DESCRIPTIVE MODEL OF KOMATIITIC Ni-Cu

By Norman J Page

DESCRIPTION Lenticular, irregular elongate to tabular, pipelike Ni-Cu sulfides associated with komatiitic volcanic extrusive rocks (see fig. 6).

GENERAL REFERENCE Arndt and Nisbet (1982).

GEOLOGICAL ENVIRONMENT

Rock Types Dunite, pyroxenite, peridotite, basalt, komatiites, komatiitic basalts. Rocks contain more than 15 percent and may approach 40 percent MgO.

Textures Bladed olivine or pyroxene with skeletal appearance in random or parallel orientations; spinifex textures, fracture or joint patterns that resemble pillows.

Age Range Archean or Proterozoic generally, but some may be Cretaceus or Tertiary.

Depositional Environment Mafic to felsic rock sequences with numerous volcanic events.

Tectonic Setting(s) Greenstone belts.

Associated Deposit Types Dunitic Ni.

DEPOSIT DESCRIPTION

Mineralogy Pyrite + pyrhotite + chalcopyrite + pentlandite, by-product PGE.

Texture/Structure Sulfide contents vary from base to top of deposit. Base contains massive sulfide grading into net-textured or matrix sulfide into disseminated sulfide.

Alteration None related to ore.

Ore Controls In lowermost flows more than 10 m thick; in zones of increased spinifex development; and near feeder areas for the flows. Orebodies show evidence of active faulting at the time the flows were deposited and have thickening and thinning of flows along strike. Ore occurs in irregularities at bottom of flows. Unit contains greater than 1,000 ppm sulfur or is associated with sulfide-bearing chert and argillite. Shale or iron carbonate sequences occur below flows.

Weathering Develop gossans, laterites.

Geochemical Signature High Mg, Ni, Cu, Mg, PGE. Gossans contain 15 to 30 ppb Pd and 5 to 10 ppb Ir over known Ni-Cu deposits where Cu and Ni are leached out of the gossan.

EXAMPLES

Kambalda, AUWA	(Gresham and Loftus-Hills, 1981)
Damba, ZIMB	(Williams, 1979)
Langmuir, CNON	(Green and Naldrett, 1981)

GRADE AND TONNAGE MODEL OF KOMATIITIC Ni-Cu

By Donald A. Singer, Norman J Page, and W. David Menzie

COMMENTS Nickel grade is correlated with tonnage ($r = -0.47$) and with copper grade ($r = 0.59$, $n = 21$). Au, Ir, Pt, and Pd grades are based on reported analyses of samples from the deposits. See figs. 7-10.

DEPOSITS

Name	Country	Name	Country
Carnilya E.	AUWA	Munda	AUWA
Carnilya Hill	AUWA	Nepean	AUWA
Damba	ZIMB	Perseverance	ZIMB
Epoch	ZIMB	Rankin Inlet	CNNT
E. Scotia	AUWA	Redross	AUWA
Hitura	FNLD	Scotia	AUWA
Hunters Road	ZIMB	Selukwe	ZIMB
Kambalda	AUWA	Shangani	ZIMB
Kotalahti	FNLD	Sothman Twp.	CNON
Langmuir 1	CNON	Spargoville	AUWA
Langmuir 2	CNON	S. Windarra	AUWA
Marbridge	CNQU	Textmont	CNON
McWatters	CNON	Trojan	ZIMB
Miriam	AUWA	Wannaway	AUWA
Mt. Edwards	AUWA	Wigie 3	AUWA
Mt. Windarra	AUWA		

