

DESCRIPTIVE MODEL OF PLACER PGE-Au

By Warren E. Yeend and Norman J Page

DESCRIPTION Platinum-group alloys and elemental gold in grains and (rarely) nuggets in gravel, sand, silt, and clay, and their consolidated equivalents, in alluvial, beach, eolian, and (rarely) glacial deposits derived from ultramafic sources.

GENERAL REFERENCES Boyle (1979), Wells (1973), Lindgren (1911), Mertie (1969).

GEOLOGICAL ENVIRONMENT

Rock Types Alluvial gravel and conglomerate and heavy minerals indicative of ultramafic sources and low-grade metamorphic terrane. Sand and sandstone of secondary importance.

Textures Coarse to fine elastic.

Age Range Tertiary to Holocene. Older deposits may have been formed but their preservation is unlikely.

Depositional Environment Marine (near shore), rivers and streams (medium to low gradient), desert (eolian) sand dunes, in-situ weathering.

Tectonic Setting(s) Paleozoic to Mesozoic accreted terranes, Tertiary conglomerates along major fault zones; low terrace deposits; high-level terrace gravels.

Associated Deposit Types Alaskan PGE deposits.

DEPOSIT DESCRIPTION

Mineralogy Platinum-iron alloys (isoferroplatinum with rarer ferroanplatinum, tetraferroplatinum, and tulameenite), platinum-iridium, gold, osmium-iridium alloys; magnetite, chromite, or ilmenite.

Texture/Structure Flattened, rounded edges, flaky, flour-sized alloys and gold; very rarely equidimensional nuggets.

Ore Controls Highest Au values at base of gravel deposits or on argillaceous to clayey beds within gravel sequence; metal alloys concentrated in "traps" such as natural riffles in floor of river or stream, fractured bedrock, slate, schist, phyllite, dikes, bedding planes, and in structures trending transverse to direction of water flow. For PGE, predominantly zoned "Alaskan" type ultramafic complexes and minor ophiolite as source rocks; streams or rivers usually head in regions of ultramafic rocks.

Geochemical Signature Anomalously high amounts of Ag, As, Hg, Sb, Cu, Fe, S, Cr.

EXAMPLES

Urals, USSR	(Duparc and Tikonovitch, 1920; Mertie, 1969)
Goodnews Bay District, USAK	(Mertie, 1969)
Choco, CLBA	(Mertie, 1969)
Tulameen District, CNBC	(O'Neill and Gunning, 1934)

GRADE AND TONNAGE MODEL OF PLACER PGE-Au

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DATA REFERENCE Calkins and others, 1978.

COMMENTS All deposits used for the model are from the Urals of USSR. The platinum grade plot suggests three populations. Many of the deposits with grades less than 1,000 ppb Pt were probably mined by dredges, whereas the majority of deposits were mined by conventional placering methods. Some of the very high grades may represent reporting errors such as grades for a high-grade portion of a deposit being reported as representative of the total deposit. Probably because of the

effects of combining deposits mined by two technologies, tonnage is correlated with platinum grade ($r = -0.42$) and with gold grade ($r = -0.54$, $n = 23$). Platinum grade is correlated with gold grade ($r = 0.58$, $n = 23$), with osmium grade ($r = 0.89$, $n = 21$), with iridium grade ($r = 0.98$, $n = 10$), and with palladium grade ($r = 0.99$, $n = 13$). Osmium grade is correlated with iridium grade ($r = 0.97$, $n = 9$) and with palladium grade ($r = 0.89$, $n = 12$). Iridium grade is correlated with palladium grade ($r = 0.97$, $n = 9$). Other correlations were not significant with the available number of samples. See figs. 198-200.

