

## **Phanerozoic magmatism and associated metamorphism in the Bird's Head, New Guinea**

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The Bird's Head is the north-westernmost peninsula of New Guinea. It is characterised by a mountain range exposing a basement of metamorphosed Silurian-Devonian turbidites cross-cut by various granitoid bodies. This area offers a unique window to study pre-Cenozoic tectono-thermal events at the north-eastern margin of eastern Gondwana.

We present new field, geochemical, and U-Pb zircon data from this remote, relatively unstudied region. We show that the granitoids intruded the basement rocks in two distinct phases in the Devonian-Carboniferous and the Permian-Triassic. Both events produced highly evolved peraluminous granite and granodiorite, supplemented by fewer metaluminous diorite and gabbro. Abundant country rock xenoliths, associated migmatites, as well as mineralogical and geochemical data suggest that the granitoids were generated by partial melting of the continental crust (S-type). The Permian-Triassic event is further characterised by structures indicating syn-intrusive extension. We propose that Permian-Triassic magmatism in the Bird's Head occurred in an evolved continental-arc environment. Mantle-wedge-derived melts underplated and intruded the lower crust, providing the necessary heat to induce partial melting of the overlying metasedimentary crust. These melts were emplaced during a phase of crustal extension and are the likely cause of high-T/low-P regional metamorphism in the surrounding country rocks.

Partial melting in a continental arc setting has been proposed for the generation of S-type granitoids of the Andes and along the western Pacific. The paired metamorphic and igneous rocks that we observe also show similarities to the Buchan type area in NE Scotland and the Cooma Complex in SE Australia, the latter of which is considered to have formed in an Andean-type margin.