

Recent advances on the stratigraphy of the Paraná-Etendeka Magmatic Province in Brazil from field relationships and dating: a critical summary

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The establishment of a stratigraphy for the volcanic pile of the Paraná-Etendeka Magmatic Province in Brazil is a formidable task, much difficulted by the enormous extension of the volcanism, by the rarity of continuous sections outside the Serra Geral escarpment in south Brazil and by the apparently monotonous aspect of the basalt flows, irrespective of their age.

In spite of these drawbacks, a robust framework was established in some remarkable previous studies, and recent contributions by various research groups from field surveys, geochemistry, geochronology and paleomagnetism are bringing important new information that contribute to confirm some old inferences and stimulate some new ideas on the volcanic succession of the Province.

In this contribution, I summarize the most relevant recent progress in this subject, brought about by researchers participating in the Fapesp Thematic Project “The Paraná-Etendeka Magmatic Province in Brazil: temporal and petrological relationships between the tholeiitic and alkaline magmatism and their geodynamic implications” and by other groups. Among the most relevant aspects, I discuss:

(1) the eruptive style, age and stratigraphic position of the Santa Maria rhyolites, which seem to be the youngest of these units, with a consistent reverse paleomagnetic polarity, and may not be related to the same event that generated the earlier ~134 Ma basalt (Gramado-Urubici)- dacite (Caxias) sequence of south Brazil;

(2) the stratigraphic position of the Chapecó-type trachydacites, which have a consistent normal paleomagnetic polarity yielding a virtual pole that is distinct from the rest of the province, and yet show a ~134 Ma age that seems firmly established from both Ar-Ar and U-Pb dating and is indistinguishable from that of the previous “low-Ti/Y” basalt-dacite sequence. Moreover, the Chapecó trachydacites are shown by field relationships to underlie the Pitanga-type high-Ti basalts, but their relationships with the “Palmas” rhyolites are ambiguous;

(3) the meaning and extent of the Parapanema-type basalts, which typically overlie the more voluminous “high Ti/Y” Pitanga type in the western portion of the Province, but are shown to underlie “Gramado-type” basalts in their southwesternmost expositions in Brazil and Uruguay.

A critical and integrated summary of these and other information on the relative and absolute ages of the volcanic units (and their intrusive counterparts) is used to suggest some future approaches that may result in refinements and even revisions of the stratigraphy of the PEPM lava pile.

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