

Structure of sediment-hosted gold deposits in the Great Basin and China: genetic and exploration implications

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ABSTRACT

Although generally confined to particular portions of stratigraphic successions, sediment hosted deposits in Nevada and southern China both are localized in areas of contractional deformation. In the Great Basin, principal ore trends coincide with structural highs of ore-hosting Silurian-Devonian shelf and slope facies carbonate and siliciclastic rocks beneath the late Paleozoic, mylonitic Roberts Mountains Thrust (RMT). Widespread probable Jurassic or early Cretaceous east-southeast verging folds and thrusts overprint and displace the RMT. On the Carlin trend, these contractional structures are offset by northwest-trending normal faults which are filled by Jurassic dykes, recording a syn-magmatic extensional event. Their cutting of the RMT and southeast vergent folds indicate initial formation of these faults in the Mesozoic, and not as Paleozoic growth faults. Subsequent probable Laramide age contractional inversion of the Jurassic faults is associated with northwest-trending upright fold and reverse faults further contribute to composite structural culminations. Gold mineralization is coeval with subsequent normal extensional collapse of the Mesozoic structural highs, associated with initial phases of northwest-southeast Eocene extension of the previously folded and thickened crust and initial stages of regional core complex formation. Syn-ore extension and mobilization of the older reverse and Jurassic extensional faults forming upward converging permeable networks beneath the capping RMT and fold hinges which trapped Eocene Au-bearing fluids and overlapped with magmatism.

Carlin-like deposits of southern China (Guizhou Province) also record polyphase fold-thrust geometry, and late syn-mineralization extension. At the Jinfeng deposit, mineralization occurred during normal inversion of the contractional architecture, focused around an intra-orogenic extensional fault system. The similarities in structural history, relative timing to deformation and geometry to the Great Basin deposits underscore the importance of the inherited structural architecture on deposit localization. With similar host rocks, these common histories and processes may explain many of the similarities between the deposits in Nevada and China.