DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY

DESCRIPTIVE AND GRADE-TONNAGE MODELS FOR DISTAL DISSEMINATED Ag-Au DEPOSITS: A SUPPLEMENT TO U.S. GEOLOGICAL SURVEY BULLETIN 1693

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DESCRIPTIVE MODEL OF DISTAL DISSEMINATED Ag-Au
(Number 19c)

by
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BRIEF DESCRIPTION

SYNONYM: Sediment-hosted Ag-Au, disseminated Ag

DESCRIPTION: Disseminated Ag and Au mainly in sedimentary rocks distal to porphyry Cu, skarns, and polymetallic veins (Graybeal, 1981).

TYPICAL DEPOSITS: Taylor, Candelaria, Star Pointer, Cove deposits; White Pine district, Nevada; Tecoma Utah; Vekol, Tombstome, and Hardshell, Arizona.

DISTINGUISHING FEATURES: This model is similar to sediment-hosted Au but has significantly higher Ag grades than (see Ag grades in grade and tonnage models for both). It also is characterized by higher geochemical background values

COMMODITIES: Ag, Au

OTHER COMMODITIES: Locally, Sb

ASSOCIATED DEPOSIT TYPES: Porphyry Cu, Cu skarn, Pb-Zn skarn, Au skarn, polymetallic veins, polymetallic replacement and replacement Mn deposits.

REGIONAL GEOLOGIC ATTRIBUTES

TECTONIC SETTING: Continental margins.

REGIONAL DEPOSITIONAL ENVIRONMENT: Shelf and basinal sedimentary rocks are folded and faulted and intruded by I-type granitic rocks.

AGE RANGE: Mesozoic-Teritiary in Western U.S.; may be any age.

LOCAL GEOLOGIC ATTRIBUTES

HOST ROCKS: Carbonate and clastic sedimentary rocks.

ASSOCIATED ROCKS: Felsic hypabysall or subvolcanic intrusions.

ORE MINERALOGY: Native Au, native Ag, electrum, argentite, Ag sulfosalts, tetrahedrite, stibnite, galena, sphalerite, chalcopyrite, pyrite, marcasite, arsenopyrite; at Cove deposits stannite and canfieldite.
GANGUE MINERALS: Quartz, rhodochrosite, Ag-rich manganoan calcite.

STRUCTURE and ZONING: Ore minerals sparsely disseminated or in stockwork of thin quartz-sulfide veins.

ORE CONTROLS: Deposits commonly occur in skarn and polymetallic vein and replacement districts outboard of all other types of mineralization. Fracture permeability is the most important ore control, Primary rock permeability may be imprtant locally

STRUCTURAL SETTING: Shear zones, axial plane fractures in folded rocks

ORE DEPOSIT GEOMETRY: Irregular bodies, locally conformable to bedding

ALTERATION: Silicification (Taylor, Star Pointer, Cove), and decalcification (Star Pointer) of carbonate rocks; sericite-clay in clastic rocks (Candelaria).

EFFECT OF WEATHERING: Leaching and redeposition of Ag as cerargyrite forms bonanza deposits (White Pine district, Nevada; Vekol, Arizona).

GEOCHEMICAL SIGNATURE(S): Ag±Pb±Zn±Cu±Sb±As; Mn introduced at Cove, Candelaria, and Star Pointer. Ag:Au ratios are highly variable: Candelaria 400:1; Taylor, 143:1; , Tecoma, 60:1; Purísima Concepión, 51:1; Hilltop, <2:1.

GEOPHYSICAL SIGNATURE(S): Zn, Pb, Mn, Cu, Ag, Au, As, Sb, Hg, Te

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GRADE AND TONNAGE MODEL OF DISTAL DISSEMINATED Ag-Au

by Dennis Cox and Donald A. Singer

COMMENTS This model applies to the descriptive model for distal disseminated Ag-Au, number 19c, by Cox (1989). Estimated pre-mining tonnages and grades from the deposits listed below were used to construct the model. Where several different estimates were available for a deposit, the estimated tonnage associated with lowest cutoff grades was used.

The grade-tonnage model is presented in a graphical format to make it easy to compare this type with other deposit types (Cox and Singer, 1986), and to display the data. The plots (figures **1-3**) show either grade or tonnage on the horizontal axis, whereas the vertical axis is always the cumulative proportion of deposits. The units are all metric and a logarithmic scale is used for tonnage and gold and silver grade. Each dot represents an individual deposit and the deposits are cumulated in ascending grade or tonnage. Smoothed curves, representing percentiles of a lognormal distribution that has the same mean and standard deviation as the observed data, are plotted through the points. Intercepts for the 90th, 50th, and 10th percentiles of the lognormal distributions are constructed.

