

Temporal and Spatial Patterns of Mineral Deposits in East Gondwanian Crustal Fragments.

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Present-day spatial distribution patterns of mineral deposits reflect cycles of crustal generation, rejuvenation and destruction processes. The crustal fragments of East Gondwana encompass large regions with geological histories dating back to Early Archean, from which time the regions had experienced repeated tectonic cycles. Some attempts to identify temporal evolution of metallogeny are made. Specifically, rapid growth and stabilization of continental crust with high heat flow during Late Archean resulted in abundance of gold, volcanic-hosted massive sulphide and komatiite-associated nickel mineralization. The greenstone assemblages that compose Archean cratons are similar to terranes in the convergent margins of the Pacific basin which hosts most modern gold and volcanic-associated massive sulphide mineralization. In contrast, metal deposits that form in continental basins or are associated with anorogenic magmatism were exceptionally abundant in Middle Proterozoic corresponding to the assembly of the first large continents.

However, the mineral distribution patterns are complex, and as such, their systematic analysis and correlation across crustal fragments are better done within a Geographic Information System (GIS). From data-base queries reflecting specified deposit characteristics (age, type, host rock, tectonic setting, etc.), sets of mineral distribution maps are constructed and evaluated for their patterns in and continuity across the fragments. In this way, the postulated epochs of mineralization at 2000-1600 Ma, 1600-1300 Ma and 1300-1000 Ma can be objectively tested.