

A reconstruction of mafic intraplate volcanism along the eastern margin of Australia: linking geophysical and geochemical constraints to plate motions

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The eastern margin of Australia has experienced extensive mafic volcanism since its breakaway from Antarctica (~ 80 Ma). A plume origin has been suggested for intraplate volcanism, however, the timing and location of eruption points does not clearly correlate with Australia's northward motion of 5-8cm/yr. That Cenozoic volcanism coincides with dynamically supported topography of up to 1km throughout the eastern highlands suggests a complex interaction between a mantle plume and lithospheric geometry as Australia migrated northward. Further complications to the expression of volcanism and dynamic topography arise from boundary forces such as the sinking eastern Gondwana slab and large Pacific mantle upwelling. We present a synthesis of geochemistry, seismic, and geodynamic constraints within an integrated plate reconstruction of Australia over the last 80 million years. This provides a framework within which to test geodynamic models that match geophysical and geochemical observations.