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PETROLOGY AND GEOCHEMICAL CHARACTERIZATION OF THE MANTLE SOURCES IN THE NORTHWEST REGION OF THE PARANÁ CONTINENTAL FLOOD BASALT PROVINCE

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The Paraná continental flood basalt (PCFB) province, one of the largest continental provinces preserved on Earth, has been the focus of many studies and is still a matter of debate. The PCFB covers more than 70% of the Paraná Basin as flows, sills, and dykes. The mineralogy of basalt is represented by plagioclase (An_{42-67}; 40-55%), pyroxene (augite: $Wo_{30-40}En_{34-46}Fs_{35-39}$; 19–40%), magnetite (2 – 10%), and olivine (Fo_{31-50}; <1.5%). Based on rheological calculations the temperature of crystallization of the pyroxenes is estimated at 1100°C. From a geochemical point of view, the origin of the tholeiitic basalts with low-TiO_2 (≤ 2%; Ribeira) in the northern PCFB province, characterized by the occurrence of basalts with higher concentrations of TiO_2 (TiO_2> 2%) and incompatible trace elements, are here investigated through the determination of Sr, Nd and Pb isotope ratios. The isotope data, along with trace element ratios are used to assess the possible role of the interaction with the continental crust and/or the Sub-Continental Lithospheric Mantle (SCLM). The Ribeira basalts investigated in this study have initial (134 Ma) $^{87}Sr/^{86}Sr_i$ ratios of 0.705341 – 0.705931, $^{143}Nd/^{144}Nd_i$ of 0.512308 – 0.512097, $^{206}Pb/^{204}Pb_i$ of 17.628 – 17.810, $^{207}Pb/^{204}Pb_i$ of 15.506 – 15.541, and $^{208}Pb/^{204}Pb_i$ of 37.859 – 38.154. These isotopic compositions do not display any correlation with Nb/Th, Nb/La or P_2O_5/K_2O ratios, which also reflect that these rocks were not significantly affected by low-pressure crustal contamination. The geochemical composition of the northern PCFB may be explained through the involvement of fluids and/or small volume melts related to metasomatic processes.