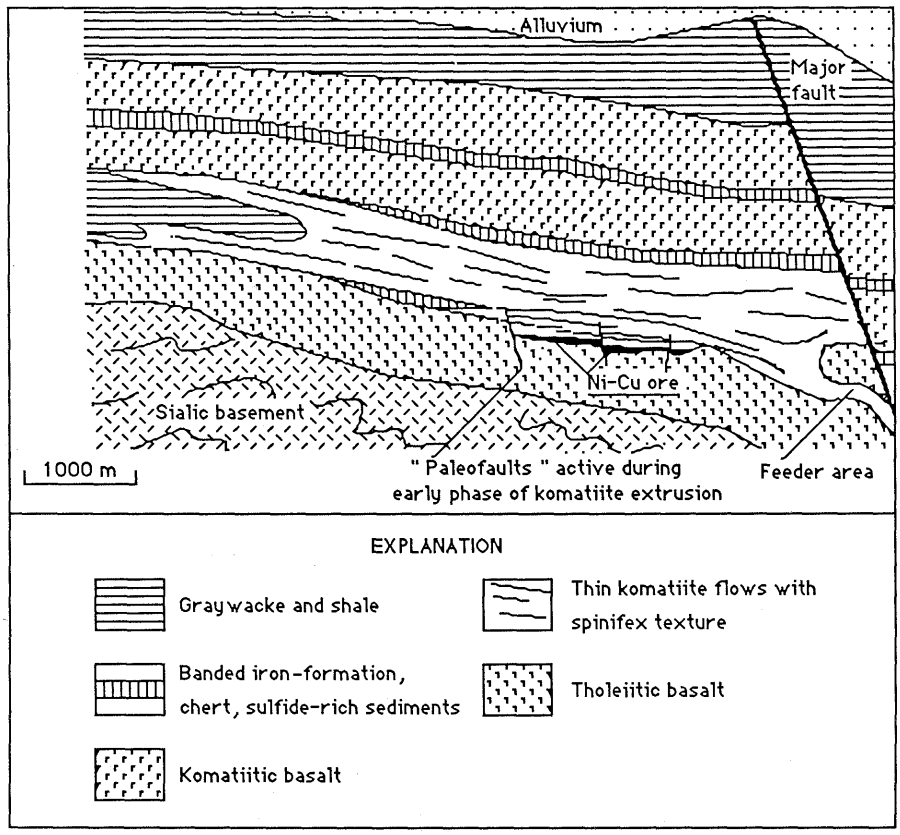

Figure 6. Cartoon cross section of typical komatiitic volcanic sedimentary sequence showing ore controls of komatiitic Ni-Cu deposits. Modified from Marston and others (1981).

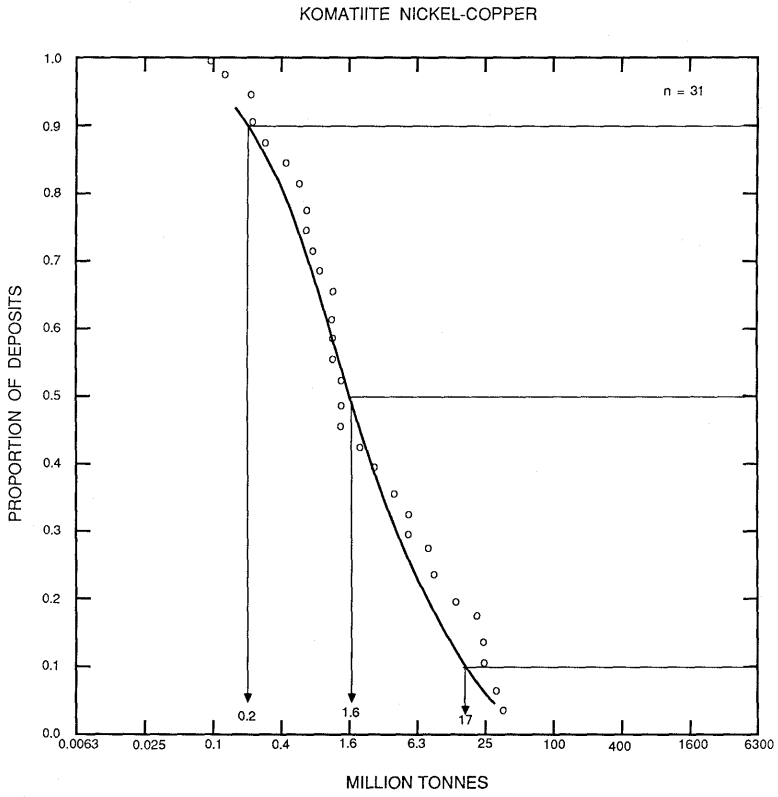

Figure 7. Tonnages of komatiitic Ni-Cu deposits.