DEPOSITS

<u>Name</u>	<u>Country</u>	<u>Name</u>	<u>Country</u>
Aleksandrovskii Log	URRS	Malaia Prostokischenka	URRS
Alexii-Olginsky Log	URRS	Malaia Sosnowka	URRS
Anianowsky Lojok	URRS	Malomalsky-Priisk	URRS
Arkhangelskii Log	URRS	Malot Pokap	URRS
Besimianni Log	URRS	Martian R.	URRS
Bielgorsky Log	URRS	Melnitschnaia	URRS
Bobrowka River	URRS	Molitchowka	URRS
Bolshaya Choumika R.	URRS	Morphine-Log	URRS
Bolshaya Kamenouchka	URRS	Niasman R.	URRS
Bolshaya Ossokina R.	URRS	Nikolai-Tschoudotworsky	URRS
Bolshaya Prostokischenka	URRS	Novoi-Log	URRS
Bolshaya Sosnovka	URRS	Obodranny-Lojok	USSR
Bolshoi Pokap R.	URRS	Panowka	URRS
Bolshoi Sakciam	URRS	Patchek	URRS
Boyandinskaia	URRS	Pestchanka R.	URRS
Ejowka	URRS	Phedinan R.-Triok	URRS
Gloubokia 1	URRS	Podbornaia	URRS
Gloubokia 2	URRS	Podmoskowoi-Log	URRS
Illinsky Log	URRS	Popowsky-Lojok	URRS
Ivov R.	URRS	Popretschne-LQg	URRS
Jerusalimsky-Priisk	URRS	Roublewik R.	URRS
Jourawlik R.	URRS	Sirkov Log	URRS
Judinsky-Lojok	URRS	Small unnamed-Weressow	URRS
Kamenka	URRS	Solovyevskii Log	URRS
Kamenka R.	URRS	Soukhoi Log	URRS
Kisslaia-Peruonatchainik	URRS	Srednia-Prostokischenka	URRS
Kitlim, Severniy R.	URRS	Stepanoff-Log	URRS
Korobowsky Lojok	URRS	Syssid R.	URRS
Kossia R.	URRS	Tilai R.	URRS
Kossoi-Log	URRS	Toura R.	URRS
Kossorgskii Log	URRS	Trudny-Log	URRS
Krutoi Log	URRS	Tsach R.	URRS
Lobwa R.	URRS	Tschachewitaia	URRS
Log No. 1-Propretschnoi	URRS	Tschch R.	URRS
Log No. 2-Suftlii Bor	URRS	Unnamed creek-B. Sosnowka	URRS
Log No. 3-Suftlii Bor	URRS	Verkho-Tourie	URRS
Log No. 6-Suftlii Bor	URRS	Wyssid R.	URRS
Log No. 7-Suftlii Bor	URRS	Yermakof-Log	URRS
Logwinska	URRS	Zaetzeff, R.	URRS
Lojok at Bisserskaya	URRS	Zemlianoi.-Mostik Log	URRS
Lojok No. 1&2 Omoutnaia	URRS		
Main Valley of Kisslaia	URRS		
Malaia Koswa R.	URRS		

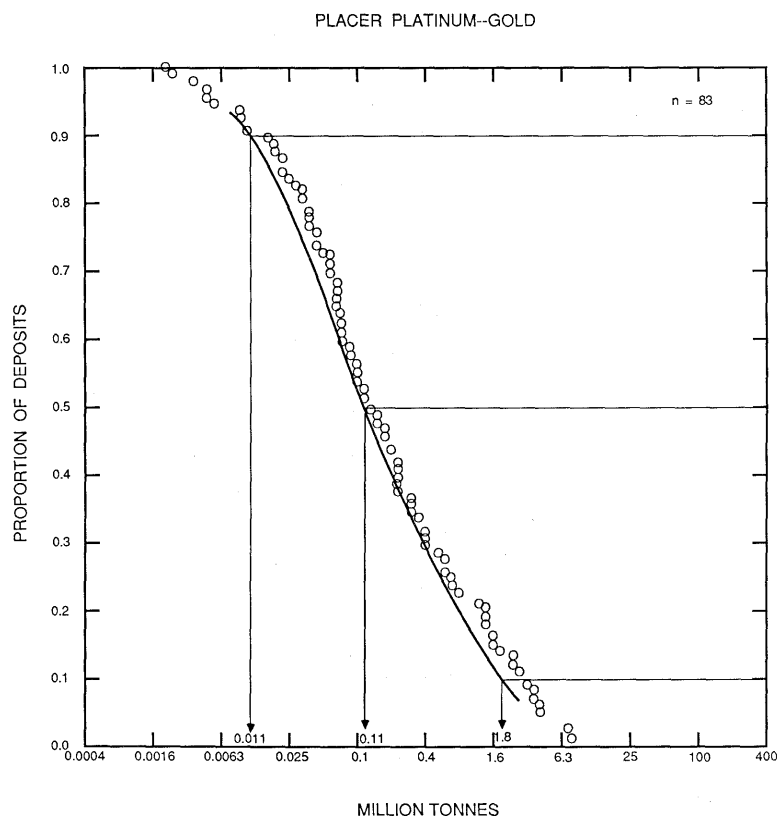


Figure 198. Tonnages of placer PGE-Au deposits.

