

THE GRADE-TONNAGE MODEL OF THE PORPHYRY COPPER DOPOSITS IN CHINA

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A grade-tonnage model for 72 porphyry copper deposits in China has been established based on the Mineral Resources Data Base of China. The mathematical characteristics of grade-tonnage distribution of the deposits have been summarized.

A grade distribution model of the porphyry copper deposits is a logarithmic function, $\text{Ln}F=4.61-0.38e^{-1.92\text{Ln}C}$, where F and C are respectively a cumulative frequency of grade (Cu, in %) and a grade (in %). The porphyry copper deposits with probability of 95% have an average grade less than 1.4%, and 90 per cent of them have average grades between 0.4% and 1.4%.

A tonnage distribution model of the porphyry copper deposits show a linear distribution in a double logarithmic coordinate system. A theoretical function is $\text{Ln}F=0.292\text{Ln}T+3.037$, where F represents cumulative frequency of tonnage (in %) and T , reserves of ore deposits (in 10^4ton) The linear slope of 0.292 is D , a fractal value of the tonnage distribution model.

The porphyry copper deposits show a distribution scattered about like the stars and no clear correlation between reserves of ore deposits and average grades in a combined grade and tonnage model. The grades essentially fall into the relatively narrow field of 0.4~0.8% for the large or super-larger (world class, grant, etc.)copper deposits of more than 500,000 ton.