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Departamento de Geología, Universidad de Chile, Santiago

SOME GONDWANA MINERALIZATIONS IN SOUTHERN SOUTH AMERICA: PRELIMINARY REVIEW

J. Cabello
Minera Utah de Chile Inc.

From a metallogenetical viewpoint, the mineral deposits related to the Gondwanic evolution of southern South America (Chile-Argentina territory) could be assigned to three different stages: i) Cambrian to late Devonian; ii) early Carboniferous to middle Triassic, and iii) late Triassic to middle Jurassic.

The Cambrian to late Devonian stage is characterized by the development of marine sedimentation in epeiric seas along the ancient southwestern border of Gondwanaland. Several collisional episodes are also characteristic of the same stage. Most of base and precious metals assignable to this stage appear to be related to sedimentary rocks showing almost no connection with magmatic activity. In northwestern Argentina, in the Jujuy Province stratabound mineralization at the Aguilar lead-zinc mine is hosted by Ordovician metal sediments. Also in Jujuy, hosted Ordovician sandstones and shales, are several lead-zinc (Pumahuasi, Santa Victoria) and gold-antimony (Santa Catalina -Rinconada) districts with vein-type mineralization.

In the Antofagasta Province, northern Chile, several silver-lead veins and irregular copper bodies are known exclusively hosted by Devonian sandstones and shales.(e.g. Galenosa, Santa Ana, Chesterfield and Tovaku). In La Rioja, Argentina, a probably Devonian stratabound mineralization of lead-zinc-barite hosted by Ordovician limestones is known at La Helvecia. Here, the mineralization is unconformably overlain by Carboniferous sandstones.

The early Carboniferous to middle Triassic stage is characterized by a normal subduction process with the development of a magmatic arc and an accretionary prism. In the middle Permian this magmatic arc was extinguished probably due to a terrane collision which, in turn, gave place to a cortical fusion event. In the central-southern coastal range of Chile (Nahuelbuta Range), several localities with submarine volcanogenic massive sulfides hosted in low-grade metamorphic rocks are known. They are

interpreted as part of an accretionary prism probably formed in an oceanic environment during the late Paleozoic. Related to the magmatic arc development, several porphyry copper developments (with ages ranging from 323 to 267 M.a.) are known in Argentina at Taca-Taca (Jujuy), Alcaparrosa (San Juan), Yalguaraz (Mendoza), and La Voluntad (Neuquén). Tourmaline breccias and associated mineralization are also reported. Imilac (Antofagasta, Chile) is a Permian copper occurrence considered to be related to a caldera type structure; San Francisco de los Andes, in San Juan, Argentina, is a Carboniferous-Permian example of polymetallic mineralization in a tourmaline breccia. Santa Alicia and San Jorge, near Yalguaraz, Mendoza, Argentina, are two cases of copper-bearing tourmaline breccias of probable Permian age. Also in Argentina the presence of several polymetallic vein-type occurrences in the Provinces of San Juan (Tocota, Castaño Viejo, Castaño Nuevo) and Mendoza (Infiernillo-Las Picazas, Agua Escondida), hosted by Permo-Triassic rhyolitic sequences, suggest a genetic relationship. Other cases of copper and lead-zinc mineralizations assigned to this stage are known in southern Argentina. (e.g. Lihuel-Calel, Gonzalito, La Leona-Tres Cerros).

The Salamanca prospect in the Mendoza Province, Argentina, is a massive sulfide with copper-zinc-nickel mineralization of probable Carboniferous age hosted by folded Paleozoic schists intruded by serpentinites and granodiorites.

The Marayes gold district in Sierra de la Huerta (San Juan Province, Argentina) is interpreted as avein type mineralization hosted by Precambrian amphilobites and metamorphozed limestones, intruded by a late Paleozoic rhyolitic subvolcanic body.

The late Triassic to middle Jurassic stage represents the final part of Gondwana evolution ending with the break-up of the supercontinent. An extensional tectonic environment, represented by widespread silicic magmatism, is interpreted to have taken place at this time. Two recently discovered low-sulfidation, epithermal precious metals prospects occur in this setting. The Fachinal deposit in Aysén, Chile, consists of silver-gold veins, stockworks and breccias, hosted in Mesozoic acidic volcanics with features suggesting the presence of a caldera-type structure. Also the Cerro Vanguardia prospect in Santa Cruz, Argentina, consists of several banded and brecciated silica veins with precious metals mineralization hosted by middle Jurassic ignimbrites.

Therefore, it can be said that base and precious metals mineralization related to the Gondwana evolution of southern South America correspond well with what could be expected to be generated according to the geological setting in which they are formed.