

**Mesoarchean mafic magmatism from
two distinct mantle sources:
Evidence from Sm-Nd isotopic
studies on metabasalts of the Gadag
greenstone belt, Dharwar craton,
India**

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The auriferous Gadag greenstone belt (GGB) occurs to north of the Chitradurga greenstone belt in the western Dharwar craton. Chadwick *et al.* [1] suggested that the belt consists of five distinct tectonic domains, trending NW-SE, bound by shear zones. Metabasaltic rocks with pillow structures are reported from Doni, Attikatti and Vadvi domains. They are studied for geochemistry and Sm-Nd isotope systematic to determine their petrogenesis and ages.

Metabasalts occur as chlorite actinolite schist (CAS) in the Doni domain and they define a Sm-Nd whole-rock isochron age of 3025 ± 100 Ma (MSWD=4.2, $^{143}\text{Nd}/^{144}\text{Nd}_i = 0.50870$). Whereas, metabasalts (MB) from Attikatti and Vadvi domains are massive, fine grained and show porphyritic texture. They yielded a Sm-Nd isochron age of 2863 ± 100 Ma (MSWD=2.9, $^{143}\text{Nd}/^{144}\text{Nd}_i = 0.50899$). In the absence of correlation between $1/\text{Nd}$ vs. ϵ_{Nd} for CAS and MB both ages are interpreted to represent time of their formation. The ϵ_{Nd} values of CAS samples (t=3025) range from -0.12 to -0.47, except one sample G6B (+0.72) and the ϵ_{Nd} (t= 2863) of MB samples are varying from +0.87 to +1.84. Magmas representing CAS of the Doni domain was derived from mantle source that was metasomatized for long time or contaminated with less radiogenic Nd derived from >3.5 Ga old continental crust, prior to melting. Magmas representing MB of the Attikatti and Vadvi domains were derived from long term LREE depleted mantle sources. Thus mafic metavolcanic rocks of GGB were formed at different periods and tapped distinct mantle sources and were later juxtaposed tectonically.

[1] Chadwick *et al.* (2003) *J. Geol. Soc. India*, **61**,645-663.