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

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ABSTRACT

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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; TiO2 > 3%) rocks, also enriched in incompatible elements, whereas scarce basaltic dykes, with low contents of titanium (LTi; TiO2 ≤ 2%) and affected by crustal contamination (87/86Sri ~ 0.708;
143Nd/144Ndi ~ 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 (TiO2 > 3%; Sr < 550 µg/g) is analogous to the Pitanga flows from northern PMP;
(2) HTi-U (TiO2 > 3%; Ti/Y > 500; Sr > 550 µg/g) is similar to the Urubici flows from southern PMP; (3) ATi-SM
(TiO2 > 2%; Ti/Y < 500; Sr > 550 µg/g) has a slight alkaline tendency and geochemical signatures not encountered in the PMP flows. The 87/86Sri (0.7059±0.0004; N=10) and 143Nd/144Ndi (0.5124±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 87/86Sri (0.7064 ± 0.0003; N=6) and lower 143Nd/144Ndi (0.51231±0.00002; N=8) ratios. The lead isotopic ratios of all HTi dykes vary in a narrow range (206Pb/204Pb = 18.34±0.07; 207Pb/204Pb = 15.57±0.02; 208Pb/204Pb = 38.6±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.

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