## 5.2.P15

# Signatures of Mesoproterozoic alkaline magmatic province from Andhra Pradesh, southern Peninsular India

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Alkaline magmatism is manifested in different tectono-magmatic provinces in the Precambrian shield of Southern Peninsular India and one such province is located in the Eastern Dharwar Craton (**EDC**) abutting the intracratonic "Cuddapah Basin" (**CB**) which is overthrusted by Eastern Ghat Mobile Belt (**EGMB**).

The Mesoproterozoic alkaline province in the state of Andhra Pradesh is composed of a gamut of alkaline rocks including syenites, lamprophyres and lamproites in a close spatial and temporal association with granites and gabbros which are however not alkaline. Kimberlite pipes discovered from this part also, fall on the western side of **CB**. Studded with such a wide ranging array of the rocks, the province is devoid of any carbonatite - ultramafic - alkali granite association.

The magmatic province in Andhra Pradesh is marked by two converging major lineaments: 1) A NE-SW trending Veldurthi – Guntur (**V-G**) lateral ramp in the North and 2) a NW-SE trending Cuddapah – Nellore (**C- N**) transverse tear fault in the South and all the syenites together with lamprophyres and lamproites are found emplaced between the lineaments. The province displays the entire spectrum of syenite family including silica –oversaturated, -saturated and -undersaturated compositions.

Thus, with the wide ranging lithology from west to east across **CB** amply demonstrates the fact that this province is saddled with multifaceted manifestations corresponding to alkaline, subalkaline and basic magmatic activities. The two facets of alkaline magmatism – syenites and its variants on the eastern side and, kimberlites on the western side of the **CB**, present an interesting insight through their distinctive mineralogy and major, trace and REE geochemistry.

The olivine lamproites and kimberlites occurring outside the **CB** demonstrate that they are products of probably ***"earliest"*** potassic mafic magmatism – indicating a mantle metasomatism involving melting of phlogopite under reduced pressure that was induced as a post-thrusting phenomenon to **EGMB**, and/or post shearing episode, in this part of the subcontinent.

## 5.2.P16

# Nd and Sr isotope composition and origin of a 2.44 Ga layered mafic intrusion in Koillismaa, Finland

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Early Paleoproterozoic layered mafic intrusions in north-central Finland and adjacent Russia are part of the globally recognized ~2.5 Ga cratonic igneous province characterized by mafic intrusions and dike swarms. In Finland, these intrusions form an E-W trending, ~300-km-long belt of mafic bodies representing at least five separate intrusive complexes [1]. They were emplaced into Neoarchean (~2.8 Ga) crust, are flanked by Paleoproterozoic volcano-sedimentary sequences, and are also associated with some silicic rocks [2].

We present new Nd and Sr isotope data on one of the Finnish bodies, the 2.44 Ga Koillismaa layered mafic intrusion [1]. This includes the following mafic rock units: layered series (Porttivaara), microgabbronorite inclusions (associated with reef-type sulfide-PGE enrichments [3]), and an enigmatic gabbroic pluton (Soukeli) immediately adjacent to the layered series. The layered series has been divided into three zones that delineate a stratigraphic sequence of ~2 km [4]; in terms of Nd and Sr isotopes these zones are astonishingly uniform: $\varepsilon_{Nd}$ (at 2440 Ma) = -1.6 ± 0.8 (2$\sigma$; n=7), $Sr_i$ = 0.7027 ± 0.0011. The microgabbronorite inclusions have slightly less radiogenic Nd and somewhat more radiogenic Sr isotopes ($\varepsilon_{Nd}$ -3.3 to -1.7; $Sr_i$ 0.7027 to 0.7030). The Soukeli gabbros have clearly more unradiogenic Nd isotope ratios ($\varepsilon_{Nd}$ -6.4 to -4.5) and more radiogenic Sr isotope ratios ($Sr_i$ 0.7029 to 0.7069). Comparison to the surrounding Neoarchean crust [$\varepsilon_{Nd}$ (at 2440 Ma) -8.5 to -5] shows that the layered series (and probably also the microgabbronorite inclusions) were not substantially contaminated by Archean material during transit. Actually, their magmas may have been derived from a ~chondritic mantle with $\varepsilon_{Nd}$ ~ -1.5 and $^{87}Sr/^{86}Sr$ of ~0.7030 at 2440 Ma. The Soukeli gabbros contain (presumably xenocrystic) zircons (~2.7 Ga; [4]) and their Nd and Sr isotope composition is compatible with an enriched Neoarchean lithospheric mantle source.

**References**

[1] Alapieti et al. (1990) *Mineral. Petrol.* **42**, 1-22.

[2] Lauri and Mänttäri (2002) *Precambrian Res.* **119**, 121-140.

[3] Iljina et al. (2001) In *Mineral deposits at the beginning of the 21st century, 6th Biennial SGA-SEG meeting, Krakow, 26-29 August,* (ed. Piestrzynski et al.), pp. 649-652.

[4] Alapieti (1982) *Geol. Surv. Finland Bull.* **319**.