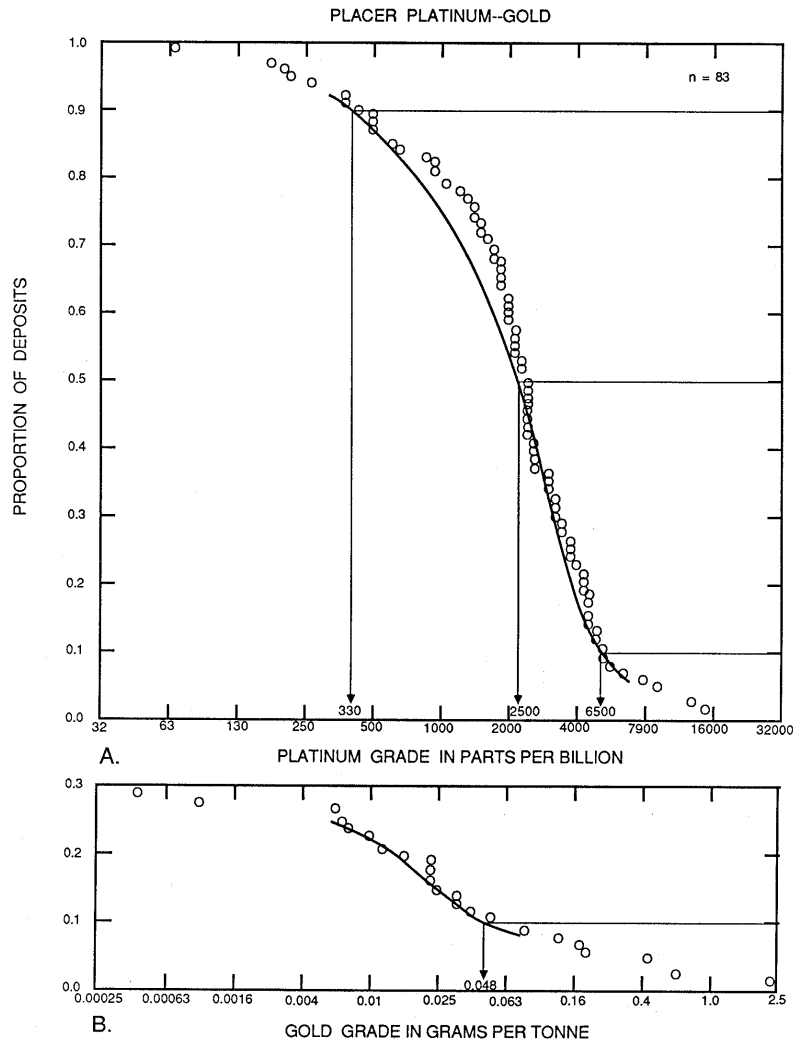


Figure 199. Precious-metal grades of placer PGE-Au deposits. **A**, Platinum. **B**, Gold.

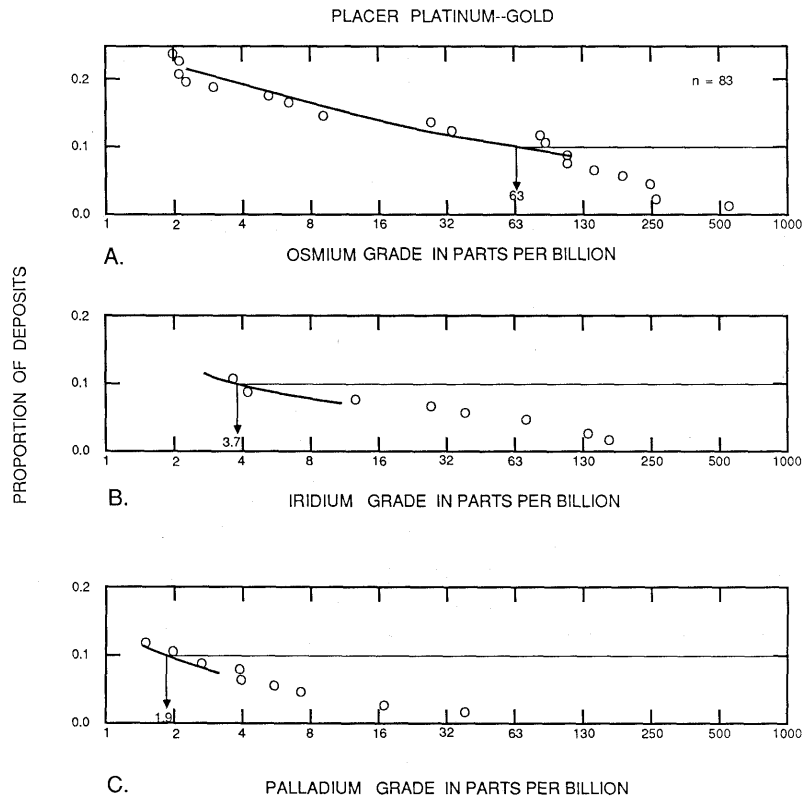


Figure 200. Other PGE grades of placer PGE-Au deposits. A, Osmium. B, Iridium. C, Palladium.