Suite	353-342 Ma	S-type	Takaka (& Buller?)
Paringa	364 ± 4 Ma	I-type	Takaka & Buller
Tobin	345 ± 4 Ma	I-type	Takaka & Buller
Foulwind	290-320 Ma	A-type	Takaka & Buller

Tobin I-type suite overlaps in age with Ridge S-types, but no coeval I-types are recognised to be associated with the voluminous Karamea Suite S-type Suite. Isotopic and chemical compositions of the S-type suites (Karamea and Ridge) appear to reflect the nature of their host sedimentary terranes (Buller and Takaka, respectively), suggesting that these terranes extend vertically to the lower crust source regions. Amalgamation of Buller and Takaka terranes occurred between emplacement of the Karamea Suite (absent in Takaka Terrane) at ~ 380-370 Ma, and emplacement of Paringa I-type Suite across both terranes at 368-360 Ma. We suggest that the Karamea Suite formed during continental thickening associated with subduction-related terrane amalgamation. Paringa Suite (Sr/Y ~ 25-100) may have been subsequently derived from partial melting of associated subduction-generated mafic underplate. A poorly-defined I/S boundary at ~ 345 Ma may be analogous to the "0.706" line of western North America, and reflects outwards growth of the Gondwana continental margin. No associated volcanics or subduction-related sedimentary sequences have been yet been unambiguously observed for any suite.

Paringa and Tobin 368-341 Ma I-type magmatism in New Zealand forms part of the one event that can be recognised along the entire Gondwana margin from West Antarctica to eastern Australia. S-types are less regularly developed along the margin. Voluminous 430-400 Ma magmatism of the Lachlan Fold Belt is not observed in New Zealand. Conversely, no Late Devonian S-type magmas comparable in volume to the Karamea Suite are observed in Australia. However, accretionary complexes of comparable age to the Karamea Suite are recognised in the New England Fold Belt, and slate belt metamorphism in New Zealand, North Victoria Land and Marie Byrd Land is of similar age to the Lachlan Fold Belt granites. The ages and chemical/isotopic compositions of the New Zealand granites suggest more direct correlation with Marie Byrd Land of West Antarctica, and an original along-strike position *between* the older Lachlan Fold Belt of SE Australia and the younger (outboard and increasingly juvenile) New England Fold Belt of eastern Australia. The results from the New Zealand section of the margin assist recognition of a more or less continuous episode of ocean-wards building magmatism from 430–280 Ma which extended 3000-4000 km along the Gondwana margin from NE Australia across NZ and the Campbell Plateau to West Antarctica.