No significant correlations between grades and tonnages were observed.

TABLE 1.—Tonnages and grades of distal disseminated Ag-Au deposits

[Tonnages in million metric tons, silver (Ag) and gold (Au) grades in grams per metric ton. Country and state abreviations explained in **Table XX, this bulletin**]

Deposit	Country	Tonnage	Au grade	Ag grade
Candelaria	USNV	27	0.19	50
Cove	USNV	81	1.8	92.5
Fresnillo	MXCO	19	0.22	141.6
Hardshell	USAZ	6	0	245
Hilltop	USNV	10.35	2.5	2
Purisima Concepcion	PERU	0.2	3.1	7.5
Real de Angeles	MXCO	66	0	66.6
Star Pointer	USNV	1.36	4.8	10.3
Taylor	USNV	7	0	103
Tecoma	USUT	1.5	1.56	93.3

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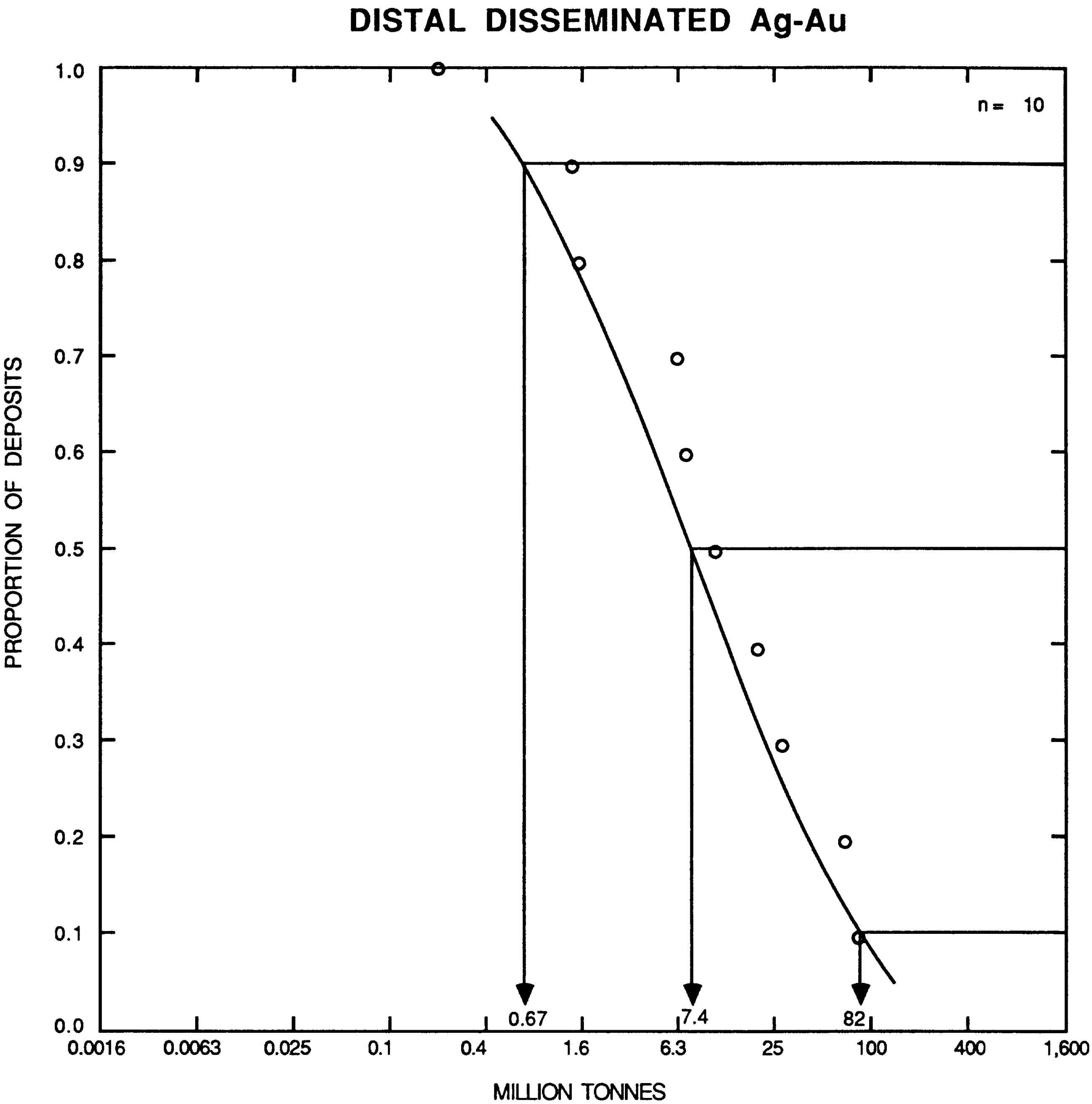

