# Geochemistry of crude oil and petroleum systems in Fushan depression, Beibuwan Basin, South China Sea

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22 crude oils from the Liushagang Formation(Els) in the Fushan Sag, Beibuwan Basin were selected for molecular geochemistry and isotope analysis to establish oil-source correlation. The crude oil can be divided into 2 major categories and 3 groups. The group I crude oil belonging to the first category is low mature distributed in the Huachang area next to the hydrocarbon generation center. Its hydrocarbon precursors are formed in the oxidized low salinity freshwater environment, with fewer angiosperms and more aquatic plant inputs. It mainly come from Els1 and $Els_2^1$ mudstones. The second category are mature crude oils including Group II and Group III. The Group II can be furtherly divided into two subgroups. Subgroup $II_1$ in Huachang area is mainly distributed in $Els_3^1$, originates from the $Els_3^1$ source rocks, and the subgroup $II_2$ in Bailian area is contributed from $Els_2^2$, and $Els_3^1$ and $Els_2^2$ source rocks. The source material of Group III oil contained more angiosperms and aquatic organisms was formed in the freshwater environment with medium oxidation and the relatively high salinity. The oil maturity of the group was between Subgroup $II_2$ and Subgroup $II_1$. Group III crude oils were derived from the $Els_3^2$ mudstones, and some are attributed to $Els_3^1$ and $Els_2^2$ shale.

Combined with the special tectonic depositional background and oil-source correlation in the Fushan depression, two petroleum systems could be identified and the maximum flooding surface(mfs) of Els2 probably becomes its divided line. The petroleum in the systems were strongly controlled by the source rock. Oil and gas are migrated and accumulated through the transmission network constitued with the horizontal delta-infiltrated sand layers and vertical faulted system. All the research should benefit to the further petroleum exploration and oil resources evaluation.