

THOLEIITIC DYKE SWARM FROM THE PONTA GROSSA ARCH AND GENETIC RELATIONSHIPS TO THE PARANÁ FLOOD  
VOLCANICS (BRAZIL)

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The Lower Cretaceous tholeiitic dyke swarm of the Ponta Grossa Arch is the most important dyke formation in Brazil, associated with flood volcanic rocks of the northern Paraná basin.

The Ponta Grossa (PG) dykes are formed by two-pyroxene tholeiites and rare rhyodacites and rhyolites. Two main groups of basaltic rocks may be distinguished: a dominant, high  $TiO_2$  (> 2% wt.) group and a subordinate, low  $TiO_2$  (< 2% wt.) group, characterized by high and low incompatible element contents, respectively. Sr-Nd isotopic data show that the PG dykes plot in the mantle array ( $\epsilon_{Sr} = c. +17$  and  $\epsilon_{Nd} = c. -3$ ) and do not show chemical evidence supporting appreciable crustal contamination.

Intra-dyke chemical variation suggest that the slight normal or reverse differentiation may be related to pre-emplacement low-pressure differentiation processes. Important chemical differences between low- $TiO_2$  (LTI) and high- $TiO_2$  (HTI) basaltic dykes cannot be accounted for in terms of fractional crystallization but are consistent with different degrees of melting of a garnet peridotite mantle source, e.g. 9% and 20% melting for the HTI tholeiites, respectively.

Field distribution of magmatism, chemistry and Sr-Nd isotope compositions support

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the view that the PG dykes are related only to the flood volcanics of the northern Paraná basin, rather than to those of the central and southern Paraná basin.

Paleomagnetic data indicate that the investigated PG-dykes are younger than the Paraná flood volcanics. All the results suggest that PG dykes were probably feeders of stratoid volcanics erupted in the northern Paraná basin in the direction of the present continental margin and later eroded.

Chemistry and isotopic data reveal that asthenospheric mantle source components were not significant factors in the genesis of the tholeiitic dykes. The PG tholeiites are probably related to lithospheric mantle, and dyke emplacement occurred during early phases of rifting and/or flexuring, as documented for similar dykes swarms in Ethiopia, Yemen and Lebombo (S. Africa) which cut across flood volcanic-suites.