

SEG 100 Conference: Celebrating a Century of Discovery

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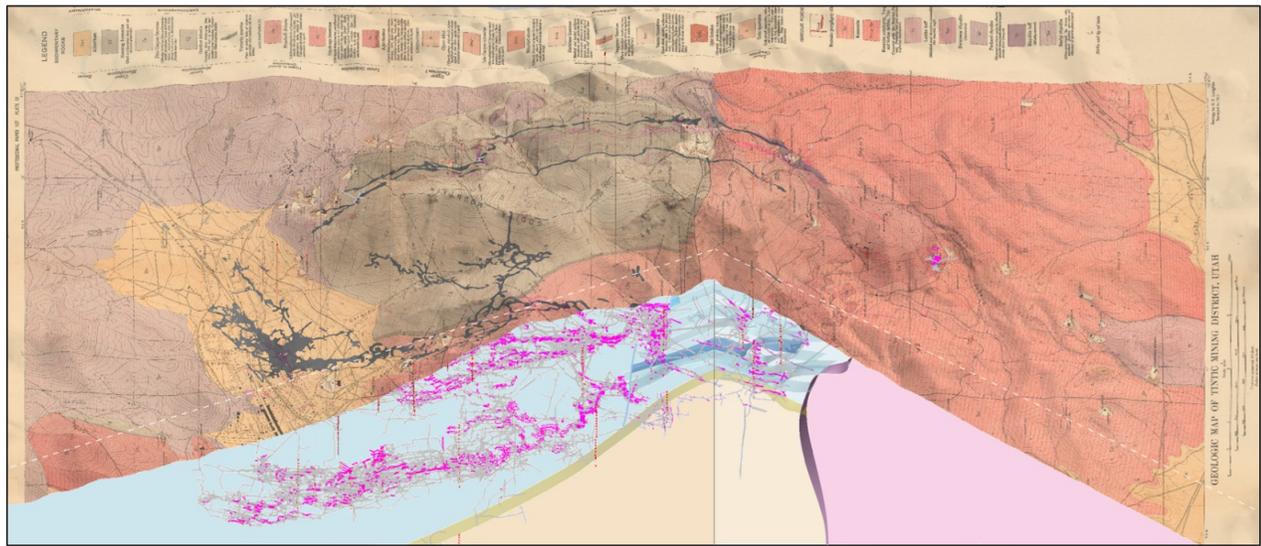
100 Years Later: Reviving Lindgren's Legacy in the Tintic District

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The Tintic Mining District is one of the premier polymetallic mining camps in Utah, alongside Park City and Bingham Canyon, operating continuously from 1871 to 1983 with total historical production from the Main Tintic District estimated at 2.18 Moz Au, 209 Moz Ag, 116 kt Cu, 589 kt Pb, and 63 kt Zn. Past production is wholly derived from carbonate replacement deposits (CRDs) and fissure veins, which cut across the Paleozoic quartzite and carbonate stratigraphy, and late Eocene-Oligocene igneous rocks of the Deep Creek-Tintic Belt. Given the Tintic District's early prominence, the USGS conducted geological investigations that led to the seminal 1919 USGS publication on the district by Lindgren and Loughlin. This touchstone work established the groundwork for modern, empirical models for our understanding of the formation of hydrothermal deposits in the Tintic District. Critical observations made by Lindgren and his contemporaries on the structure and metal zonation of the ore zones helped to vector towards extensions and/or undiscovered ore and enabled later mineral discoveries in other parts of the district (e.g., the subeconomic Southwest Tintic Porphyry deposit; 559 Mt at 0.28% Cu).

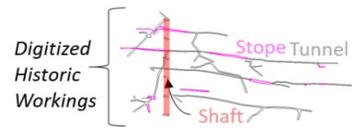
Historical data and land consolidation efforts in the Main Tintic District over the past ~40 years have recently enabled district-scale evaluation, the application of modern exploration paradigms, and cutting-edge technologies. This has facilitated a system-scale approach to exploration efforts in Tintic to further establish the geometry of the hydrothermal system responsible for mineralization and to elucidate the potential for undiscovered CRD/porphyry targets. Integrated data sets include detailed surface and underground mapping with petrographic, fluid inclusion, and geochemical sampling over 15 km², in addition to soil geochemistry and SWIR analysis. These data sets identified robust multifaceted anomalies indicative of porphyry-style alteration and mineralization in the Silver City area that was originally posited by Lindgren ~100 years prior. Geophysical data sets include 3-D inversions of a 72-km² highly detailed, deep-penetrating Typhoon™ IP survey and a 2,850-km² airborne magnetic survey. This proprietary IP survey yielded high-quality resistivity and chargeability data to over 1.5-km depth, resulting in an unparalleled ability to compare the geometry of the historical workings and alteration around known orebodies with deeper and less constrained portions of the system. Through integration of the geophysical data, geochemical results, and digitization of ~625 km of historical underground workings and ore-stopes, a 3-D model of the district was constructed. This provides an unprecedented level of detail that guides exploration towards underexplored domains where CRD mineralization is likely and to prospective zones where porphyry-style mineralization like that observed at Bingham Canyon may occur.

The Tintic Mining District has a legacy of quality data acquisition and analysis accompanied by successful, novel exploration efforts that resulted in further discoveries since Lindgren's time. By continuing to dig deeper into the fundamental observations made by Lindgren and his contemporaries and through the application of robust scientific first principles that he championed, while leveraging modern systems-scale understanding and exploration tools, it is likely that further discoveries in the Tintic District will occur in the next 100 years.



LEGEND

- Late Eocene-Oligocene composite *Silver City Stock*
- Paleozoic Carbonate Stratigraphy
- Cambrian *Tintic Quartzite*



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