

Post-Ordovician metallogeny of the East Lachlan: the Siluro-Devonian After Party

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The long-lived Macquarie Arc (Late Cambrian to Early Silurian) provided the greatest treasure of gold and copper in eastern Australia, with these metals carried rapidly through the crust from an enriched mantle during and immediately after active subduction. Around 65% (~70 Moz) of NSW's 107.6 Moz gold and 75% (~15 Mt) of its 20.2 Mt copper has come from the Macquarie Arc's fertile porphyry-epithermal deposits (NSW Resources 2021a, 2021b). Most of this rich endowment is found in a single 6km long WNW-trending narrow basin in Cadia Valley.

Once the metal party was over at ca. 432 Ma and the subduction system rolled back to the east, the good times rolled onto the Siluro-Devonian After Party.

The East Lachlan Orogen continued to deliver riches of gold, silver and copper (and other base metals) through the Silurian and particularly the Devonian. The fertile mineral systems changed, with Au-Cu porphyry mineralisation out, and gold-copper endowment now sourced from the crust within an extensional back arc environment, delivered in orogenic, volcanic-associated massive sulphide and intrusion-related mineral deposits.

Some of the gold and copper from these deposits was sourced by re-melting the residual fertile parts of the Macquarie Arc now found in the mid-crust. The resulting intrusions and volcanosedimentary rocks now flank the exposed Macquarie Arc, and because of their similar chemistry, alteration and geophysical properties, have been mis-interpreted as Macquarie Arc rocks. We look at the nature of these 'after-party' rocks, how to distinguish them, and whether they are genuine targets for economic deposits - i.e. did they bring beers to the after party?

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