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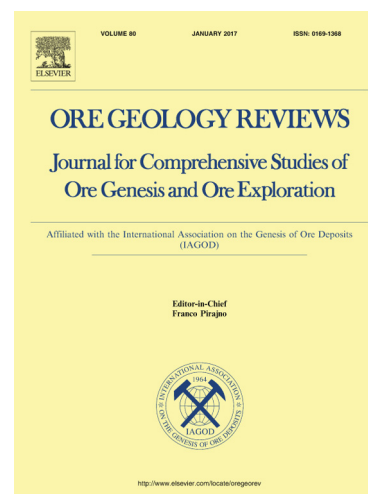
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## Future copper resources

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### Abstract

Concerns about future supplies of raw materials demand careful examination of underlying assumptions and data. Flawed deposit information, ignored undiscovered resources and questionable assumptions about future consumption require a new look at copper resources.

A careful compilation of 1,978 copper-bearing mineral deposits totals 2,700 million metric tons of copper including past production—considerably more than reported in previous studies. About 69% of the copper is in porphyry copper deposits and 12% in sediment-hosted copper, Magmatic sulfide (mostly intrusive Ni) deposits account for 5.1%, and IOGC adds about 4.7%. VMS deposits represent 45% of the 1,978 deposits but only 4.9% of the copper.

The largest 20% of the deposits account for over 92% of the total copper metal. In other words, total Cu content in the smaller 1,600 deposits is only about 8% of all Cu known in all deposits. This is a consequence of highly skewed frequency distributions of deposit tonnages and contained metals in all kinds of mineral deposits. This relationship is critical if one is concerned about long-term supply of copper. Typically, distributions of contained metal can be modeled well by the lognormal distribution for individual types of deposits.

Information used here and in many other studies on copper includes past production.

Total past production through 2015 is about 667 million tons Cu. After subtracting past production from the total copper in known deposits, the remaining unproduced copper from known deposits is 2,030 million tons. Known deposits inform us about undiscovered copper resources.

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