VOLCANIC-HOSTED MASSIVE SULFIDE BASE METAL MINERALIZATION IN THE EARTH'S HISTORY

STAROSTIN, V.I., SAKYA, D.R., and PELYMSKY, G.A. Moscow State University (Lomonosov), Moscow, Russia

The evolutionary scenario of the Earth can be divided into five geometallogenic periods: formation of thin lithosphere plates, oldest fold zones, and greenstone belts (3.8-3.0 Ga); development of the major part of continental crust (3.0-2.7 Ga); origination of supercontinents and onset of lithosphere plate tectonics (2.7-1.8 Ga); weak metallogenic activity and multiple reworking of the primary crust (1.8-0.6 Ga); and abyssal mantle differentiation and cyclic functioning of the mechanism of lithosphere plate tectonics (0.6-0.0 Ga). Massive sulfide deposits are encountered throughout the entire geological section. The oldest mineralization is registered within Lower Archean supracrustal rocks of the Isua Belt, Greenland and the Pilbara volcanic block, Australia. The Late Archean was characterized by an intense differentiation of material in the crust and uppermost sections of the mantle. During the Paleoproterozoic, base metal deposits were formed in basalt-rhyolite associations within riftogenic belts of Australia, Scandinavia, and Africa. The Mesoproterozoic is marked by a lack of large ore districts. However, the reactivation of endogenic processes in the Neoproterozoic resulted in the formation of base metal deposits in Australia and Russia. The Phanerozoic time is also characterized by a high tectonomagmatic activity and extensive development of base metal deposits over all continents. Each geometallogenic period represents an autonomous cycle with intricate zonalities.