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Revised grade and tonnage model of carbonatite deposits

by

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COMMENTS This model applies to the descriptive model of carbonatite deposits (No. 10) by Singer (1986a) and should replace the grade and tonnage model in that volume (Singer, 1986b). Data used in this model are presented in Table 1. In some cases, other estimates of grades or tonnages were available, but their quality was questionable and so they were not used here.

Figure 1 presents a plot of the tonnages of these deposits. Figures 2 and 3 present plots of the niobium and rare-earth grades respectively. In each figure the cumulative proportion of deposits versus the tonnage or grade of the deposits is plotted. Individual symbols represent the deposits. In Figure 4 tonnage is plotted against both niobium and rare-earth grades. This plot demonstrates the lack of correlations among these variables and the lack of any distinct groupings of these deposits. Locally these carbonatite complexes may contain economically interesting grades of uranium, thorium, titanium, iron, copper, vermiculite, zirconium or phosphorus; frequently, these commodities are in different zones than the niobium or rare-earth-rich parts of the complex. In addition, adjacent deposits can be either niobium or rare-earth rich, such as at Catalao I and Catalao II.

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Table 1. Grades and tonnages of carbonatite deposits.

(Tonnages in millions of metric tons, niobium, rare-earth, and phosphate grades in percent of X<sub>2</sub>O<sub>3</sub>. Zero indicates no grade reported. Location codes: BRZL Brazil, BURN Burnai, CINA China, CNON Canada British Colombia, CNON Canada Ontario, CNQU Canada Quebec, INDA India, KNYA Kenya, MLWI Malawi, MNGL Mongolia, NAMB Namibia, NRWY Norway, SAFR South Africa, TNZN Tanzania, UGND Uganda, USCA United States California, USCO United States Colorado, ZIRE Zaire)

DEPOSIT	LOCATION	Tonnes/10 <sup>6</sup>	Nb <sub>2</sub> O <sub>5</sub> grade%	RE <sub>2</sub> O <sub>5</sub> grade %	P <sub>2</sub> O <sub>5</sub> %
Amma Dongar	INDA	105	0	3	0
Araxa	BRZL	462	2.48	0.033	15
Argo	CNON	62.5	0.52	0	0
Bayan Obo	CINA	750	0.1	4.1	0
Bingo	ZIRE	7.1	2.86	0	0
Catalao I	BRZL	21	0.98	1.02	8.9
Catalao II	BRZL	2	2.18	0	0
Dominion Gulf	CNON	33	0.39	0	0
Iron Hill	USCO	36.3	0.25	0.01	0
James Bay	CNON	36.3	0.52	0	0
Kangankunde	MALI	11	0	0.62	0
Lueshe	ZIRE	30	0.35	0	0
Manitou Island	CNON	4.85	0.756	0	0
Martison Lake	CNON	145	0.35	0	20
Mountain Pass	USCA	90	0	5	0
Mrima Hill	KNYA	50.8	0.67	0.59	0
Mushgia Khudag	MONG	6.1	0	1.37	0
Nemogos (Lackner Lake)	CNON	10	0.23	0	7
Nemogosenda Lake	CNON	20	0.47	0	0
Oka	CNQU	221	0.23	0.1	0
Ondurukurme	NAMB	8	0.3	3	0
Panda Hill	TNZN	272	0.3	0	0
Palabora	SAFR	652	0	0.15	9
Pocos de Caldas	BRZL	6	0	3	0
Salitre II	BRZL	200	2	0	0
Sandkopsdrif	SAFR	57	0.15	1	3.2
Seis Lagos	BRZL	2890	2.81	0	0
Serra Negra	BRZL	60	1.5	0	0
Sove	NRWY	55.3	0.23	0	0
St. Honore (Soquem)	CNQU	16	0.69	0.0088	0
Sukula	UGND	118	0.25	0	0
Tapira	BRZL	166	1.18	0.03	8.3

