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AMS-04 South American alkaline igneous complexes

A review of carbonatitic magmatism in the Parana-Angola-Etendeka system. General geological and petrochemical outlines

Piero Comin-Chiaramonti, *Trieste Universty (Italy)*
Aldo Cundari, *Geotrack International (Australia)*
Celso B Gomes, *Sao Paulo University (Brazil)*

Early and Late Cretaceous carbonatitic complexes from southern Brazil occur along the main tectonic lineaments of the South America platform. A similar situation is recognized for the Angolan and Namibian occurrences in Africa. In general, the alkaline-carbonatite complexes show intrusive/subintrusive, subcircular or oval shaped structures and are indicative of high upwelling energy.
However, lava flows, single dykes and dyke networks may be also found. Processes of liquid immiscibility from trachytic-phonolitic liquids, starting from parental alkaline mafic magmas are believed to have generated carbonatitic liquids, as suggested by field relationships and geochemical characteristics. Ca-, Mg- and Fe-carbonatites are widespread even in the same complex.
The remarkable scatters of the incompatible elements is mainly due to 1) the control of accessory phases, e.g. apatite, pyrochlore, fluorocarbonates and fluorite, and 2) the repeated overprinting of hydrothermal over magmatic processes.
Geochemical characteristics have been systematically determined for carbonatite samples from selected outcrops in Paraguay, Brazil, Angola and Namibia (Eastern Paraguay: Rio Apa, Amambay, Sapucai; Southern Brazil: Alto Paranaíba, i.e. Catalão, Salitre, Tapira, etc.; Ponta Grossa Arch, i.e. Barra do Itapirapuã, Jacupiranga, Juquiá, Mato Preto, etc.; Lages and Anitápolis; Angola: Bailundo, Langonjo, Lupungola, Sulima and Tchivira-Bonga; Namibia: Dicker Willem, Kalkfeld, Ondurakorume, Okurusu, Osongombo and Otjisazu). The occurrences comprise three main chronogroups, i.e.
1) Early Cretaceous (Eastern Paraguay; Brazil, Ponta Grossa Arch and Anit·polis; Angola and Namibia);
2) Late Cretaceous (Brazil, Ponta Grossa Arch, Lages and Alto Paranaíba; Namibia);
3) Paleogene, Brazil and Namibia.
Two principal types of associated alkaline rocks are represented, i.e. plagioleucitites l.s. (Eastern Paraguay; Brazil: Ponta Grossa Arch; Angola and Namibia) and kamafugites l.s. (Brazil: Alto Paranaíba and Lages; Namibia).

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