



Sedimentary characteristics and models of Cambrian hydrocarbon source rock in Southwestern Tarim basin, NW China

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Cambrian marine hydrocarbon source rock is one of the most important oil and gas source in Tarim basin. However, there is a long-term controversy on sedimentary characteristics and models of the source rock of Cambrian in southwestern Tarim basin because of deeply-buried and old strata. Based on the comprehensive analysis of core, outcrop, drilling, geochemical and new high-resolution seismic data, the research discussed the characteristic of sedimentation and patterns of source rock of Cambrian in southwestern Tarim basin. Through precise interpretation of Cambrian strata using well-logs and seismic data, the stratigraphic architecture was recognized and divided into six formations. The sedimentary facies in southwestern Tarim basin were classified into carbonate platform, ramp, slope, shelf and basin facies from Bachu Platform to Southwest Depression along southwest, and their thickness became thinner gradually. It's worth noting that the shelf and slope zones deposited a set of condensed and argillaceous sediment, which usually were regarded as high-quality source rocks. By organic geochemical analysis of borehole core and outcrop samples, it showed that total organic carbon (TOC) in Karpin outcrop was highest, ranging from 13.89% to 22.39% (average 17.99%). Besides, there were three wells, TOC value of which were over 0.5%, which were Fang 1, He 4 and Kang 2 all located in carbonate platform. According to sedimentology regularity, there is close relation between source rock and distribution of sedimentary facies. Two depositional models of source rock have been provided on the basis of sedimentary settings analysis: 1. muddy source rock in shelf and slope is relevant to ascending ocean current; 2. carbonate source rock in the sags of carbonate platform is often associated with gypsum-salt rock. The research findings deepen the understanding of marine source rocks and clarify the exploration direction in Tarim basin and other similar marine basins.