# CARBONATITE

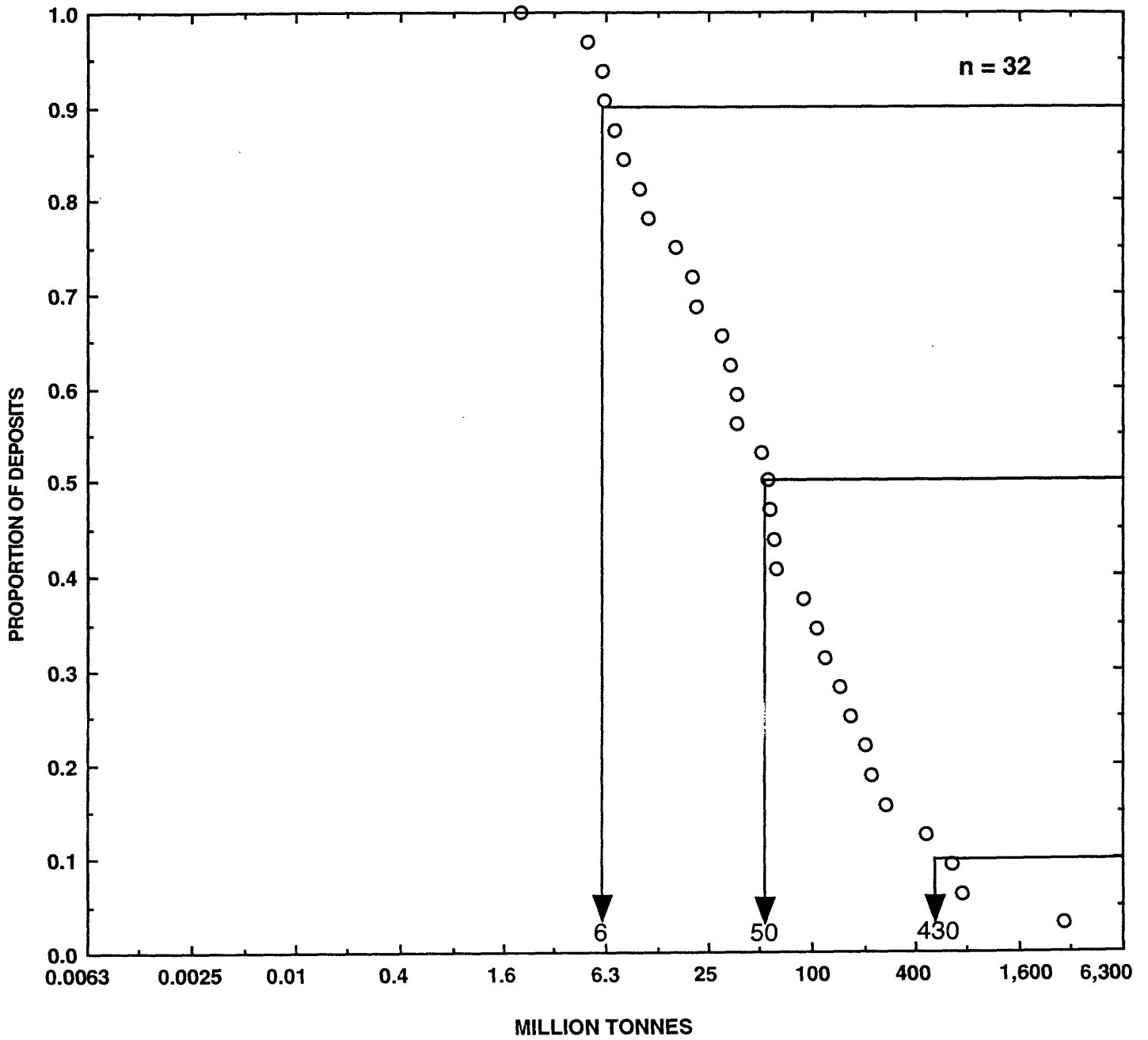


Figure 1--Tonnes of carbonatite deposits.

