# Sources and transportation of organic carbon in the sediment from the Yellow River to the Bohai Sea: indicated by compound specific fatty acids

L. Zou[1], C.L. Huang[1], Y.G. Jia[1], T.Z. Mi[1], Z.H. Gao[2], H.W. Gao[1]

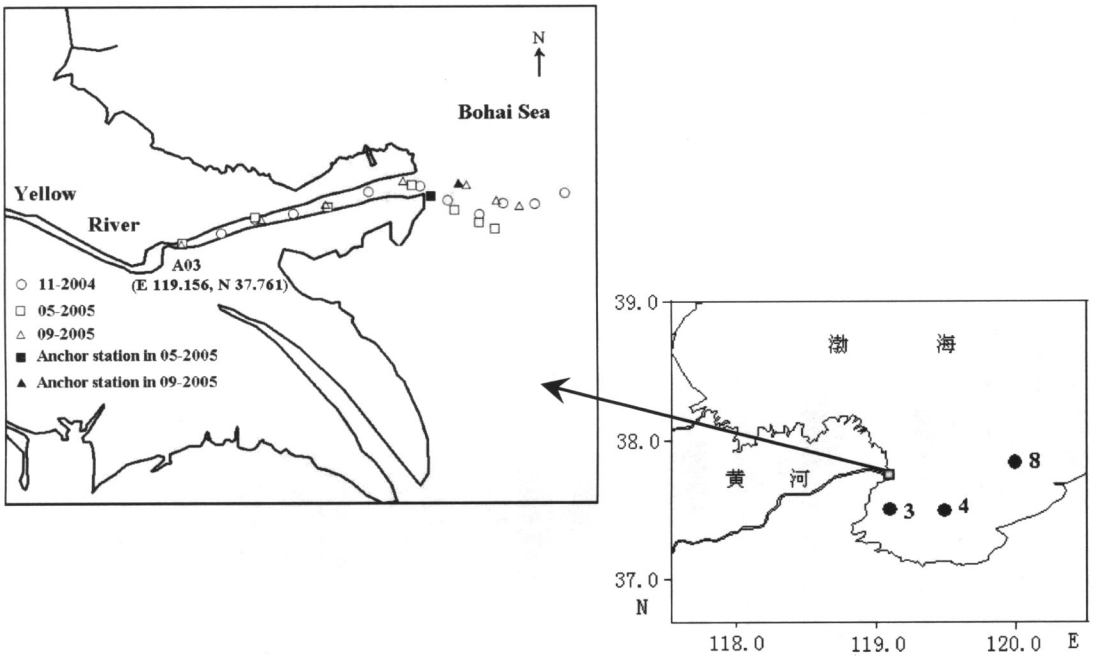
1 Key Lab of Marine Environmental Science and Ecology, Ministry of Education, Ocean University of China, Qingdao, 266003, P.R. China

2 North China Sea Environment Monitoring Center, State Oceanic Administration, Qingdao 266033, P.R. China

1. Introduction:

The behavior of organic carbon is one of the un-neglectable and complicated topics in the estuarine processes. Organic carbon in estuarine area is composed of both natural and anthropogenic ones. And the natural organic carbon, which is primarily produced by organisms, includes hydrocarbons, amino acids and lipids. The information of total organic carbon is a compositive result, and a different, even an opposite information may be obtained if the sub-groups of organic carbon are concerned. The Yellow River plays an important role on the input of organic matters to the Bohai Sea and continental shelf of West Pacific Ocean. Meanwhile, the high content of suspended particles makes the activity of organic carbon more complicated. That is why use the lipid biomarker to address the source and transportation mechanism in the Yellow River Estuary.

