

GEOCHRONOLOGY OF THE CRETACEOUS-CENOZOIC ALKALINE MAGMATISM IN SOUTHEASTERN BRAZIL: Preliminary results

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RESUMO

Alkaline-ultramafic intrusions (and their hypabyssal and volcanic products) related to the breakup of the west margin of Gondwana are widespread in South America, especially in central and southeastern Brazil. Earlier geochronological data obtained by the K/Ar and Rb/Sr methods have indicated a wide range of ages for the alkaline igneous activity. However, most of these ages do not correctly measure the timing of rock crystallization, and are often too imprecise to properly evaluate the duration of each magmatic center and the time-space regional trends. In contrast, modern $^{40}\text{Ar}/^{39}\text{Ar}$ and U/Pb geochronology have the accuracy and precision to provide reliable ages, and most importantly, they are useful to detect potential difficulties related to incorporation of excess ^{40}Ar , U or Pb loss, or thermal disturbances caused by post-magmatic events (e.g., hydrothermalism, deuteric alteration, etc.). Compilation of the existing published $^{40}\text{Ar}/^{39}\text{Ar}$ step-heating ($n = 221$) and U/Pb ($n = 100$) ages, followed by $^{40}\text{Ar}/^{39}\text{Ar}$ age recalculation and filtering of $^{40}\text{Ar}/^{39}\text{Ar}$ and U/Pb results, shows that alkaline magmatism took place at different stages during Gondwana breakup: 1) shortly predating continental breakup (146.3 ± 0.9 to 139.2 ± 0.3 Ma); 2) coeval with the Paraná-Etendeka tholeiitic magmatism (133.4 ± 0.6 to 132.7 ± 0.7 Ma); 3) associated with rift to drift transition in the South Atlantic (130.2 ± 0.2 to 102.3 ± 0.6 Ma); 4) South Atlantic drift stage #1 (88.2 ± 0.7 to 51.5 ± 1.0 Ma); and 5) South Atlantic drift stage #2 (21.6 ± 0.1 to 0.3 ± 0.4 Ma). The exact duration of each of these magmatic events and their spatial distributions requires refinement. But the long duration of magmatism implies that mantle melting and subsequent magma ascent are common processes during continental rifting-drifting stages. Models invoking mantle plumes as the main source of intracontinental alkaline magmatism must be reassessed.

Palavras-chave: $^{40}\text{Ar}/^{39}\text{Ar}$ step-heating geochronology; U/Pb geochronology; intracontinental alkaline magmatism; Gondwana breakup