# CARBONATITE

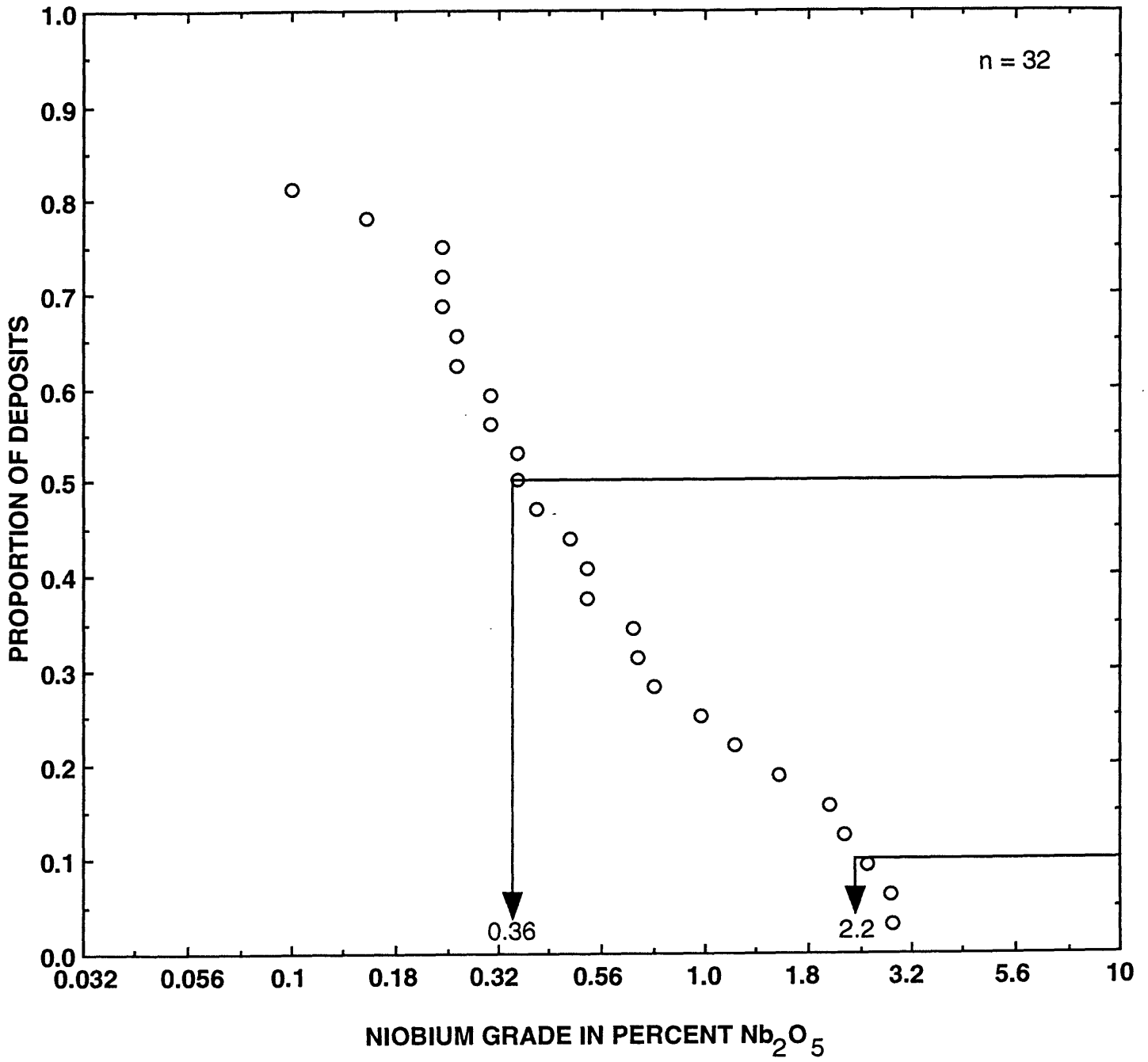


Figure 2--Niobium grades of carbonatite deposits.

