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Palaeomagnetism of dykes from southwest coast of India: Implication for India-Madagascar pre-drift configuration

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Cretaceous magmatic events are manifested as dyke swarms in the southwest coast of India. They are mostly coast parallel with two distinct trends. The dolerite dykes with NW-SE trend are wide spread in the region while the NNW-SSE trending dykes occur sporadically. The dykes are essentially composed of plagioclase and augite with typical ophitic texture. Magnetite and titanomagnetite constitute the opaque phase.

The details of the palaeomagnetic studies on these dykes are discussed. The samples were subjected to stepwise alternate field demagnetisations and thermal demagnetisations. Characteristic Remanent Magnetization (ChRM) could be estimated for these samples after removal of small secondary viscous components. The NW-SE dykes have yielded directions with normal and reverse polarities. These are considered to be emplaced during the period between 70-65 Ma. At least four groups could be identified based on the palaeomagnetic directions. The first group is represented by three sites with normal polarity and two sites with reverse polarity and has a mean ChRM of $D/I = 346.8^\circ/-68^\circ$. The second group consists of one site with normal polarity and two sites with reverse polarity. The mean ChRM for this group is $D/I = 301.8^\circ/-57.5^\circ$. The third group is having a mean ChRM of $D/I = 282.5^\circ/-54.1^\circ$. The fourth group has a mean direction similar to the Precambrian (1.65 Ga) dykes of Tiruvannamalai and Kolar regions of southern India, suggesting a possible extension of Proterozoic dykes far south. This group has a mean ChRM of $D/I = 163.7^\circ/-67.6^\circ$. But the Ar-Ar age on one of the dykes from this group has yielded a Cretaceous age.

The NNW-SSE dykes are emplaced in an *en echelon* pattern and are cut across by the NW-SE dykes at places indicating the former to be older. They occur as leucogabbro and dolerite dykes. These are considered to be emplaced during the period between 95-90 Ma. They have a normal polarity as they are emplaced during the Cretaceous Normal Superchron (CNS). The dykes have yielded a mean ChRM of $D/I = 323^\circ/-57^\circ$.

The ocean floor near to the west coast of India is characterised by the absence of magnetic anomalies as the ocean floor was developed during the CNS. Therefore, the reconstructions of continental blocks of India and Madagascar across the oceans have always been a topic of debate. The new results from the palaeomagnetic studies of the dykes from Kerala have been utilized to provide better constraints on the evolution of the west coast of India. We interpret the emplacement of the NNW-SSE dykes to be coeval with the separation of India from Madagascar during the period between 95-90 Ma. The new results

have reduced the angular mismatches of poles drastically from the existing mismatches of 12-20° to less than 5°. The NW-SE trending dykes are interpreted to be emplaced during the main volcanic activity in the Deccan. The emplacement may indicate the separation of India from Seychelles. The implication of the new palaeomagnetic data along with the revised age of the Ezhimala Complex on India-Madagascar pre-drift configuration during the Late Cretaceous will be discussed.

