P343-TH

25-NORHOPANES IN JURASSIC SOURCE ROCKS OF NORTHERN QAIDAM BASIN (NW CHINA) AND ITS IMPLICATIONS ON MICROBIAL DEGRADATION ON BOTRYOCOCCUS

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In a recent study on biomarker signatures of Jurassic mudstone source rocks of northern Qaidam Basin (NW China), 25-norhopanes were detected in some source rocks. We interpret this as these source rocks deposited under special environment had been exposed to microbial degradation in the period before diagenesis, and the bio-precursor for biodegradation may be botryococcus.

Hydrocarbons in the northwestern Qaidam Basin are mostly derived from Jurassic units, which can further be subdivided into Lower and Middle parts and the Upper Jurassic have been eroded due to Himalayan orogeny. In this study, we selected 7 Lower and 5 Middle Jurassic samples for GC and GC-MS analyses, respectively.

It is showed that 25-norhopanes were detected in three mudstones.

Firstly, the three samples are all characterized by low abundance of TOC (0.54%, 0.18%, and 0.17%). This is verified by organic petrologic microscopic examination, which demonstrates that there is relatively smaller amount of organic maceral-like matters than those with higher TOC. However, a large number of mineral-bituminous matrix (MBM) has been observed (Fig. 1a).

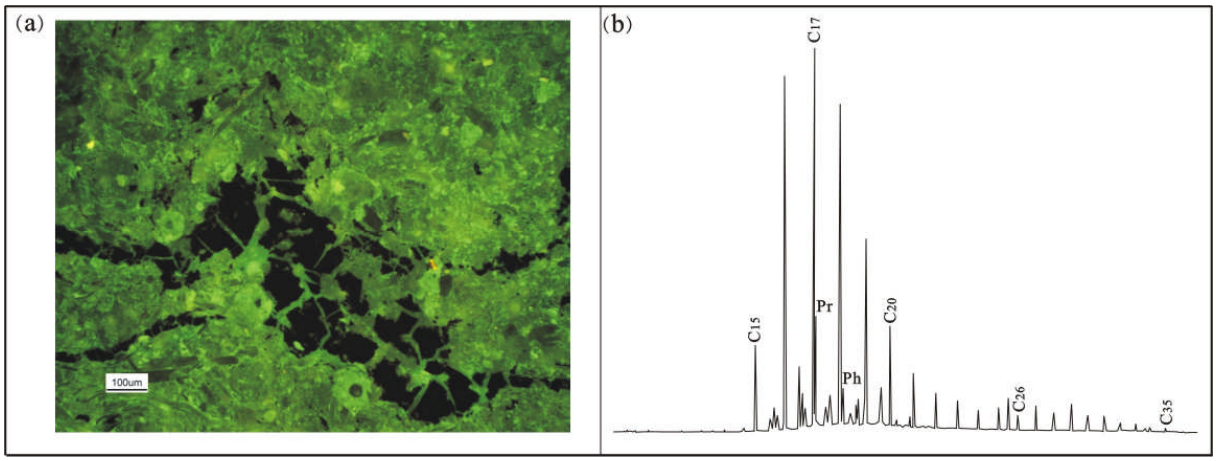

Figure 1. Organic maceral feature (a) and gas chromatogram (b) of sample SS25-2 (Well Shishen 25, 1278.5 m, J_1)

Secondly, these three samples have special n-alkane distribution in GC chromatogram different from others. Carbon numbers are mostly concentrated within nC_{15} to nC_{20}, and peak carbons are located in the fore-part (e.g., nC_{16} or nC_{17}). Fig. 1b gives one typical example. Meanwhile, their Pr/Ph, Pr/nC_{17}, Ph/nC_{18} and OEP are all lower than 1.0, inferring a relatively reduction deposition environment. Combined with the fact that we observed botryococcus in other samples, it is tentatively suggested that the MBM may come from botryococcus.

Thirdly and most interestingly, we found 25-norhopanes in these three samples (Fig. 2). Evidence supporting the existence of 25-norhopanes in source rocks has been reported international and national. Additionally, our analytical results show that there is relatively high content of gammacerane in these three samples. Thus, the detection of 25-norhopanes in these three samples indicates that in relatively saline environment, primary micro-algae can be degraded by microbe, resulting in the microbial removal of the methyl group at C-10 in the hopane nucleus and the formation of 25-norhopnes (Fig. 2). The products of this interaction immersed into mineral matrix or adsorbed on grains, making MBM's advantageous distribution in source rocks (Fig. 1a).

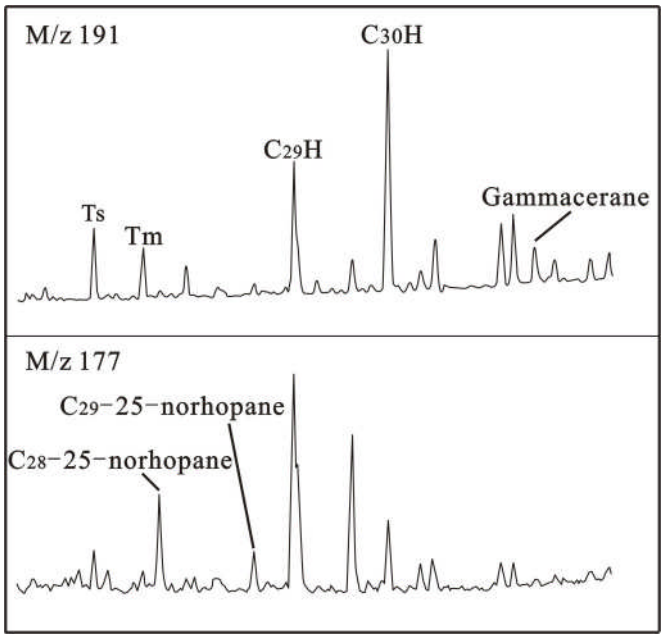

Figure 2. Hopane series of sample SS25-2 (Well Shishen 25, 1278.5 m, J_1) of the Jurassic mudstones from the northern Qaidam Basin.

Therefore, we believe that in the northern Qaidam Basin, saline deposition environment, microbe input, and the degradation of phytoplankton (e.g. *Botryococcus branuii*) in the period of deposition or forepart diagenesis may have some close relation.