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The “Montaña de Manganeso” Mn deposit, San Luis Potosí, Mexico: mineralizing fluids and deposit typology

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The manganese mining district of Montaña de Manganeso is located to the northeast of the city of San Luis Potosí, 72 km northwest of the Charcas Ag-Pb-Zn-Cu mining district, in the central part of Mexico.

In the district are exposed heavily folded and partially metamorphosed sedimentary series that host the ore mineralization and are attributed to the Mesozoic Guerrero Terrain. They include shales with flint lenses, sandstones and metatuffs. Other rocks that crop out are limestones and andesitic dykes. Major structures in the region include folds, décollement and thrust structures; in addition there are normal faults that host the mineralization.

Hydrothermal alteration is affecting the host rocks and consists in silicification and argillic alteration, showing the later a wider spatial distribution, while silicification is restricted to fracture zones. The mineral composition of hydrothermal alteration was determined by short-wave infra-red spectrometry and X-ray diffraction, and includes opal-CT, tridymite, cristobalite, quartz, mixed-layer illite/smectite, smectite, hematite and goethite. The manganese mineralization consists of manto-like orebodies, along with veins with a predominant orientation from NE20° to NW10°. Ore minerals are braunite, manganite, pyrolusite, cryptomelane and romanechite.

An andesitic dyke was dated using U-Pb with LA-ICP-MS; an age of 40 Myr was obtained, representing an Eocene mineralization age. Microthermometry analysis of fluid inclusions in quartz revealed homogenization temperatures between 101°C and 132 °C, and salinity between 8 and 13 wt. % eq. NaCl.

The mineralization is of hydrothermal, low temperature origin, belongs to the epithermal type and formed in a hot spring environment.

