Geophysical Research Abstracts
Vol. 12, EGU2010-6433, 2010
EGU General Assembly 2010
© Author(s) 2010

Episodic Nature of Mafic Magmatism in Kerala, Southwest coast of India: Palaeomagnetic and Geochemical constraints

Mathew Joseph (1,3), Mireille Perrin (1), Tallavjhala Radhakrishna (2), Jean Marie Dautria (1), Patrick Monié (1), Henri Maluski (1), Delphine Bosh (1), G Balasubramonium (2), and Josina Punoose (2)

(1) Géosciences Montpellier, CNRS-UM2, Université Montpellier 2, CC60, 34095, Montpellier, Cedex 5, France (mireille.perrin@univ-montp2.fr), (2) Centre for Earth Science Studies, Trivandrum, 695031 India, , (3) Geological Survey of India, Trivandrum, 695013 India

Mafic dyke intrusions occur all along the Kerala region of India. Generally these dykes with a NW-SE trend are considered to be associated with the development of the western continental margin of India and the Deccan volcanism. These dykes are usually considered to be emplaced around 60-70 Ma. Twelve sites were sampled for the present study from central and northern parts of Kerala.

The dykes are composed mainly of plagioclase and augite. Olivine is present in a few samples. Generally, Fe-Ti oxides constitute the opaque phase. All the mafic dykes of Kerala plot within the sub-alkalic field. Three groups can be distinguished chemically. Group 1 displays chondrite normalised REE patterns slightly fractionated; Group 3 is much more fractionated while Group 2 is intermediate. Groups 1 and 2 display negative anomalies in K, Sr, P and V similar to Deccan tholeiites. Group 3 shows strong Th, U, Nb and Ta negative anomalies which characterise continental basalt resulting from partial melting of a mantle previously modified by the addition of LILE enriched and HFSE depleted slab-derived aqueous fluids.

The samples were subjected to stepwise alternating field demagnetisations and thermal demagnetisations. Characteristic remanent magnetisation (ChRM) could be estimated for all samples after removal of small secondary viscous components. The directions include both normal and reverse polarities. The first group is formed by five sites with normal polarity and two sites with reverse polarity and has a mean direction of D/I = 346.8°/-68° with a paleopole at 95.2°W/26.2°N. 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°/-57.5° with a paleopole at 60.6°W/16.2°N. Another site gives a different mean ChRM with D/I = 282.5°/-54.1° and a pole-position at 49.7°W/4.6°N. The chemistry of this site being also different, it has to be considered separately. The fourth group has a mean ChRM similar to the Precambrian dykes of south India but its chemistry is similar to the Cretaceous dykes of Kerala. Three dykes belong to this last group with a mean ChRM of D/I = 163.7/ 67.6 and a palaeomagnetic pole at 118.6W/ 4.6°S.

One of the first group dykes with normal polarity has yielded Ar-Ar plateau age of 68 Ma. This episode can therefore be correlated with the 30N chron of the polarity time-scale. The timing of the various pulses of magmatism and their correlations with the rift/drift history of Indian continental block during the Phanerozoic will be discussed.