Age disparity for spatially related Sevattur and Samalpatti carbonatite complexes

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The Neoproterozoic Sevattur and Samalpatti alkaline–carbonatite complexes in S India were supposedly emplaced into regional metagranite at ~800 Ma [1]. Both complexes are close to each other (~4 km apart), with a similar NE–SW elongated oval shape arranged along NE–SW trending lineament formed by the Koratti–Attur tectonic zone [2]. Both complexes share a similar setting with central syenite intrusion mantled with a discontinuous ring and/or crescent-shaped suites of carbonatites, pyroxenites, gabbros, and dunites. In contrast to identical tectonic position and similar structure, the two complexes differ significantly in geochemistry and Sr–Nd–Pb–O–C isotope compositions. The Sevattur suite is derived from an enriched mantle source without significant post-emplacement modification whilst extensive hydrothermal overprint by crustal fluids must have occurred to result in the observed ^{13}C–^{18}O-enriched systematics reported for the Samalpatti carbonatites [3]. Some Samalpatti pyroxenites, though, show a clear mantle signature [3].

We report preliminary K–Ar age-data, that indicate a prolonged period of the magmatic activity in this area. Sevattur gabbro and pyroxenite (both Bt-fraction) as well as one Samalpatti Cr-rich silicocarbonatite (Amp-fraction) yielded the range of ages at 700–800 Ma, consistent with previous reports [see 3 for details]. The new K–Ar data from syenites display significantly younger ages of 560–576 Ma for Samalpatti and 510–540 Ma for Sevattur, regardless of the mineral fraction used (Bt or Kfs). The K–Ar results are being supplemented by systematic U–Pb analyses of zircons. If proven true, the age disparity would have profound consequences on our understanding of carbonatite evolution.

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[1] Kumar et al. (1998) GCA 62, 515-523. [2] Srivastava (1998) J Geol Soc India 51, 233-244. [3] Ackerman et al. (2017) Lithos, in press.