

Lode and Placer Gold Composition in the Klondike District, Yukon Territory, Canada: Implications for the Nature and Genesis of Klondike Placer and Lode Gold Deposits

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Abstract

We have determined the major and trace element composition of approximately 2,700 gold particles from 21 gold-bearing mesothermal quartz veins and 35 placer gold samples from the Klondike district in western Yukon Territory. Measured Au, Ag, Cu, and Hg contents were used to define a characteristic geochemical signature (or fingerprint) for each of the vein samples. These signatures were then compared with the various compositional populations that we have distinguished within each of the placer samples. Preliminary conclusions derived from the study include: (1) placer gold in both recent stream deposits and in the Pliocene to Pleistocene White Channel Gravels is detrital in origin; (2) the placer gold is mainly, if not entirely, derived from mesothermal quartz veins; (3) all lode sources for the placer gold have not yet been located; and (4) gold composition data can be used to identify the lode signature for placer gold and, if it has not been removed by erosion, help locate and link placer gold to its specific lode source.