Proterozoic A-Type granitoids and volcanic rocks that make the basement to the Central African Copperbelt, Zambia

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The basement of the Zambian Copperbelt, one of the world's most prolific copper provinces, is composed by series of A-Type plutonic rocks and their correlative meta-volcanics. Basement rocks in the environs of the Copperbelt and intrusives that cut the Katangan sedimentary sequence are all anorogenic. Most of the granitoids display rapakivi features.

Sedimentary-hosted copper mineralization at the Nchanga Mine lies unconformably on top of the Nchanga Granite ring complex (877±11Ma). Chemistry of the complex spans the fields of midalkaline to subalkaline rocks. Parts of the pluton are made of high heat producing granites that probably maintained a long-lived circulation of hydrothermal fluids. The Nchanga Granite might have contributed to the origin of copper in its environs. There is evidence for more plutons of similar characteristics around the Konkola and Musoshi mines.

Widely-varying mafic rocks and midalkaline granitic dikes (~765Ma) occur in the Nchanga mine area. Part of them intersect the basement to the Copperbelt and were emplaced after consolidation of the Katangan sediments; in some cases, after Cu-Co mineralization.

The Muliashi Porphyry (1874-1860Ma) is a geochemically-distinct group of rocks. Some portions display hydrothermal alteration and/or metamorphism. Granitoids from the environs of Chambishi (~1983Ma) and Mufulira (~1994Ma) are geochemically akin to the Muliashi Porphyry. Metavolcanic rocks, collectively called "Lufubu Schists" (1980-1874Ma, including the ~1964 Ma Samba deposit schists) correlate both geochemically and geochronologically with plutonic rocks in the Copperbelt basement.

Intense sodic alteration and hematitization are evident in basement rocks. Other alterations include K, Rb and Pr enrichment; some rocks display Nb and Cu enrichment. Unidentified regional metamorphism processes, that took place before the emplacement of the Nchanga Granite, may have modified original rock chemistry.

Near Chambishi, a large volume of anorogenic gabbroids intruded Katangan metasediments. Granophyres, an iron oxide body, and characteristic sodic±hematite alterations accompanied the gabbroids. These may be evidence for iron oxide-copper-gold mineralization present below the Chambishi sedimentary-hosted Cu-Co deposit. Some rocks from the Muliashi Porphyry and associated metavolcanics (including hosts to the Samba deposit) contain significant copper that might have a hypogene origin. None of them bear resemblance with porphyry copper systems.

Both the Muliashi Porphyry and Mufulira suites contain pink and gray granitoids. The two suites are macroscopically and chemically "identical". They seem to have formed in similar environments from equivalent protoliths, but were emplaced 120Ma apart from each other.

Congolese granitoids of the Luina and Mokambo domes have not been studied in detail.