

Biomarker Characteristics of Source Rocks and Oil-Source Correlation in Baxian Sag, Bohai Bay Basin, China

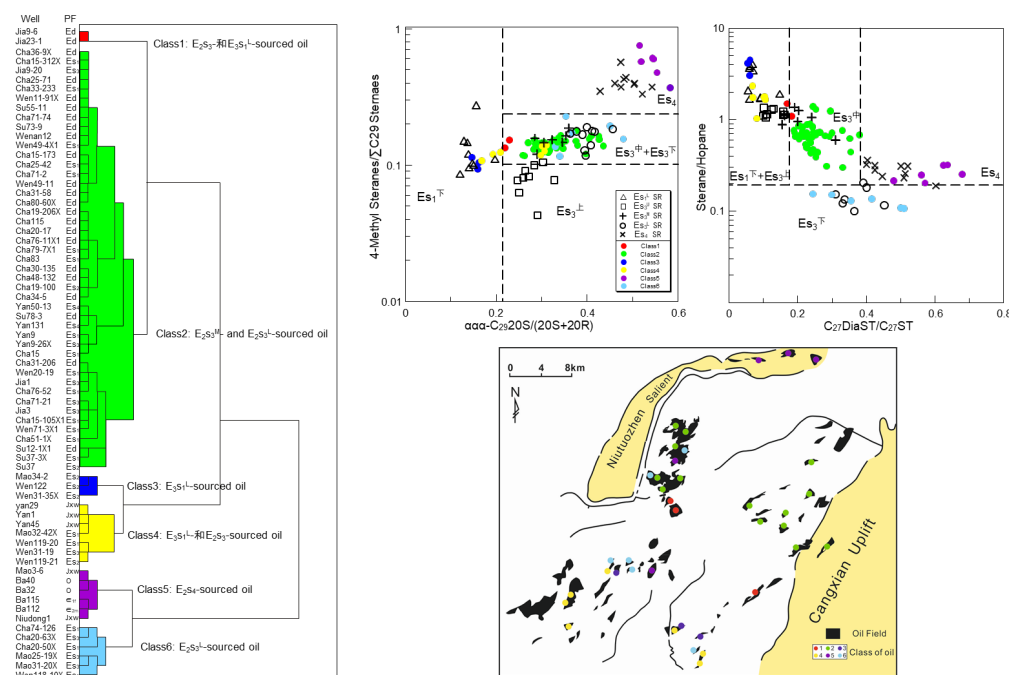
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Baxian sag is one of the most petroliferous sags in Bohai Bay basin, So far more than 3×10^8 tons of oil has been found. The previous studies lack the research of biomarker distinction among four possible source rock intervals (E_3s_1L , $E_2s_3^M$, $E_2s_3^L$, E_2s_4). The complicated accumulation patterns and mix of oils result in the ambiguous oil-source correlation. The inadequate work impedes the future fine exploration. The purpose of this study is to distinguish the biomarker characteristics, interpret the deposited environments and organic matter input of source rocks and clarify the oil-source correlation and petroleum distribution. The study on source rocks was based on the biomarkers gotten by GC and GC-MS. We divided the origin genetic types of oil through hierarchical cluster analysis, setup the oil-source relationship and discussed the distribution of each type of oil which are based on the knowledge of petroleum geology and petroleum geochemistry. E_3s_1L was deposited in anoxic environments with minor terrestrial organic matter input, $E_2s_3^M$ in sub-oxic to anoxic with medium terrestrial organic matter input, $E_2s_3^L$ in sub-oxic with medium terrestrial organic matter input and E_2s_4 in sub-oxic with significant terrestrial organic matter input. Three oil families derived from E_2s_4 , $E_2s_3^L$, E_3s_1L , respectively, and three types of mixed oils have been identified. Each source rock interval has distinctive biomarker associations. Each type of oil has its own distribution characteristic, and it is mainly controlled by the areal distribution and the thermal evolution condition of source rocks. Such a petroleum distribution pattern has important implications for future exploration. There is considerable exploration potential for $E_2s_3^M$ and $E_2s_3^L$ -derived oils in the Baxian sag, and traps close to or within the generative kitchens have better chance to contain oils generated from the $E_2s_3^M$ and $E_2s_3^L$.



Figures: Results of hierarchical cluster analysis showing crude oil origin classes, variation of two sets of biomarkers for oil and source rock samples from the Baxian and geographic distribution of oils in the Baxian Sag. PF = production formation; SR = source rock; ST=sterane.

Biography:

YANG Fan, PHD candidate, is mainly engaged in petroleum geology and geochemistry. He has expertise in petroleum geology and geochemistry in improving the petroleum exploration. His distinguishable biomarker associations of source rocks has been successfully applied to Baxian sag and adjacent Raoyang sag and creates more strict way to build up oil-source correlation. he has built this method after years of experience in research, experimenting both in lab and oil field.