

Epithermal Au-Ag Mineralization in the Imlay Mining District, Nevada, Over the Last ~6 Ma: Florida Canyon Mine and Surrounding Prospects

Lucas Brown¹, Mark Barton²

¹University of Arizona, Tucson, United States of America, ²University of Arizona, Tucson, United States of America

The Imlay Mining District in northwestern Nevada contains mineral systems formed over the last ~6 Ma that are representative of young (<7 Ma), apparently amagmatic low-sulfidation epithermal Au-Ag deposits in the Great Basin. Economic mineralization is focused at the Florida Canyon Mine, which has produced >3.3 Moz of Au from veins, breccias, and disseminated bodies in Triassic passive margin sediments. New mapping, core logging, petrography, and analytical work including U-Pb geochronology of vein minerals, indicate westward migration of hydrothermal activity over time towards modern geothermal systems.

Hydrothermal activity began with 6.3-6.1 Ma quartz-fluorite ± calcite veins, breccias, and jasperoids that parallel NW-SE and NNE-SSW normal faults. At ~5 Ma, the system migrated with the onset of NE-SW normal faults to Florida Canyon, where it persisted intermittently until at least ~2 Ma. Four hydrothermal stages during this period show cooling and lowering of base level over time: (1) colloform-crustiform quartz ± auriferous pyrite ± electrum ± Ag-selenide veins with variable gangue mineralogy that were crosscut by (2) similar veins with more chalcedonic quartz textures. Subsequently, (3) quartz-kaolinite ± alunite and deeper quartz-carbonate-sulfide veins with associated argillic alteration crosscut the earlier hydrothermal features and were followed by (4) overprinting acid-sulfate alteration and hydrothermal hematite ± chlorite breccias. Epithermal quartz-sulfide-chlorite veins in the active Humboldt House geothermal system post-date hydrothermal activity at Florida Canyon, are the farthest west, and occur ~1 km below the highest observed epithermal veins in the district.

Collectively, these features are interpreted to reflect westward migration of structural controls and the locus of hydrothermal activity accompanying progressive base level lowering by tectonic uplift or Pleistocene climate change. The scale and longevity of epithermal mineralization in the Imlay District, coupled with the lack of voluminous coeval magmatism, argue against a magmatic origin for precious metals.