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Phanerozoic Rifting Phases And Mineral Deposits

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In North Africa occur Mediterranean and Red Sea metallogenic provinces. In each province distribute 47 iron-manganese- barite and lead-zinc deposits with tectonic-structural control. The author presents in this paper aspects of position of these deposits in the two provinces with Phanerozoic rifting .

The Mediterranean Province belongs to two epochs, Hercynian and Alpine. The Hercynian Epoch manganese deposits in only Moroccoa- Algeria belong to Paleozoic tectonic zones and Proterozoic volcanics.

The Alpine Epoch iron-manganese deposits are of post-orogenic exhalative–sedimentary origin. Manganese deposits in southern Morocco occur in Kabil-Rief quartz-chalcedony veins controlled by faults in andesitic sheets and in bedded pelitic tuffs, strata-form lenses and ore veins, in Precambrian schist and in Triassic and Cretaceous dolomites. Disseminated manganese with quartz and barite and effusive hydrothermal veins are hosted in Paleocene volcanics. Manganese deposits in Algeria are limited and unrecorded in Tunisia. Strata-form iron deposits in Atlas Heights are widespread in sub-rift zone among Jurassic sediments inter-bedding volcanic rocks. In Algeria, Group Beni-Saf iron deposits are localized along the Mediterranean coast in terrigenous and carbonate rocks of Jurassic, Cretaceous and Eocene age within faults and bedding planes.
In Morocco strata-form hydrothermal lead-zinc deposits occur in contact zone of Tertiary andesite inter-bedding Cambrian shale, Lias dolomites and Eocene andesite. In both Algeria and Tunisia metasomatic Pb-Zn veins occur in Campanian - Maastrichtian carbonates, Triassic breccia, Jurassic limestone, Paleocene sandstones and limestone and Neogene conglomerates and sandstones.

The Red Sea metallogenic province belongs to the Late Tertiary-Miocene times. In Wadi Araba hydrothermal iron-manganese deposits occur in Cretaceous sediments within 320°and 310 NW faults related to Tertiary basalt. Um-Bogma iron-manganese deposits are closely connected with NW,WNW and N-S faults genetically related to volcano-hydrothermal activity associated the Red Sea rifting. At Sherm EL-Sheikh hydrothermal manganese deposit occurs in Oligocene clastics within fault zone. Four iron-manganese-barite mineralization in Esh-Elmellaha plateau are controlled by faults trending NW,NE and nearly E-W intersecting Miocene carbonate rocks. Barite exists disseminated in the ores and as a vein in NW fault. In Shalatee - Halaib district 24 manganese deposits and barite veins with sulphide patches occur within Miocene carbonates distributed along two NW fault planes,trending 240°and 310° and occur in granite and basalt .
Uranium -lead-zinc sulfide mineralization occur in Late Proterozoic granite, Late Cretaceous sandstones, and chiefly in Miocene clastic-carbonate-evaporate rocks. The occurrences of uranium- lead-zinc and iron-manganese-barite mineralization have the characteristic features of hypogene cavity filling and replacement deposits correlated with Miocene- Recent Aden volcanic rocks rifting. In western Saudi Arabia barite-lead-zinc mineralization occurs at Lat. 25° 45’ and 25° 50’N hosted by Tertiary sediments in limestone nearby basaltic flows and NE-SW fault system. The mineralized hot brines in the Red Sea deeps considered by the author a part of this province.

The author considers the constant rifting phases of Pangea and then progressive fragmentation of Western Gondwana during the Late Carboniferous-Lias, Late Jurassic-Early Aptian, Late Aptian - Albian and Late Eocene-Early Miocene and Oligocene-Miocene, responsible for formation of the mineral deposits constituting the M provinces. During these events, rifting, magmatism and hydrothermal activities took place in different peri-continental margins.