

## **Distribution and migration of gold in arid desert regolith above the concealed deposit**

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The Deep penetration methods for geogas and mobile elements survey were evaluated in the 210 gold belt. The experimental results in this paper confirm that these methods can effectively indicate the concealed ore bodies under the regolith cover. The drilling investigations revealed the “C-shape” distribution patterns of the mobile gold. The geogas and soil samples in surface anomalies were collected, in which the size, morphology and component of the particles were characterized by transmission electron microscope. Gold-copper and gold-bismuth nanoscale particles were observed in the geogas and soil samples. It is believed that the nanoscale particles sourced from the underlying concealed ore bodies are likely to cause the surface geochemical anomalies. The nanoscale particles could travel upwards to the surface, during which the geogas and soil anomalies were developed in pore space and soil. Due to the large superficial area, the nanoscale metal particles can be associated with micro bubbles and transported upwards by the geogas carriers. In addition, the nanoscale particles could migrate upward [1] just like gas. On the ground surface, some of the nanoscale particles retained in the geogas, while the others could be captured by soil barriers such as clay, iron and manganese oxides. The dissociation and desorption of the nanoscale particles from soil particles’ surface during their migration upwards probably created the “C-shape” distribution patterns of the mobile gold in vertical profiles in drilling holes.

**Key words:** Gobi-overlay; concealed gold deposit; nanoscale metal particles