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Precious and Base Metal Occurrence in Amphibolites within the Buenos Aires Complex, Tandilia System, Argentina

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Amphibolites from the Paleoproterozoic basement of the Tandilia System (Buenos Aires province) occur as 'sill-type' intercalations, dike-shaped bodies, or as xenoliths associated with gneisses and migmatites. Recent geochemical studies, conducted on whole rock, have determined the first occurrence of Au, in association with Ag, As, Se, Hg and Sb, in these amphibolites. Gold concentrations vary from 1 to 2 ppb in xenolithic and sill-type amphibolites. Across all metabasite bodies anomalous contents of silver (from 0.01 to 0.26 ppm), arsenic (0.2 to 1.6 ppm) and selenium (0.2 to 0.5 ppm) have been found. Additionally, mercury (0.019 ppm) and antimony (0.08 ppm) were detected in a single xenolith and a sill-type amphibolite, respectively. Mercury was also found through Scanning Electron Microscopy and X-Ray microanalysis, associated with Fe sulphides, on stratiform amphibolites. Significant values have been established for additional base metals, including lead (0.5 to 24.5 ppm), zinc (99 to 166 ppm), and copper (11.8 to 900 ppm) within all metabasites. Some of these amphibolites exhibit an affinity to Mid-Ocean Ridge Basalt (MORB), while others display characteristics indicative of a volcanic arc origin, possibly associated with the Transamazonian Orogeny (Paleoproterozoic). It is plausible that the MORB-affiliated ones formed initially. Although no ore deposits have been defined yet in the basement of Buenos Aires, the tectonic setting, the identification of these metals, and the comparison of this occurrence with other areas, along with further detailed studies, will allow for the postulation of these metabasites as a potential source in a model of orogenic gold deposit.