EVOLUTION OF IRON MINERALIZATION IN THE EARTH'S HISTORY

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The evolution of iron mineralization can be divided into two megaperiods characterized by a successive replacement of different (volcanosedimentary, plutonogenic, and sedimentary) types of ore association. During the Archean–Early Proterozoic megaperiod, the formation of stratiform volcanosedimentary (Keewatin-type) and ferruginous–calcareous–siliceous (Timiskaming-type) associations was accompanied by the intrusion of large mafic–ultramafic plutons (2.6 and 1.8 Ga) with titanomagnetite and ilmenite–magnetite associations. Sedimentary manganous–ferruginous–siliceous (itabirite-type) and siliceous shale (taconite-type) associations were developed at the end of this megaperiod. The Late Proterozoic–Cenozoic megaperiod incorporated ferruginous–tuffaceous–shaly (Kiruna-or Baltic-type), oolitic hydrogoethite and leptochlorite–hematite (Riphean–Vendian), and hematite–leptochlorite–siderite, manganous chlorite–magnetite, etc. (Early Paleozoic) associations. Diverse plutonogenic iron ore deposits were formed during the Paleozoic rejuvenation, and as much as twelve sedimentary associations were developed during the final (Jurassic–Neogene) stage. Volcanosedimentary and plutonogenic deposits were formed at different stages of tectonomagmatic reactivation, while sedimentary deposits were accumulated at the platformal stage. Iron mineralization megaperiods reflect the cyclic evolution of tectonic processes in the Earth.