

Hydrocarbon Microseepage Information Extraction In Muli Area, Qinghai Province

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Abstract: hydrocarbon microseepage information extraction by remote sensing data based on the geochemical abnormality of earth surface. The substances of the hydrocarbon microseepage caused the alteration of overlying strata, which may be shown as the mineral and chemical properties change of the surface soil. And the change can be detected by the change of reflectance spectroscopy. The soil and rock alteration anomalies of the hydrocarbon microseepage area including carbonate mineral enrichment, increased abundance of clay minerals and divalent iron ions enrichment. Therefore, the extraction of the iron staining anomalies and the hydroxy anomalies information play an important role in the oil and gas remote sensing exploration.

In this paper, multispectral satellite data (ETM+ data) was used to estimate the carbonates of clay-rich region in Muli area, Qinghai Province, where natural gas hydrate sample was detected in 2008. The principle component method (PCA) was used to calculate the iron staining anomaly index (PCA1345) and hydroxyl anomaly index (PCA1457), which shows carbonates of clay-rich region. Characteristic spectral responses caused by the hydrocarbon microseepage was also detected by curve analysis of ground experiments. According to analysis of the samples tested, the area of clay alteration features, characteristics of clay alteration, carbonate alteration features were significantly higher than non-oil areas. The analysis results of sample spectrum and extraction results of satellite data have good correspondence, which shows that the region has great potential for oil and gas exploration.

Keywords: oil and gas exploration, remote sensing, TM data, Qinghai Province