Figure 1. Tonnages of distal disseminated Ag-Au deposits

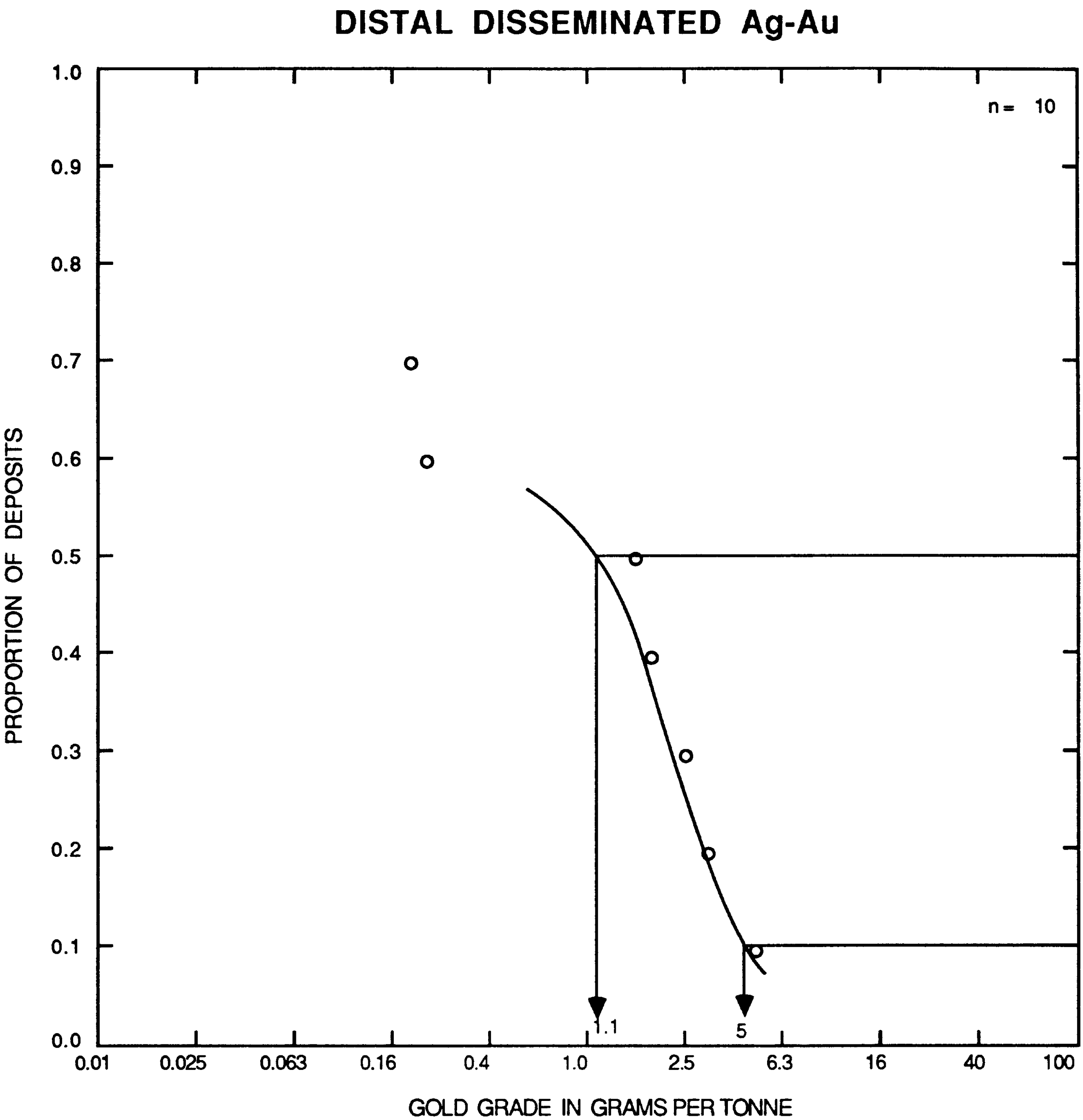

Figure 2. Gold grades of distal