Influence of Paleoclimate Transition on the Mineralization of Sandstone-Type Uranium Deposit: A Case Study of 2081 Uranium Deposit in the Erlian Basin, Inner Mongolia, China

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Abstract: This study has analyzed samples systematically collected from the 2081 sandstone-type uranium deposit in the Erlian Basin in order to discuss the important significance of paleoclimate transition on the mineralization of sandstone-type uranium deposit. Techniques including X ray diffraction and scanning electron microscope were adopted to analyze mineral contents of sedimentary minerals of the Saihan Formation and the variation of other geochemical parameters for recording the paleoclimate evolution with the depth of the sedimentation. Our results show that the Paleoclimate evolution during mineralization of the 2081 uranium deposit can be divided into five stages including warm and humid climate (Ⅰ), arid and cold climate (Ⅱ), warm and semi-humid climate (Ⅲ、Ⅳ), and arid and hot climate (Ⅴ). Accordingly, there are three important climate transitions. Two important metallogenic periods of the 2081 uranium deposit are highly consistent in time and space with the two important climatic transformation periods. Especially, the climate transition period from Stage II to Stage III and Stage IV corresponds to that of the mineralization stage of the No. 2 ore body and the climate transition period from Stage III and Stage IV to Stage V agrees well with that of the mineralization stage of the major No.1 ore body. These features indicate that the regional climate transition plays an important role in the formation of the 2081 sandstone-type uranium deposit in the Erlian Basin.

Keywords: mercury (Hg); meteorite; pre-concentration; isotope; measurement