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The Ba-Sr ore deposits of the Neuquén Basin, SW Argentina

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The Neuquén Basin is located on the western side of Argentina, between 32° and 40°S latitude. It comprises a continuous record of up to 6,000 m of Late Triassic-Early Tertiary succession that includes continental and marine siliciclastics, carbonates and evaporites mainly accumulated during the Jurassic-Cretaceous period. Within the Neuquén Basin there are numerous stratabound Ba-Sr ore deposits of great areal distribution spatially associated with the Mesozoic carbonate-evaporite sequences (Tábanos, Auquilco and Huitrín Formations). The Ba-Sr deposits appear in three ways: stratiform (“mantos”), veins and irregular bodies in cavities by karstic dissolution. Mineralizations are mainly composed of barite and celestite as dominant minerals, in some cases accompanied by minor proportions of galena, sphalerite, chalcopyrite, dolomite, calcite, and quartz. Zebra textures or rhythmites are common. They consist of alternated fine bands of celestine/barite and carbonates. The Ba-Sr deposits show two genetic models: syngenetic, Arroyo Nuevo mine, a singular sedimentary-exhalative deposition of barite and sulfides onto the seafloor, and epigenetic stratiform and vein types, related to hydrothermal fluids in areas with or without igneous rock outcrops. In the epigenetic stratiform types, mineralizing processes may respond to selective replacements of carbonate rocks and gypsum beds by fluids of magmatic provenance or derived from basinal brines. The Ba-Sr deposits related to magmatic fluids are associated with the Lower Tertiary magmatic activity of the Molle Group which also generated epithermal veins. The genetic process related to circulation of basinal brines implies leaching of metallic elements through the sedimentary pile, Ba and Sr essentially of siliciclastic and carbonate rocks, respectively, and sulphur from evaporite layers. Also, these processes of leaching and remobilization could be linked to the thermal action of the Tertiary andesitic magmatism.

