Oil-source correlation for severely biodegraded oils in Biyang Depression, China

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There are multi-sources and kinds of crude oil types in Biyang Depression, which include normal oils and different-degree biodegraded oils [1]. Normal biomarker parameters, such as regular sterane and gammacerane index, are influenced by biodegradation [2], and the oil-source correlation for the whole area become very difficult. Some compounds with little or no influence should be chosen for oil-source correlation.

According to Peters [3], the $17\alpha21\beta$-norhopane is more resistant than $17\alpha21\beta$-hopane to biodegradation. Based on the analysis of more than three hundred samples which include source rock and crude oil distributed in six different basins, we proposed $2\times\alpha\beta$-norhopane in place of $\alpha\beta$-hopane and used this new gammacerane index (gammacerane/$2\times C_{29}$hopane) to correlate those severely biodegraded oils and normal oils. Moreover, the different oils and source rocks in Biyang Depression can be distinguished clearly by the plate between gammacerane/$2\times C_{29}$hopane and $2\times C_{24}$ tetracyclic terpane/C_{26} tricyclic terpane (Fig. 1). Hence, the oil-source correlation for Biyang Depression has been made successfully.
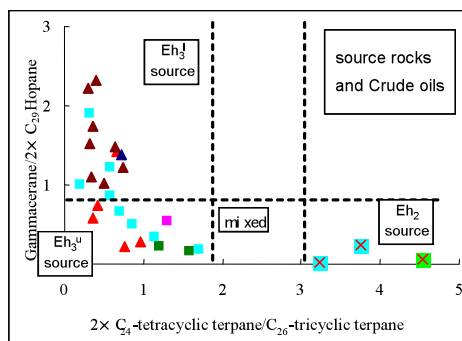

Figure 1: $2\times C_{24}$ tetricyclic terpane / C_{26} tricyclic terpane versus gammacerane / $2\times C_{29}$ hopane for oils and source rocks from Biyang Depression

[1] J.Q. Luo (2008) *Journal of Oil & Gas technology* **30**(2) 20–24. [2] Behar F (2006) *Organic Geochemistry* **37**(9) 1042–1051. [3] K.E.Peters (2005) *The Biomarker Guide* second editionII, 664–666.

Carbon isotope composition of DIC in the Yalong Jiang of Changjiang Basin, China

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Concentrations and isotopic compositions of carbon species in water samples are often used in studies of carbon biogeochemistry and rock weathering in rivers. Yalong Jiang is 2nd longest tributary of the Changjiang River in central and southern China. The Yalong rises in the Bayan Har Mountains in southern Qinghai Province at an elevation of nearly 5, 000 metres. The Yalong Jiang basin is covered by mesozoic sediments including low-grade metamorphic rocks and granitoid intrusive rocks. In this study, we surveyed carbon isotopic compositions of dissolved and suspended loads of Yalong Jiang and its main tributaries in August of 2009, with purposes of better understanding carbon sources and processes involved in the riverine carbon cycle.

The concentrations of HCO_3^- are in the range of 0.14 to 3.44 mmol L^{-1} for river waters. The $\delta^{13}C$ values of the dissolved inorganic carbon (DIC) in river waters range from -12.2‰ to -3.5‰ with a mean value of -7.1‰. The water collected from hot spring has high contents of HCO_3^- with 39.3 mmol L^{-1} and high carbon isotopic value of +0.9‰, suggesting dissolved inorganic carbon mainly derived from deep source CO_2. The $\delta^{13}C$ values of POC range from -25.4‰ to -21.9‰ for river waters with a mean value of -24.4‰, which suggests that they are mainly derived from C_3 plants. In the present study, the contents and isotopic composition of carbon species indicated that carbonate mineral and silicate weathering by CO_2 from C_3 plants and equilibration of DIC with atmospheric CO_2 involved riverine carbon cycle in Yalong Jiang of Changjiang Basin, China.