2.12 – 2.07 Ga Late- to post-collisional peraluminous granitoid magmatism in the Marowijne Greenstone Belt of Suriname

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SUMMARY

Migmatitic evolution of the Marowijne Greenstone Belt occurred in several phases during the Trans-Amazonian Orogeny. The first episode initiated the emplacement of the TTG-suites in multiple phases between 2.19 – 2.16 Ga and 2.15 – 2.11 Ga, during convergence and collision of the Amazonian and African cratons. TTG plutons that arose include the Brinck pluton, the Kabel Tonalite and the Saramacca batholith. Convergence during the second phase of the TTG magmatism, led to crustal processes resulting in the formation of the Tibiti biotite-granite from melts emerging from lithospheric structural activities, unrelated to subduction. Between 2.10 – 2.07 Ga another magmatic event presented itself, marking continuing convergence and the emplacement of syn-tectonic peraluminous granites such as the Ph德拉 and the Patamacca, and at a later - to post collision stage, the formation of the Akinto Soela granite.

GEOLOGY

TIBITI GRANITE

This Tibiti granite is classified as a peraluminous, calci-alkaline, I-type biotite-granite, derived from mafic to intermediate sources by possible fractional crystallization. The age of unit (211) Ma suggests emplacement during the second phase of TTG plutonism, within a continental plate setting, as the result of lithospheric structural activity, unrelated to subduction. This unit is not considered part of the TTG-group as trace element concentrations show compositional variation.

PHEDRA GRANITE

The Ph德拉 granite is classified as a peraluminous, alkali-calcic S-type two-mica granites, derived from melting sedimentary sources and emplaced within a syn-collisional tectonic environment. This unit has the most in common with the Patamacca granite.

AKINTO SOELA GRANITE

The Akinto Soela granite is classified as an alkali-alkaline-granite derived sedimentary sources with contamination of mafic rock material, hence the per- and metaluminous nature. This unit is the youngest magmatic occurrence yet, in the MGB, emplaced during late- to post collision events.

REFERENCES


RECOMMENDATION

Additional analyses of the granitoids, especially the Tibiti and Ph德拉 units, for more reliable interpretations.

Reprocessing of zircon age dating results with the correction of “common” non-radiogenic Pb (204Pb) to eliminate uncertainties.

Evaluation of other isolated granitoid occurrences in the Marowijne Greenstone Belt to find possible deposits of Sin, Li, Be and REEs.

REE and Spider Diagram

THE MAGMATIC EVOLUTION OF THE MAROWIJNE GREENSTONE BELT

a. Pre- to early collision magmatism of the TTG suites in multiple phases (2.19 – 2.11 Ga), as the result of oceanic lithosphere subduction, including the Brinck pluton, Saramacca batholith, Kabel tonalite, etc.

b. Second phase of the TTG magmatism (2.15 – 2.11 Ga) and emplacement of within-plate granites (Tibiti granite) as the result of possible lithospheric structural activities, unrelated to subduction.

c. Syn-collision magmatism resulting from crustal thickening and the emplacement of the peraluminous two-mica granites (2.10 – 2.08 Ga), such as the Patamacca and Ph德拉 granites.

d. Late- to post collision magmatism (Akinto Soela granite) resulting from possible crustal relaxation and subsidiary subduction (2.08 – 2.06 Ga)

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