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## Electro-geochemical extraction in exploration for sandstone-hosted uranium deposits in northern China

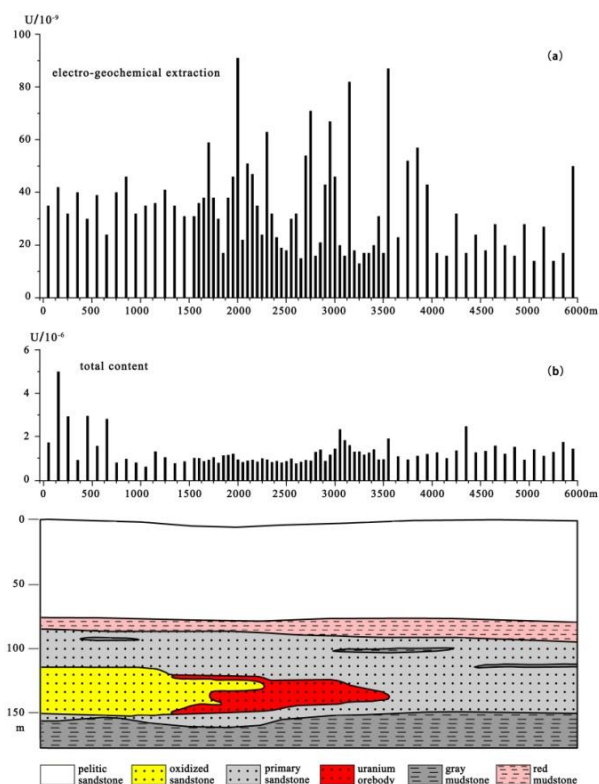
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The electro-geochemical extraction (CHIM) was introduced first in the former Soviet Union in 1970s (Ryss et al., 1973). It is based on the migration of ions in an electric field (Leinz et al., 1998) and it has been proved an effective method to locate concealed mineral deposits, especially for Cu, Pb, Zn, Au and U deposits. In China, the CHIM has been used in exploration for Pb, Zn, Cu, Ni, Au, U, oil and gas with an “effective detection depth of hundreds of meters”(Luo et al., 2008).

Field trial of the electro-geochemical extraction over the known sandstone-hosted uranium deposit has been carried out in Bayanwula area, Erlian basin. The electrodes are made of graphite rod and in a length of 15 cm. Electrodes coated by absorbent materials containing electrolyte compose the element collectors, which are buried underground at a depth of 40 to 50 cm. The distance between the positive and negative electrode is 100 cm. The soil around the electrodes should be wetted by the addition of 10%  $\text{HNO}_3$ . The voltage of the DC power is 9V.

The U ore body is manifested as a clear CHIM anomaly of U detected directly above (Fig. 1a). The typical response to uranium mineralization appears to be jumping anomalies. For the purpose of comparison, the result of the analysis of the soil for U is also shown (Fig. 1b). Typically, ‘total’ U element content is difficult to reveal the anomalies.



Result of field work presented in this paper has demonstrated the effectiveness of electro-geochemical extraction in exploration for concealed sandstone-hosted uranium orebodies located at a depth of about 150 m. It is confirmed that the form of mobile U can migrate over large distances, which makes it possible to detect the CHIM anomalies of U on ground surface. Comparison between CHIM and conventional soil geochemical results showed that the former is distinct over the uranium orebody, while the latter shows no obvious anomalies. In addition, there are still some questions, such as evaluating the suitable conditions for different kinds of minerals and mechanisms of the electro-geochemical migration of U, require further study.

Figure 1: Comparison between CHIM and soil over

*U deposit in Bayanwula area, Erlian basin*

*References:*

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- [3] Luo X R et al. (2008) Chinese Journal of Geochemistry, 27: 198–202

