

**VOLUMINOUS SILICIC VOLCANISM FROM THE PARANÁ MAGMATIC PROVINCE POSTDATES THE VALANGINIAN  $\delta^{13}\text{C}$  EXCURSION**

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**RESUMO**

Large Igneous Province (LIP) magmatism is thought to be responsible for global climate changes, which have led in some cases to major mass extinction events during the Phanerozoic. The breakup of Gondwana during the Lower Cretaceous produced the Paraná-Etendeka LIP, with up to 1,000,000 km<sup>3</sup> of preserved volcanic rocks of dominantly basaltic composition and is one of the world's largest LIPs. Silicic volcanic rocks are relatively abundant compared to other continental flood basalt provinces and are divided into Palmas (low-Ti) and Chapecó (high-Ti) types. The Valanginian is marked by a period of global-scale carbon cycle perturbation and biotic crisis, as evidenced by a positive  $\delta^{13}\text{C}$  excursion and Hg enrichment in the sedimentary record. Several studies have attempted to link the Paraná-Etendeka LIP volcanism with the Valanginian environmental event. However, such temporal correlation requires knowledge about the precise timing and duration of the volcanic activity, which is still poorly constrained in the Paraná Magmatic Province (PMP). Due to their relative stratigraphic positions, silicic volcanic rocks are good temporal markers to define the onset and duration of the magmatic activity in the province. Here, we significantly revise the timescales of magmatism and environmental impact of the Paraná Magmatic Province using high-precision U-Pb zircon geochronology. Our data demonstrate that a large amount of silicic magma from the Paraná LIP erupted very rapidly within an extremely narrow time interval of  $0.12 \pm 0.11$  ky, providing evidence for short-lived (~100 ka) low-Ti silicic magmatism. Our new, more precise data agrees overall with older age information, but it also demonstrates that silicic magmatism of the PMP is younger than the Valanginian Weissert Episode that is dated at 135.22 Ma. A previous high-precision age from the Ourinhos trachydacite was re-visited and our new data reveal that the high-Ti silicic volcanic rocks in upper stratigraphic position are ~1.5 Myr younger than previously estimated. This further reinforces the hypothesis that the silicic volcanism of the Paraná Magmatic Province was likely not the triggering mechanism for the Valanginian  $\delta^{13}\text{C}$  excursion.

**Palavras-chave:** Paraná Magmatic Province; high-precision U-Pb dating, CA-ID-TIMS; Valanginian Weissert Episode; silicic volcanism