

## **Crustal reworking in the Archaean: Geochemical evidences from granitoid of the Western Dharwar Craton**

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Earth's continental crust is not uniform, but has a more mafic lower crust and a more felsic upper crust. The generation of granites by extraction of melt from the lower portion and its emplacement in the upper portion is the principal process by which continents are differentiated. Thus to study the petrogenesis of granites is important to understand the crustal reworking processes. Dharwar craton of south India has a number of late-Archaean intrusive granites which are considered to be produced by reworking of crustal sources with or without significant mantle input. In this study we are trying to show the geochemical manifestation of this process taking example of one of the plutons from the Western Dharwar Craton.

The pluton was intruded into the granite-greenstone basement, SW of Chitradurga Greenstone Belt. It mainly consists of medium-coarse grained, grey and pink granites with quartz, K-feldspar, plagioclase and biotite as major minerals. Field observations suggest that this granite was formed by melting of TTG (Tonalite-Trondhjemite-Granodiorite) gneisses, where TTG is present as enclaves in granite. Geochemical modeling was carried out to test this hypothesis. The trace element composition of melts were determined using a model of equilibrium non-modal melting, taking average TTG of this terrane as source. Quartz, K-feldspar and plagioclase, together with small amounts of biotite and epidote were assumed to melt, generating a major element composition consistent with the granite. The effect of small amounts of accessory mineral phases such as monazite, zircon, sphene, apatite, ilmenite and magnetite was also included.

Our result shows that 11% melting of TTG can produce this granite without significant mantle input. The model is consistent with Nd isotope data which show epsilon Nd values of granite similar to that of TTG at 2600Ma (-1.5 to -6.7 for TTG and -4.1 to -7.7 for granite). We, based on these results infer that there was an extensive reworking of the pre-existing TTG crust in Neoarchaean and some granites were formed only through crustal anatexis without any mantle input.