

$^{40}\text{Ar}/^{39}\text{Ar}$ geochronology of the Paraná LIP central segment

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Constraining timing, duration and magma extrusion rates in large igneous provinces (LIPs) is essential for evaluating crust/mantle processes and links to environmental changes that drive mass extinctions. The Paraná-Etendeka LIP marked the Early Cretaceous of southwestern Gondwana shortly predating its breakup. Previous work suggest that $\sim 2.8 \times 10^6 \text{ km}^3$ of lava [1] erupted in ~ 1 million years (m.y.) during this event [2, 3]. Most samples selected for dating purposes, however, were obtained from the low-Ti sequence in the south escarpment of the Paraná LIP, whereas the voluminous high-Ti lavas in its central and northern parts remain poorly dated. To address this issue, seven basalt specimens collected from drillholes in the central area of the LIP were dated by the $^{40}\text{Ar}/^{39}\text{Ar}$ step-heating method. Our results, together with previous estimates [3, 4, 5, 6], reveal that volcanic events in this area occurred between $135.5 \pm 0.4 \text{ Ma}$ and $133.2 \pm 0.3 \text{ Ma}$, lasting for 1.6–3.0 m.y. ($\pm 2\sigma$). This also implies mean extrusion rates of 0.9–1.7 km^3/y , consistent with other LIPs that produced catastrophic events. Although not as rapid as previously proposed, the extrusion interval estimated here confirms the fast-lived nature of the Paraná-Etendeka event.

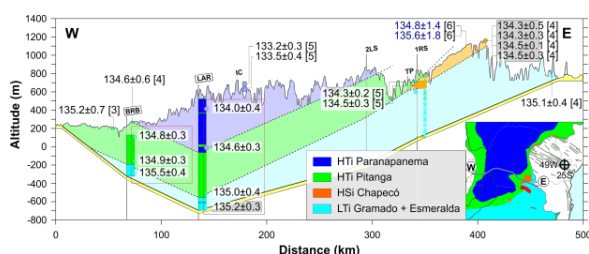


Figure 1. E-W cross-section in the central part of the Paraná LIP. $^{40}\text{Ar}/^{39}\text{Ar}$ step-heating and U/Pb ages in black and blue, respectively. All $^{40}\text{Ar}/^{39}\text{Ar}$ ages recalculated using the $28.294 \pm 0.072 \text{ Ma}$ ($\pm 2\sigma$) age of [7] for the Fish Canyon sanidine.

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 [2] Renne et al. (1992) *Science*, **258**, 975-979. [3] Thiede and Vasconcelos (2010) *Geology*, **38**, 747-750. [4] Nardy (1995) PhD thesis, Universidade Estadual Paulista. [5] Mincato (2000) PhD thesis, Universidade Estadual de Campinas. [6] Pinto et al. (2011) *Chem Geol*, **281**, 93-102. [7] Renne et al. (2011) *GCA*, **75**, 5097-5100.