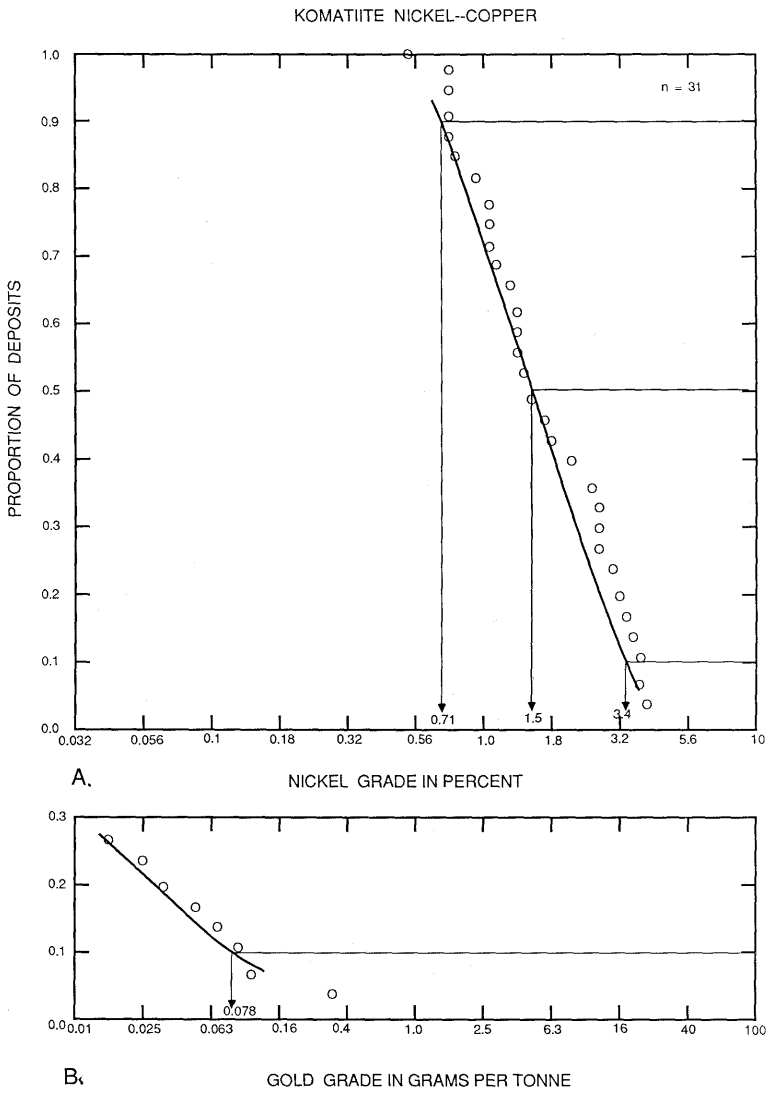

Figure 8. Nickel and gold grades of komatiitic Ni-Cu deposits. A, Nickel. B, Gold.

