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Application of formation element logging in identifying weathered clay layer of unconformity

Yulei Liu, Kongyou Wu, and Ping Liu
Geosciences, China university of Petroleum, Qingdao,China(3117463452@qq.com)

A large number of field surveys and core data from Junggar Basin have confirmed that unconformity is not just a face, but more accurately a body, that is, an unconformity structure. Because of its unique background, it can be divided into three layers vertically: the upper layer of the structure, the middle layer of the structure and the lower layer of the structure. Among them, the middle layer of the structure (composed by weathered clay layer or paleosol) becomes dense and tough under the compaction of the overlying strata, which can effectively block the oil and gas in the upper and lower reservoirs, and has great significance in petroleum exploration. The X-ray diffraction analysis (XRD) of the weathered clay layer of the Fengcheng Formation in the northwestern margin of the Junggar Basin shows that the weathered clay layer of unconformity is deficient in Ca element, however,highly enriched in Fe and Al elements, and uniquely enriched in Ti element. Based on this, the element quantitative analysis of the formation element of target zone is carried out by using the formation element logging technique (ECS), and the quantitative interpretation plate of the formation element in the oil-gas bearing area is established.This paper makes up for the shortcomings of seismic exploration accuracy, makes the weathered clay layer of unconformity identification refine and efficient, and provides a new guiding idea and exploration technology for oil and gas exploration.
Key wordsJunggar BasinWeathered clay layer of unconformity,
Formation element logging technique, Precise identification technology