

GENESIS OF THE EARLY CRETACEOUS THOLEIITES FROM SERRA DO MAR DYKE SWARM (BRAZIL):
TRACE ELEMENT AND STRONTIUM, NEODYMIUM AND LEAD ISOTOPIC CONSTRAINTS

Marques, L.S.¹; De Min, A.²; Babinski, M.³; Figueiredo, A.M.G.⁴; Andrade, L.L.¹; Vicentini, C.M.¹ and
Piccirillo, E.M.²

1. Instituto de Astronomia, Geofísica e Ciências Atmosféricas – Universidade de São Paulo, Rua do Matão, 1226, 05508-090, São Paulo, Brasil, leila@iag.usp.br.
2. Dipartimento di Scienze della Terra – University of Trieste, Via E. Weiss, 8, 34127, Trieste, Italia, demin@univ.trieste.it
3. Centro de Pesquisas Geocronológicas - Instituto de Geociências – Universidade de São Paulo, Rua do Lago, 562, 05508-080, São Paulo, Brasil, babinski@usp.br.
4. Instituto de Pesquisas Energéticas e Nucleares – CNEN/SP, Av. Prof. Lineu Prestes 2242, 05508-000, São Paulo, Brazil, anamaria@ipen.br.

ABSTRACT

Keywords: Serra do Mar Dyke Swarm, Paraná Magmatic Province, Early Cretaceous Magmatism, Mafic Dyke Swarms, Mantle Sources.

The Serra do Mar Dyke Swarm (SMDS), located at the coast of São Paulo and Rio de Janeiro States, was emplaced during the last stages of the igneous manifestation of the Paraná Magmatic Province (PMP). The SMDS tholeiites are mainly represented by high-titanium (HTi; $TiO_2 > 3\%$) rocks, also enriched in incompatible elements, whereas scarce basaltic dykes, with low contents of titanium (LTi; $TiO_2 \leq 2\%$) and affected by crustal contamination ($^{87}/^{86}Sr_i \sim 0.708$; $^{143}Nd/^{144}Nd_i \sim 0.5122$), are found in a restricted area. The close geochemical features of the LTi dykes and low-Ti flood basalts from southern PMP indicate similar genesis. According to their geochemical characteristics the HTi dykes may be divided in three groups: (1) HTi-P ($TiO_2 > 3\%$; $Sr < 550 \mu g/g$) is analogous to the Pitanga flows from northern PMP; (2) HTi-U ($TiO_2 > 3\%$; $Ti/Y > 500$; $Sr > 550 \mu g/g$) is similar to the Urubici flows from southern PMP; (3) ATi-SM ($TiO_2 > 2\%$; $Ti/Y < 500$; $Sr > 550 \mu g/g$) has a slight alkaline tendency and geochemical signatures not encountered in the PMP flows. The $^{87}/^{86}Sr_i (0.7059 \pm 0.0004; N=10)$ and $^{143}Nd/^{144}Nd_i (0.5124 \pm 0.0003; N=12)$ ratios of both HTi-P and HTi-U dykes are also similar to the Pitanga and Urubici magma types, respectively, whereas the HTi-SM group has higher $^{87}/^{86}Sr_i (0.7064 \pm 0.0003; N=6)$ and lower $^{143}Nd/^{144}Nd_i (0.51231 \pm 0.00002; N=8)$ ratios. The lead isotopic ratios of all HTi dykes vary in a narrow range ($^{206}Pb/^{204}Pb = 18.34 \pm 0.07$; $^{207}Pb/^{204}Pb = 15.57 \pm 0.02$; $^{208}Pb/^{204}Pb = 38.6 \pm 0.1$; $N=17$), being similar to the most radiogenic compositions of the HTi flows from PMP and to the Mesozoic HTi dykes from Southern Espinhaço (São Francisco Craton). The isotopic signatures of the investigated HTi dykes may be explained by the involvement of K-alkaline/carbonatitic (K-ASU type; Eastern Paraguay) and HIMU mantle components in their genesis.

Support: FAPESP and CNPq

VIII South American Symposium on Isotope Geology-SSAGI, Medellin, Colômbia – 2012

Euşame de diques
Cretáceo
Rochas magmáticas
Serra do Mar (SP)