# CARBONATITE

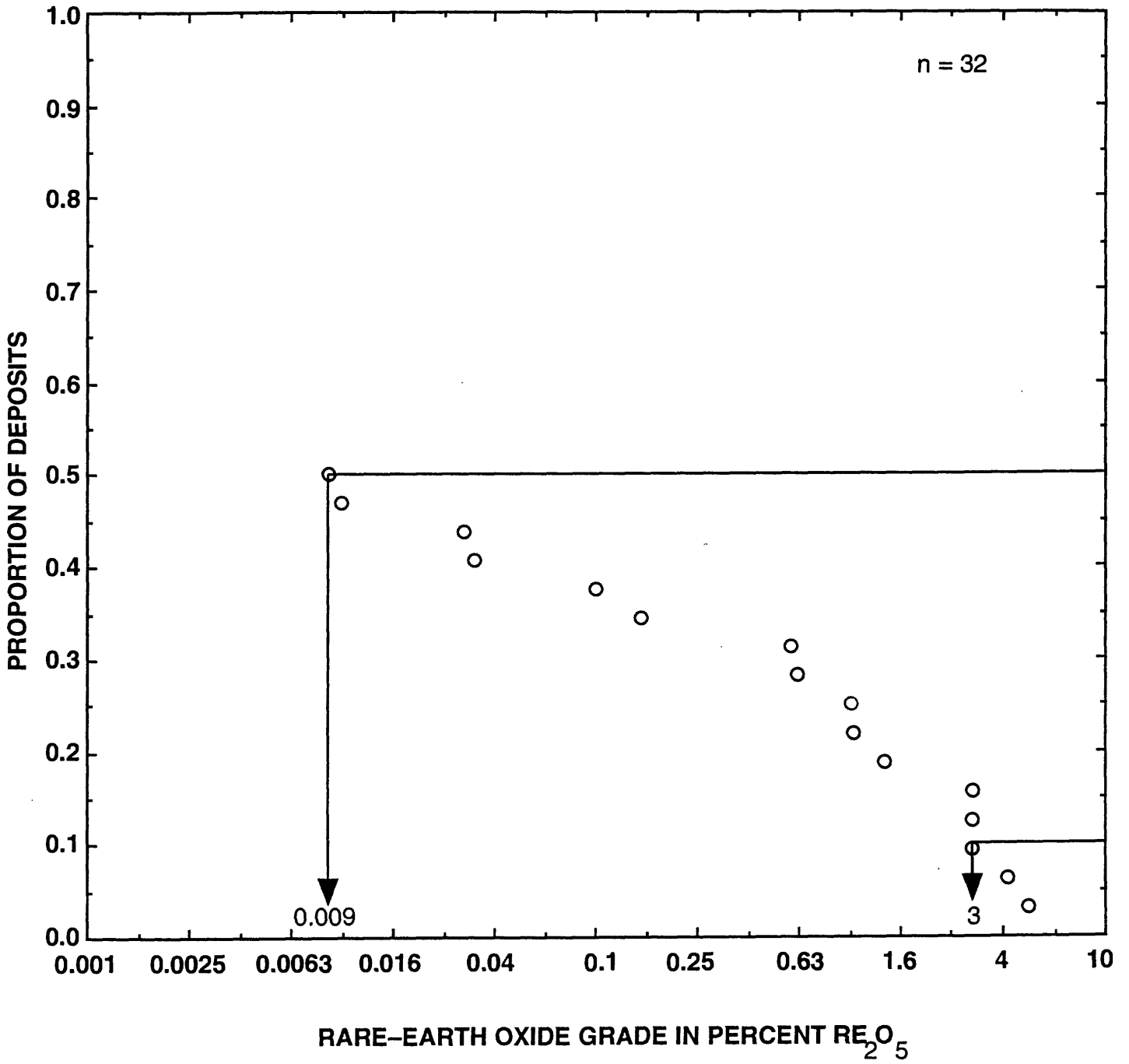


Figure 3--Rare-earth grades of carbonatite deposits.

