Discovery of High-quality source rocks in the old cratonic Tarim Basin, China

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There is still great controversy on the whereabouts of the main source kitchen within the Tarim Basin, western China. Whether the source rock is in the Cambrian or in the Ordovician, is still not clear.

Recently, PetroChina organized an expedition to survey the basin margin areas of the Tarim Basin. We have located close to a dozen of excellent lower Cambrian outcrops in the Aksu area of Xinjiang. The Lower Cambrian Yuertusi Group, which is in parallel unconformable contact with the underlying Sinian strata contains high-quality source rocks in those outcrops. They are characterized by dark shale with TOC primarily in the range of 4% to 8%, and occasionally up to 16%. The high-quality source rock is 10-15 m thick and laterally extensive. The base of the Yuertusi Group is composed of a 2 m, grey-black thinly bedded, phosphorous-bearing silicate with internal Fe-rich concretions. The middle interval, having the highest TOC, is of black shale, about 6 m thick, interbedded with dolomite layers. The upper interval comprises a 4 m, interbedded black shale and gray thinly bedded micrite. On the basis of paleogeographic analysis, this high-quality source rock may have been deposited in the mid to lower gentle slope areas where the high concentration of organisms were controlled by ocean upwelling. It is postulated that such source rock may occur widespread along the mid to eastern parts of the basin.

The discovery of the high-quality Cambrian marine source rock in the Tarim Basin proves the presence of essential petroleum system elements within the sub-salt dolomite strata[1][2]. It may open a new frontier in the deep, sub-salt strata exploration in the Tarim Basin.

[1] Zhu Guangyou *et al*. (2015), *Energy & Fuels,* 29, 1332-1344. [2] Zhu Guangyou *et al*. (2015), *Marine and Petroleum Geology*, 62, 14-27.