disseminated Ag-Au deposits

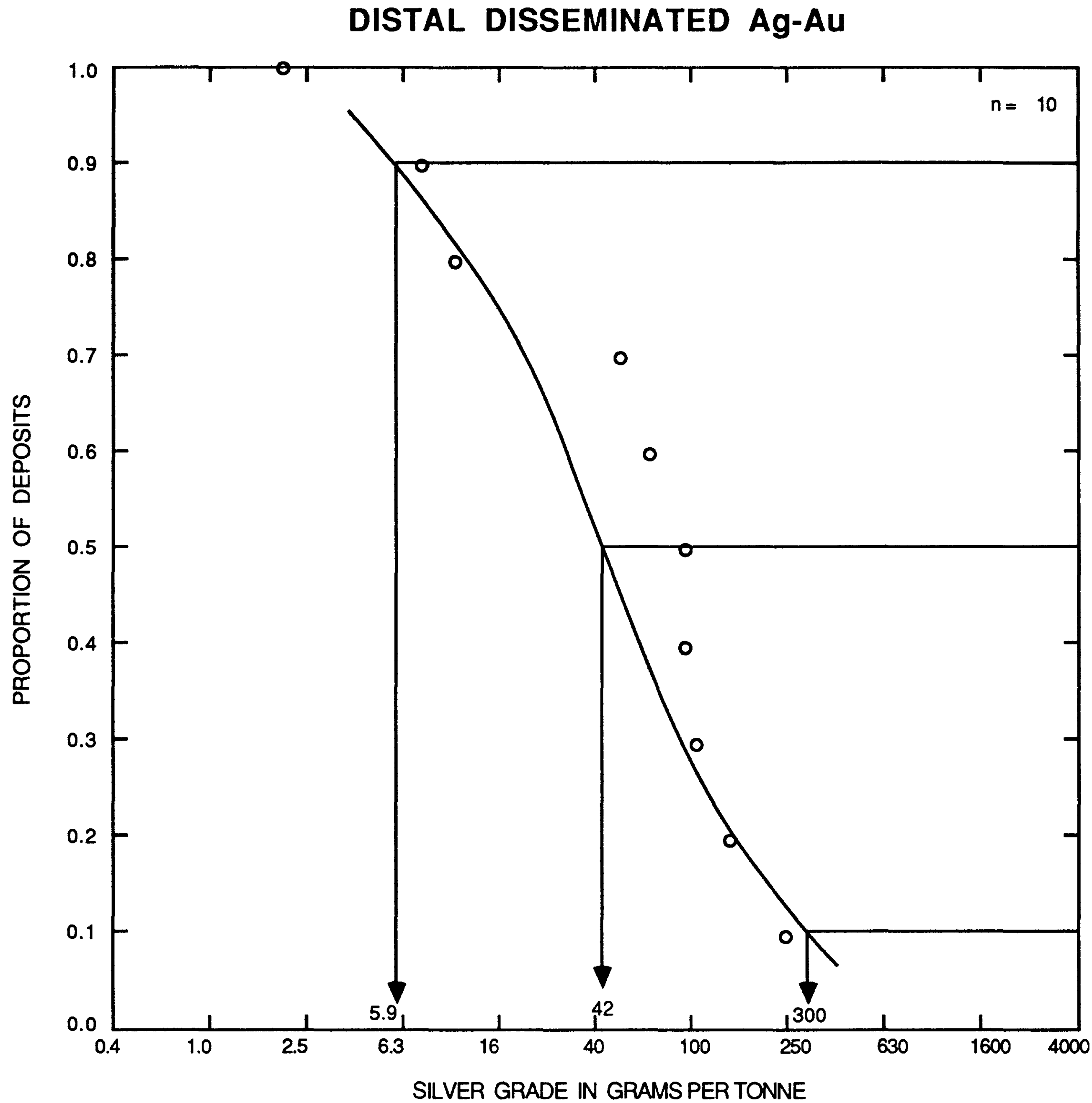

Figure 3. Silver grades of distal disseminated Ag-Au deposits