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Evidence for wide spread Neoproterozoic magmatism in the Dharwar craton, southern India: possible relationship super plumes at the fragmentation of Rodinia.

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During the Neoproterozoic Rodinian super continent formed at ca. 1100 Ma and broke apart at around 800-700 Ma. Dispersal of this super continent is believed to have been triggered by wide spread mafic and felsic volcanism. Temporally this correlates with a prominent mantle plume event responsible for substantial juvenile crust additions as evidenced on disparate cratons. The southern margin of the Achaean Dharwar craton, southern India, is straddled by several alkali syenite, carbonatite, alkali granite and granite plutons and dykes. These are scattered over a wide region of ~400 x 75 km with many localized zones of fenitised Archean gneisses. Several Rb-Sr isochron age determinations establish that these rocks were emplaced at 790±10 Ma, contemporaneous with the early break up of Rodinia. However, a 'plume origin' for these magmatic complexes is suspect. Major and trace element compositions for several of these indicate calcalkaline affinity rather than similarity to typical anorogenic associations related to hotspots. Further, initial Nd and Sr isotopic compositions indicate a variably enriched mantle source(s) not consistent with their derivation directly from an upwelling mantle plume. Nevertheless, genesis of their magmatic protoliths by partial melting of an enriched upper source in response to a thermal perturbation related to a mantle plume cannot be precluded.