

Zircon U-Pb ages and Lu-Hf isotopes of Sullia Syenite, Mercara Suture Zone : Insights to the alkaline magmatism in Southern India

DR. THENGANODIYIL AMALDEV, PHD

Cochin University of Science and Technology

Presenting Author: amaldev@cusat.ac.in

The Southern Granulite Terrain (SGT) is a well-known locale for investigating the deep crustal processes, crust-mantle interactions as well as Pre-Cambrian continental formation and evolution. The SGT is made up of a mosaic of crustal blocks that range in age from the Mesoarchean to the Neoproterozoic and are united by suture zones. Syenites, ultrapotassic rocks, carbonatites, lamproites, and shonkinites are only a few of the many unmetamorphosed and largely undisturbed alkaline magmatic suites found in the SGT. These suites are mostly found near or inside of major paleo-suture/shear zones or transcrustal faults. Similar to other alkaline plutons of SGT, the isolated body of Sullia Syenite has an intrusive relationship with the high-grade granulite rocks in the Mercara Suture Zone. Zircon grains show similar age distributions and dominantly indicate Neoproterozoic ages with the peak at 807 Ma. The zircon REE data shows a clearly steep pattern representing typical patterns of unaltered zircon, recording the magmatic crystallization environment. Although the zircon grains range from ca. 790-840 Ma, the similar REE pattern indicates that the zircons belong to a single generation with repeated recharge of magma with attendant certain time thermal history. In situ Hf isotope analyses were carried out on zircon grains on the same spots or immediately adjacent domains from where the U-Pb data were gathered. In summary, Lu-Hf isotopes show a slightly negative $\epsilon_{\text{Hf}}(t)$ values of -2.3 to -4.6 in all the syenite samples, and the average crustal model age T_{DM}^{C} age shows a peak at 1908 Ma, suggested the reworked material derived from a Paleoproterozoic magma source.