16th SGA BIENNIAL MEETING
KEYNOTE SPEAKER

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Inherited structures and golden triggers: controls on the localisation of Cretaceous-to-recent gold deposits, Aotearoa New Zealand

New Zealand's precious metal endowment is linked to pulses of hydrothermal activity resulting from magmatism, metamorphism, and tectonism along an evolving accretionary orogen (Fig. 1). In the North Island, the orogen is under extension and Miocene-to-recent Au-Ag epithermal deposits and environments are documented in Northland, the Coromandel and the Taupo Volcanic Zone. Conversely, in the South Island, the orogen is under contraction, and Cretaceous-to-recent orogenic deposits and environments occur within Otago, the Alpine zone, and Marlborough. Importantly, these disparate styles of mineralization appear confined to a belt that favours metal transport-deposition. This belt is coincident with a major crustal boundary implying a deep crustal-scale control on metal supply that is triggered episodically, resulting in diachronous distribution of gold and companion metals within the orogen.

In this presentation I synthesise geological and geophysical data to explore the making of Zealandia’s diverse but coherent metal belt, with a focus on the role of inherited structures in localising ore-forming hydrothermal systems, and the trigger that plays a critical role in crustal-scale metal mobilisation, My objective is to illustrate the diversity of mineralizing contexts within a single accretionary orogen, and the important controls exerted by crustal rheology and an indentor at the plate boundary.

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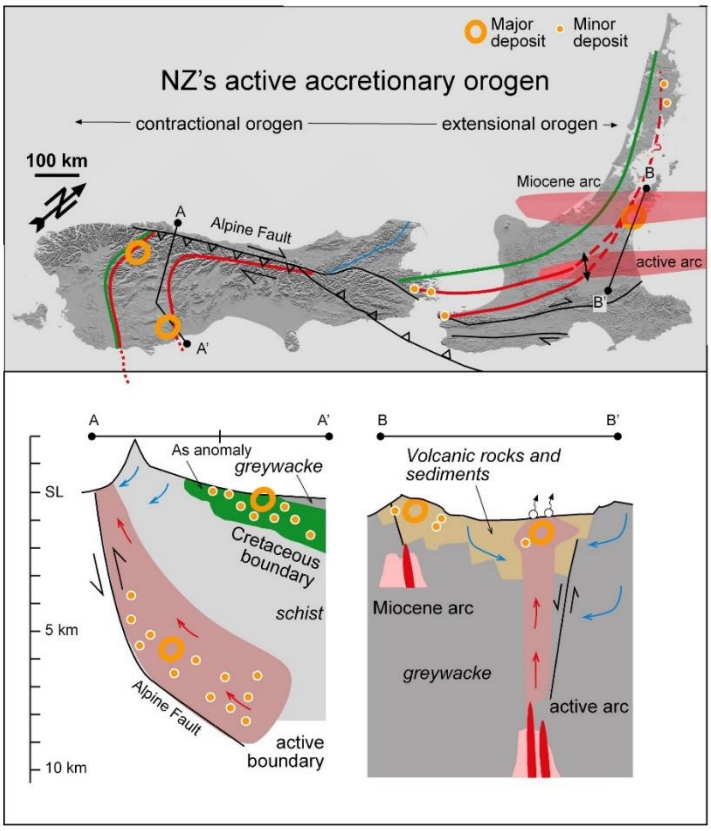

FIG 1 – Map of New Zealand illustrating the main elements of the active accretionary orogen, annotated with major crustal boundaries (Dun Mountain ophiolite – green; Haast schist-greywacke boundary – red) and two schematic cross-sections illustrating the relationship between active and preserved metal factories. Dull pink polygons = hot hydrothermal plumes. Arrows show water movement (blue = cold recharge, red = hot upflow). Magmatic intrusions indicated by red and bright pink polygons. White circles with arrows are hot springs. Faults are shown by black lines (arrows show sense of movement). The Cretaceous crustal boundary is not shown in section B-B' because it is parallel to the section line.

Julie Rowland

JR is a structural geologist with a keen interest in ore-forming hydrothermal systems and magmatic-tectonic interactions. She has worked on geothermal projects and/or epithermal systems in New Zealand, the Caribbean, Indonesia and Chile; and continental break-up in Antarctica and Ethiopia. Currently, JR is Deputy Dean (acting) of the Faculty of Science, seconded from her usual role as Head of the School of Environment, University of Auckland, New Zealand. She is a Society of Economic Geologists' Skinner awardee, a past VP Australasia for this society, and the current SEG Thayer Lindsley visiting lecturer.

JR's keynote lecture at SGA 2022 is sponsored by SEG.