

Distribution and migration of gold in Gobi-overlay of arid desert terrain

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The mechanisms in transferring metals associated with mineralization upwards through transported cover are poorly understood. Geogas is thought to be an important medium in the process of vertical migration of elements. In this paper, metal particles in gases and soils overlying a concealed gold ore body at the Jinwozi gold field, Xinjiang, northwestern China were collected and observed using transmission electron microscopy (TEM) to study gold occurrences. In addition, Geogas and soil surveys were conducted along traverse lines across the '210' gold deposit concealed by several to tens of meters of regolith cover. Soils were collected in a regolith profile to further study the horizontal and vertical distribution of gold. Geochemical analyses using 'Geogas' and soil methods show Au, Ag and Hg anomalies occur over the '210' gold ore body. A drilled profile revealed a 'C-shaped' distribution pattern of mobile gold in the regolith. Gold-copper and copper-bismuth nanoparticles were detected by TEM in the Geogas and soil samples. The results indicated that nanoparticles sourced from the underlying concealed ore bodies are likely to have been the cause of the surface geochemical anomalies. The particles could travel upwards to the surface, during which the Geogas and soil anomalies are developed in pore space and in soil, which has a large surface area. At the surface, some of the particles are retained in the Geogas, while others are captured by soil constituents such as clays, iron and manganese oxides, which create the 'C-shaped' distribution patterns of the mobile gold in vertical profile.

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