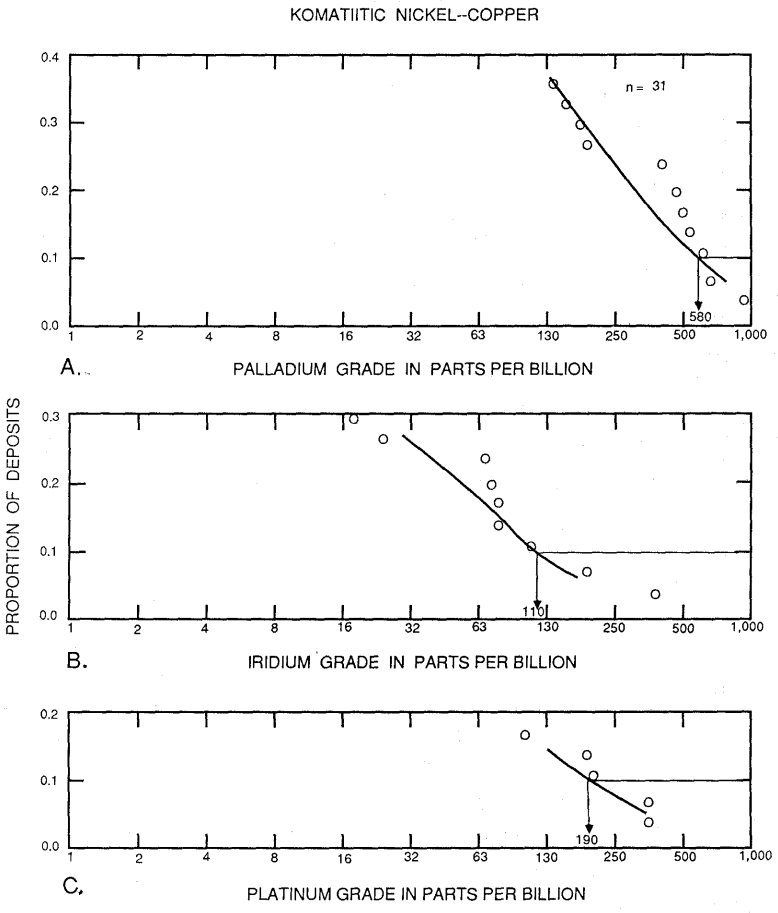

Figure 9. PGE grades of komatiitic Ni-Cu deposits. A, Palladium. B, Iridium. C, Platinum.

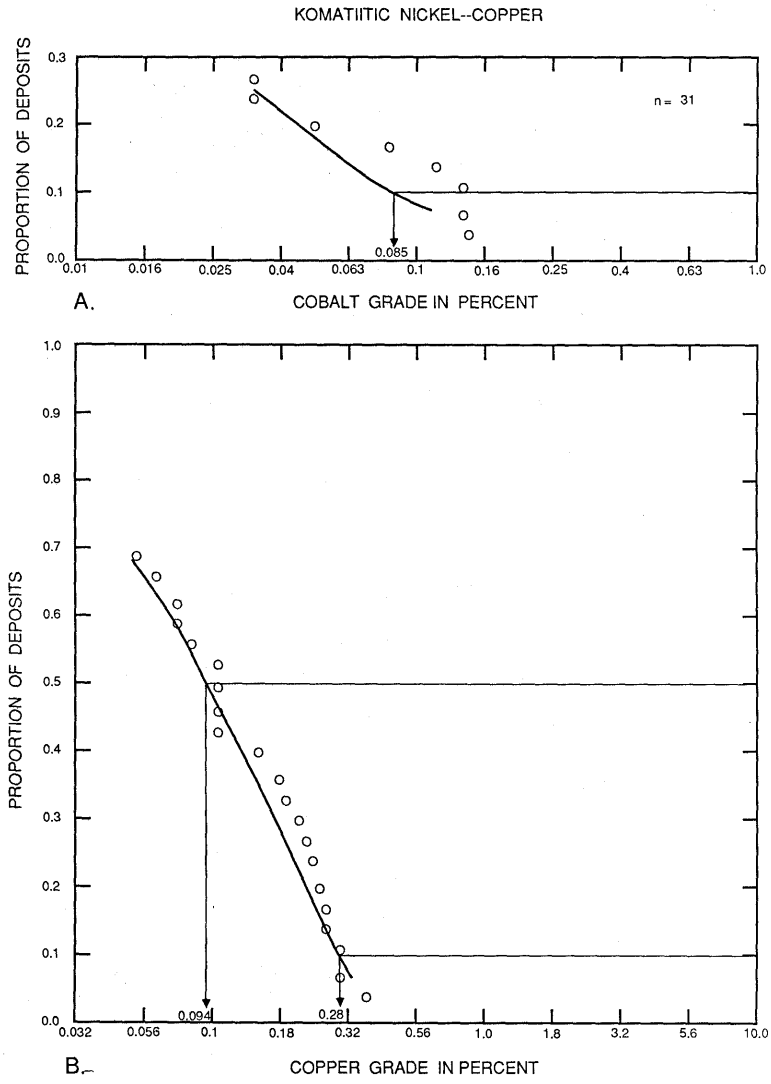

Figure 10. Base-metal grades among komatiitic Ni-Cu deposits. A, Cobalt. B, Copper.