

Research Article

DEFORMATION, METAMORPHISM AND GEOCHRONOLOGY OF THE PALAEOPROTEROZOIC SALEM-NAMAKKAL FOLD THRUST BELT AND IMPLICATIONS FOR THE GONDWANALAND CONTINENTAL ASSEMBLY

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ABSTRACT

The granulite terrain of South India consists of three tectonically distinct terranes separated by ductile thrusts. The central terrane namely the Salem-Namakkal Fold Thrust Belt which forms the topics of the present paper is sandwiched between the Northern Archaean Granulite Terrane and southern Neoproterozoic Pandyan Mobile Belt. The Salem-Namakkal Fold Thrust Belt consists of a stack of imbricate thrust sheets showing N to NE vergence. The charnockitic mylonites produce an age of 2530±39 Ma. The imprint of Pan-African event is missing in the charnockitic mylonites. However, the shonkinite dyke emplaced in the ultramafic plutons has produced 801 Ma age. The southernmost Namakkal thrust sheet show isothermal decompression while the northernmost Salem thrust sheet show isobaric cooling history. The granulites are retrograded during shearing. In the Gondwanaland assembly, the Salem-Namakkal Fold Thrust Belt forms a contiguous terrane with the Antananarivo - Tsaratanana Belt of Madagascar and probably a complimentary unit to Usagaran Block of Tanzania craton; the Pandyan Mobile Belt -Mozambique Belt forms the central axis of the collisional orogen.

Key Words: *Southern Granulite Terrane, Salem-Namakkal Fold Thrust Belt, Palaeoproterozoic age of charnockitic mylonites, Antananarivo - Tsaratanana Belt of Madagascar*

INTRODUCTION

The granulites of South India are hosted in a collage of geologically distinct terranes (Fig. 1a inset) namely the Archaean Northern Granulite Terrane, the Palaeoproterozoic Salem-Namakkal Fold Thrust Belt, the Neoproterozoic Pandyan Mobile Belt (includes Madurai Belt and, the Kerala Khondalite Belt). These stacked granulite terrains have a transitional boundary with the Archaean greenstone-TTG terranes of the Dharwar Craton, popularly known as Fermor's line. The internal granulite belts are mutually juxtaposed along deep-seated ductile thrusts. Limited observations along the Palar river suggest that the Fermor's line may locally be marked by a low-angle thrust. The Northern Granulite Terrain consists of recently uplifted hills of charnockite, surrounded by low lying granite gneisses and migmatites (Devaraju et al., 2007; Clark et al., 2009). Sm-Nd model ages of the granulites within the Northern Granulite Terrain are 3.30 – 2.68 Ga suggesting that the Dharwar Craton was involved in their generation (Devaraju et al., 2007). Geothermobarometric studies indicate that these rocks show an overall anticlockwise path, and formed at 700±30° C and 5-7 kbar (Harris et al., 1982). The Salem-Namakkal Fold Thrust Belt constitutes a mixed terrane comprised mainly of Palaeoproterozoic to late Archaean charnockites, mafic granulites and BIF (e.g. Nilgiri and Kanjamalai hills), surrounded by amphibolites, hornblende biotite schists, granite gneisses and migmatites. These rocks are emplaced as discrete thrust sheets such as