GeoMinE 2025

· XIII SIMPÓSIO SUL-BRASILEIRO DE GEOLOGIA
· IX SIMPÓSIO DE VULCANISMO E AMBIENTES ASSOCIADOS
· I CONFERÊNCIA DE GEOLOGIA E MINERAÇÃO DO MERCOSUL
· II WORKSHOP ARMAZENAMENTO DE CO_2 POR MINERALIZAÇÃO EM BASALTOS
· I EXPOGEOMINE

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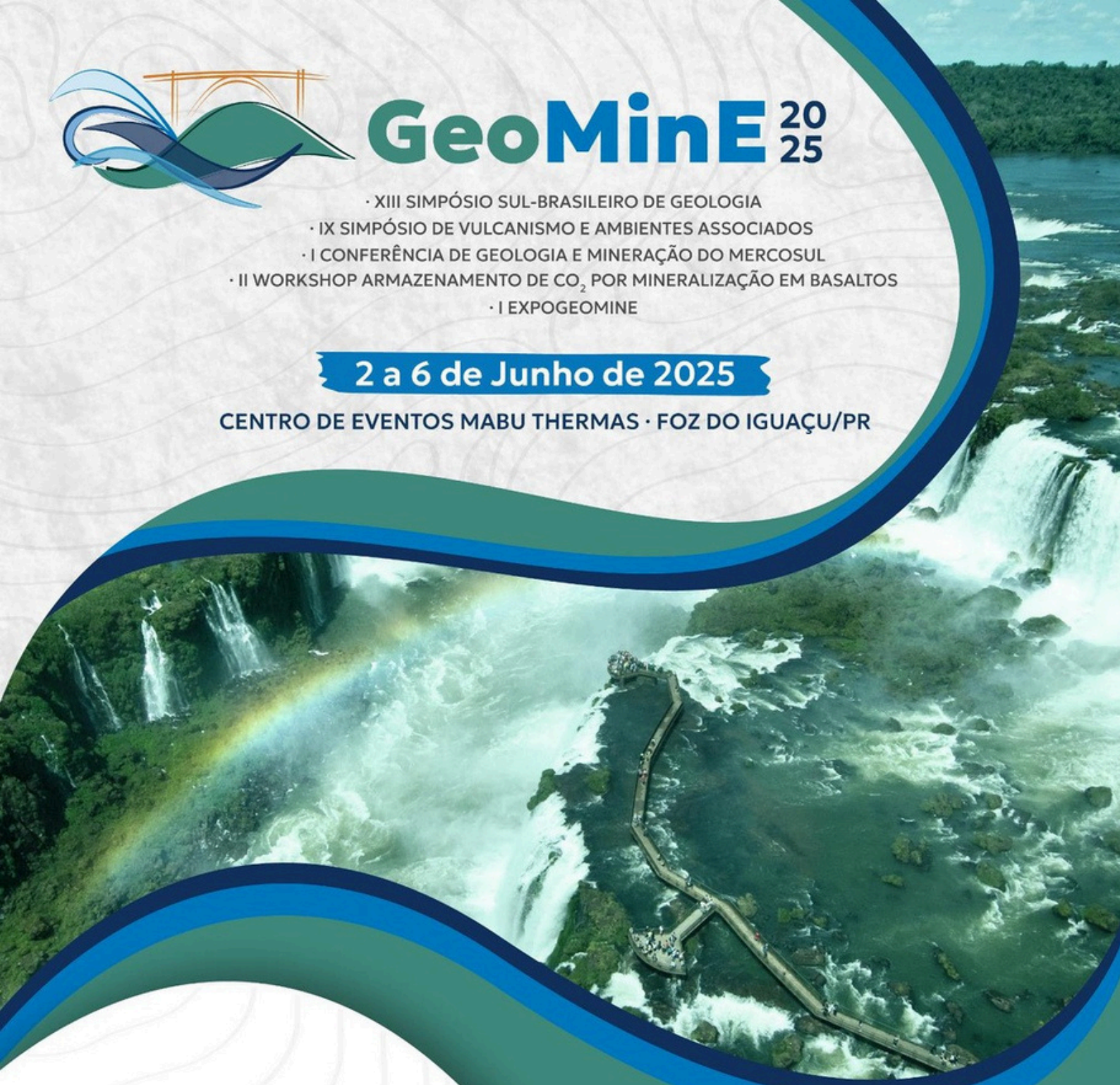

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Silicic magmatism in the Paraná Magmatic Province, Brazil: stratigraphic position, age and petrogenesis

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The stratigraphic position and age of the occurrences of silicic rocks in the Paraná Magmatic Province are known with some confidence, but some generalizations that do not take into account the accumulated knowledge still persist in the perception of many researchers and even in recent publications. In particular, the reference to their positioning “at the top of the lava pile” is repeatedly seen when, in reality, they are distributed in different stratigraphic positions and are remarkably absent at the end of the volcanism, since the youngest manifestation (Chapecó-type trachydacites) occurs at the base of the high-Ti succession, which constitutes the largest volume of basalts in the province. The low-Ti basalt succession, which precedes the high-Ti and outcrops in the south of the province, is closed with rhyolites (Santa Maria Rhyolite), but different types of dacite (referred to as Caxias do Sul, Jacuí, Anita Garibaldi and Barros Cassal subtypes, whose mutual stratigraphic relationships are still unclear) are essential constituents of the middle to upper part of this sequence. This broad distribution, and the greater amenability to high-precision U-Pb dating in zircon by CA-ID-TIMS, has allowed to circumscribe an important interval of the duration of volcanism, with the exception of its beginning (“Gramado and Urubici-type” basalts, prior to the dacites in the low-Ti sequence) and end (“Pitanga and Parananapanema-type” basalts, postdating the trachydacites in the high-Ti sequence). The time interval of less than 1 Myr for all silicic volcanism (133.6-132.9 Ma; Rocha et al. 2020, Geology) is a remarkable finding, since it involves fundamental changes in the sources of magmatism, in particular the switch from the low- to high-Ti succession. Also surprising is the inference that the entire upper package of the low-Ti succession, whose compositional variation implies important changes in the sources in the mantle and in the thermal behavior of the continental crust, occurred in less than 100 kyr.The dacites and rhyolites of the PMP are remarkably H_2O-poor, and as such correspond to the highest temperature silicic magmas known, as confirmed by geothermometric estimates and recent experimental studies. Under such conditions, textural evidence of pyroclastic eruptions is rarely preserved, so that the distinction between coherent and fragmentary deposits is often difficult, and requires detailed structural studies, often made impractical by the scarcity of outcrops. At any rate, it can be demonstrated in some cases (particularly in the Chapecó-type trachydacites) that these correspond to small, discontinuous silicic centers; an apparent exception are the Santa Maria rhyolites, which are monotonous in character and spread over significant areas without variation in their geochemical and paleomagnetic signature. All PMP silicic rocks are porphyritic, and their compositions, although usually homogeneous, appear to correspond to a mixture of a liquid richer in silica and antecrysts of plagioclase, pyroxene and Ti-magnetite; the trace element signature (and, apparently, also the Sr isotopic signature) of plagioclase from the Palmas-type silicic rocks, however, shows a good correlation with the degree of whole-rock fractionation, suggesting that putative “cannibalistic” processes would be internal to each subtype.

Palavras-chave: Paraná-Etendeka Province, LIP, CFB, stratigraphy, silicic volcanism

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