Geochemical characteristics and oil-source correlation of oil-sand extracts of Kelatuo Anticline in the northern Kashi Sag, NW Tarim Basin, China

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The Kashi Sag is an area with abundant gas/oil shows in the Tarim Basin of China. Identificating the source of the oil and gas is important for petroleum exploration. We have conducted on molecular comparisons of oil sand extracts and two sets of potential source rocks from the Kashi Sag to appraise and predict the source of the oils and oil sands. The oil sand we studied is from the north limb of the Kelatuo Anticline.

Sandy shale and coal are widely distributed in Middle and Lower Jurassic sections of the Kashi Sag, mainly in the Lower Jurassic Kangsu Formation and the Middle Jurassic Yangye Formation. Average TOC values of these strata are 1.43% and 1.87% respectively. On the basis of total extract yields and the abundance of unknown compound “A” and total extractable hydrocarbons, these formations contain good source rocks. the average TOC of Lower Carboniferous shale in the Xilibili Profile is 0.82%. Lower extract yields of compound “A” and of total hydrocarbons indicate that it is an inferior source rock. Diahopane abnormally is high in the extracts of Middle and Lower Jurassic sandy shales and coals, with lower amounts of dibenzothiophene in the fluorene series, Similarities in the C21>C23 distribution pattern in tricyclic terpanes, triaromatic steroid and fluorene series provide elaborate evidence for oil-source relation. As a whole, the molecular evidence demonstrates that Lower Carboniferous shale in the Xilibili Profile and the oil-sands of Kelatuo are strongly related.