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Epithermal Gold Discoveries in the New Khundii Metallogenic Province, Southwest Mongolia

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Exploration in an underexplored region of SW Mongolia since 2005 has defined a porphyry Mo-Cu deposit (measured and indicated resources of 218 Mt at 0.057% Mo and 0.069% Cu) and discovered two epithermal gold deposits. This emerging Khundii metallogenic province, ~5000 km² in area in a Carboniferous-Permian island arc, is ~700 km WNW of the Oyu Tolgoi porphyry Cu-Au deposit.

After definition of the granodiorite-hosted Zuun Mod porphyry Mo-Cu deposit (297±4.8 Ma), a regional exploration program over 110,000 km² included compilation of geologic, geochemical, geophysical and satellite imagery information, followed by ground exploration with stream, soil, and rock chip sampling plus geologic and alteration mapping. A prospect discovered in early 2011 led to a 400×400-m soil survey that identified a Pb-, Zn-, and Au-in-soil anomaly over 1.5×5.5 km. The first drill hole within the soil anomaly discovered the Altan Nar Au-polymetallic epithermal deposit, with veins of quartz-adularia (309.7 ± 0.5 Ma), base metal sulfides, and Ca-Mg-Mn-Fe-carbonate gangue.

The Bayan Khundii gold deposit, discovered in 2015 from prospecting ~16 km SE of Altan Nar, led to adjacent deposits at Kar Mori and Ulaan SE also being discovered (<https://erdene.com/>). Epithermal quartz-adularia-gold veins (336.8 ± 0.5 Ma) with colloform bands and minor pyrite plus variable arsenopyrite have illite halos. Epithermal veins in the area overprint an early, unrelated alteration of residual quartz and pyrophyllite±dickite±diaspore-kaolinite. Northwest of Bayan Khundii ~3 km at Ulaan, K-feldspar and magnetite plus quartz-white mica-pyrite, related to the top of a porphyry deposit with Cu-anomalies, was eroded to the base of a lithocap and overprinted by gold-bearing epithermal veins; the porphyry prospect has yet to be drill tested at depth. The Bayan Khundii deposit has 0.5 Moz of shallow ore at 4.0 g/t Au in reserves; production is slated to start in 2025, with drill testing of adjacent deposits continuing.