# CARBONATITE DEPOSITS

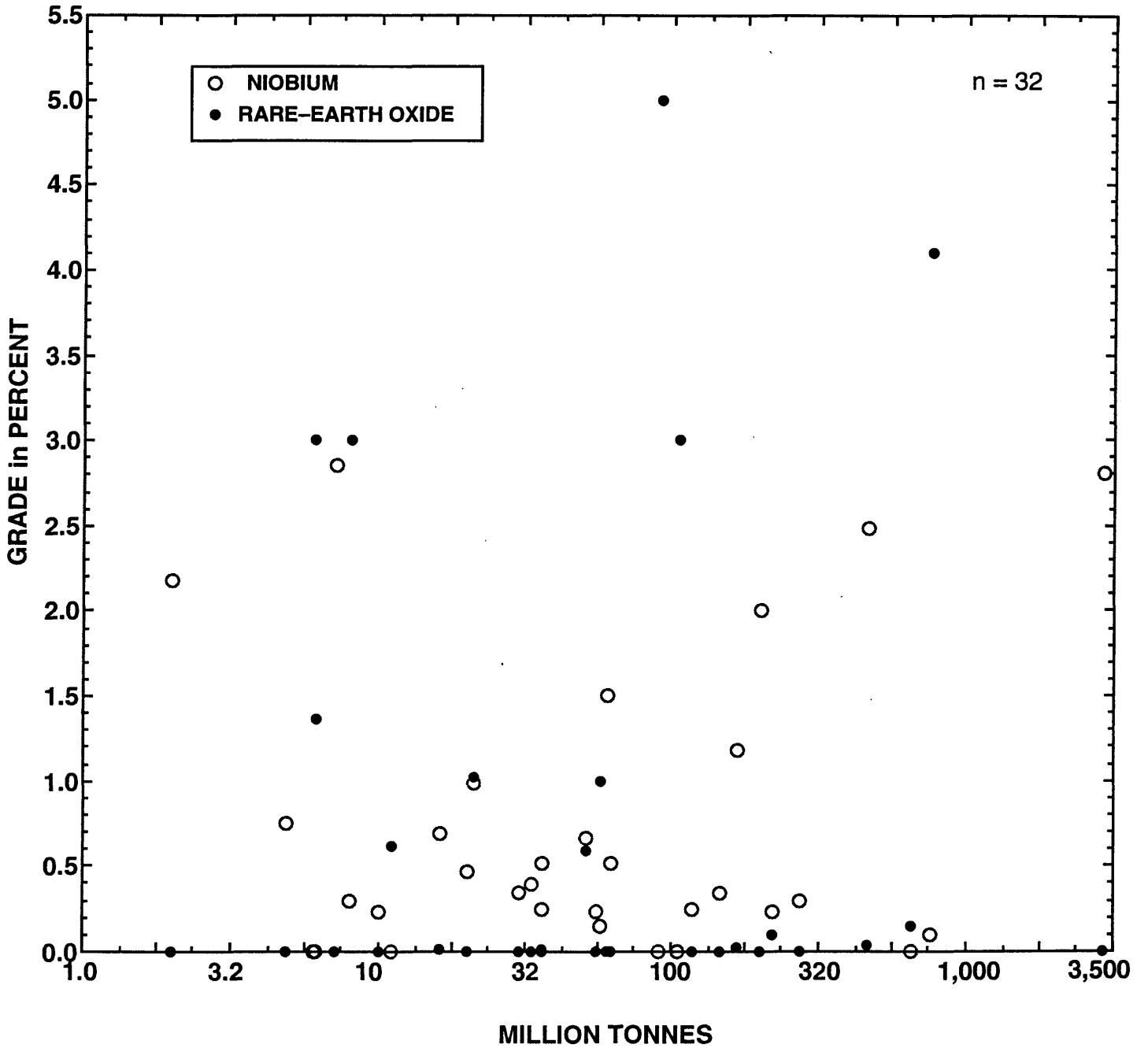


Figure 4--Niobium and rare-earth grades versus tonnages of carbonatite deposits.