

**CLIMATIC AND TECTONIC CONTROLS ON THE FORMATION OF
TERTIARY GOLD PLACERS, PIONEER DISTRICT,
POWELL COUNTY, MONTANA**

by
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Stratigraphic and sedimentologic characteristics of Tertiary sedimentary rocks in the Pioneer district, near Deer Lodge, Montana, combined with the inferred chronology of regional climatic and tectonic events, suggest possible controls on the formation of high-level Tertiary gold placers. The initial formation of placers at Pioneer coincided with both late early Miocene climatic change from warm and wet to cool and dry, and middle Miocene uplift and block faulting.

Gold was presumably released from a contact metamorphic zone in the Flint Creek Range during a period of intense chemical weathering and slow erosion rates accompanying a warm, humid climate in late early Miocene time. Increasing aridity and uplift of the Flint Creek Range in the middle Miocene resulted in decreased vegetative cover, faster erosion rates, and extensive stripping of gold-bearing regolith and redeposition of the sediments in alluvial fans in the Gold Creek basin. During the Pliocene, parts of the fans were, in turn, reworked by streams on an extensive pediment surface. These gold-bearing stream channels were abandoned when the present drainage system was incised during the late Pliocene and early Pleistocene.

This hypothesis may aid exploration for high-level placers in other intermontane basins having similar Cenozoic geologic history to the Gold Creek basin. The distribution of gold-bearing lode sources, plus the stratigraphy and structure of basin-margin areas, are possible criteria for identifying favorable areas.