Tasmanide Tectonics: Present-day Analogues as Keys to Unravelling Tectonic Complexities in the Palaeozoic to Mesozoic Accretionary Orogens of Eastern Australia

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The processes, products and geometries of rifting, subduction, and orthogonal to oblique collisions preserved in the western Pacific provide ready analogues for the interpretation of older orogenic belts. But can they account for all of the features in older rocks? Here I examine these proposals from the Tasmanides -- a collage of accretionary orogenic belts that make up the eastern one-third of the Australian continent. The Tasmanides show that the plate boundary between East Gondwana and the palaeo-Pacific plate retreated irregularly eastwards from ~510 to ~230 Ma. But there is no sequential accretion of arcs and very few arcs at all. The ~50 my punctuated life of the Ordovician Macquarie intraoceanic arc in the Lachlan Orogen, coupled with the absence of accretionary prisms, and the presence of a convergent margin in the New England Orogen for ~60 my dispel the myth of continuous roll back. Rifted continental fragments are present but elusive. But some features of the Tasmanides cannot be simply lifted from present-day analogues. These include the general lack of forearc ophiolites and ocean plate terranes, the presence of postcollisional volcanism, the presence of marginal basins but absence of true back arc basins with remnant ridges and (enriched) MORB igneous rocks, the square, not linear shape of the in the Lachlan Orogen, the presence there of vast amount of Ordovician craton-derived turbidites inboard and outboard of the arc at the same low metamorphic grades, and the presence of deeply penetrating cross orogen structures. Then there are questions as to the depths of detachments, the relationship with subcontinental lithosphere and the role of granites.

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