2. Sampling sites is shown as followed.



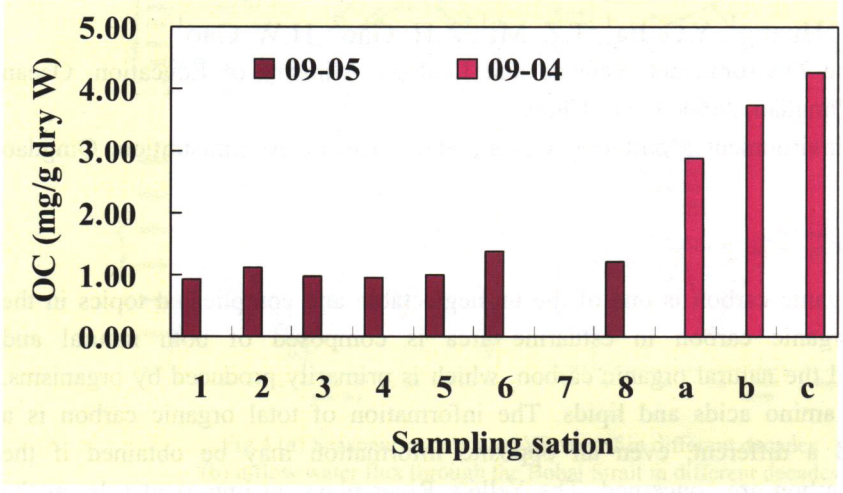

3. Sample preparation and analysis:

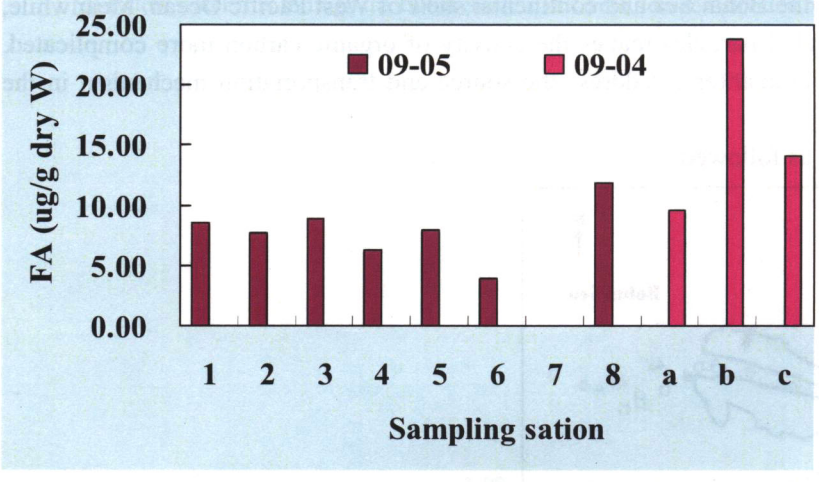
Dried 21.6-72.5 mg HMW-DOM samples were first extracted with organic solvents, and then saponified. The extracted lipids were then separated and extracted with hexane for neutral and acidic lipids under different pH condition. Fatty acids were methylated to form fatty acid methyl esters (FAMEs), while neutral lipids were trimethylsilylanized to form TMS-ethers.

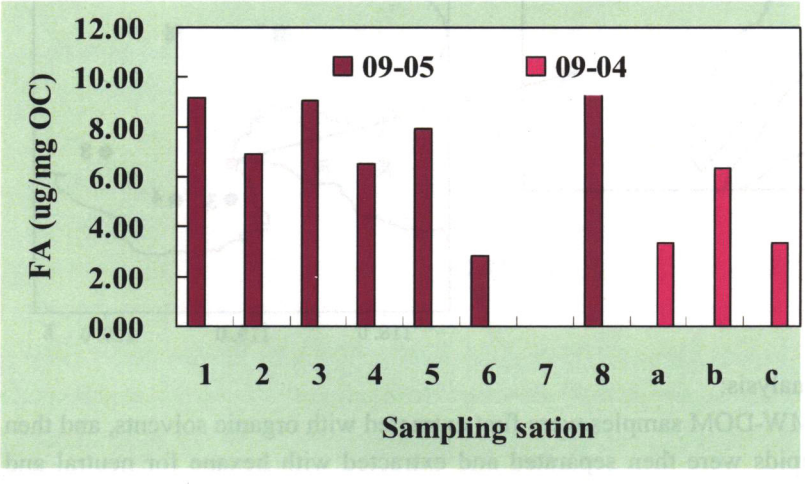
The FAMEs and TMS-ethers were quantified by capillary gas chromatography using a Hewlett-Packard 6890 GC with an on-column injector and a flame ionization detector. Isotopic ratios of compound specific carbon were measured using a Varian 3400 GC-combustion system interfaced with an isotope ratio mass spectrometer (IRMS, Finnigan MAT 252).

4. Results and discussions:

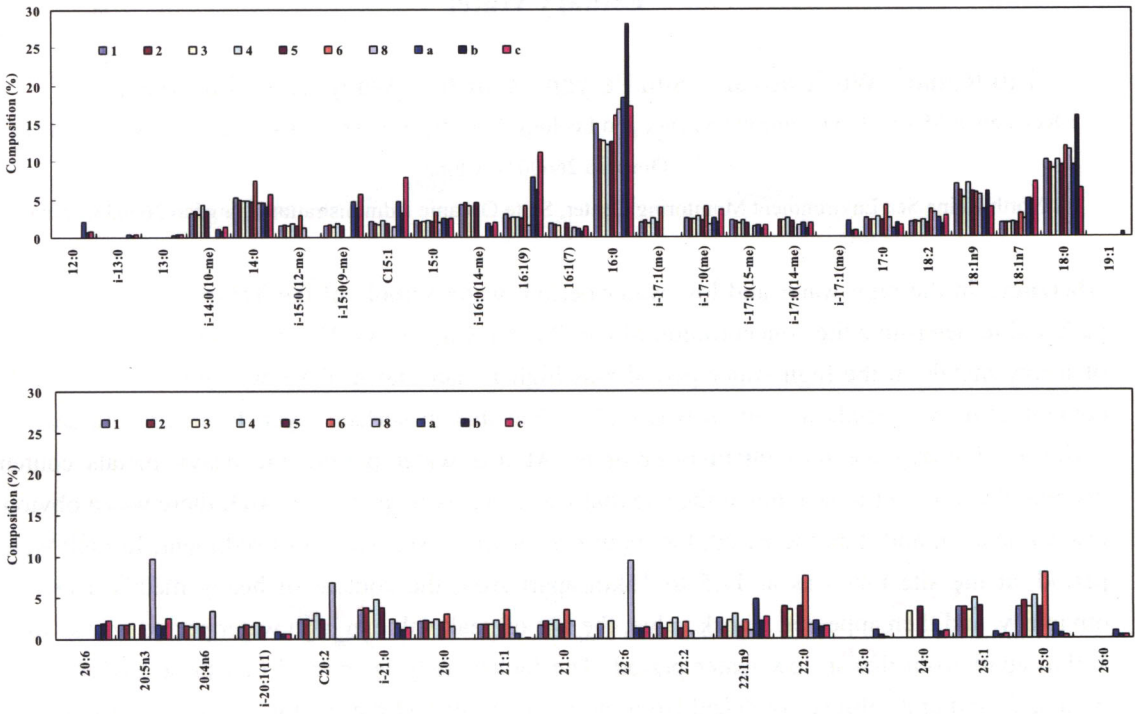
4.1 Contents of organic carbon and total fatty acids:



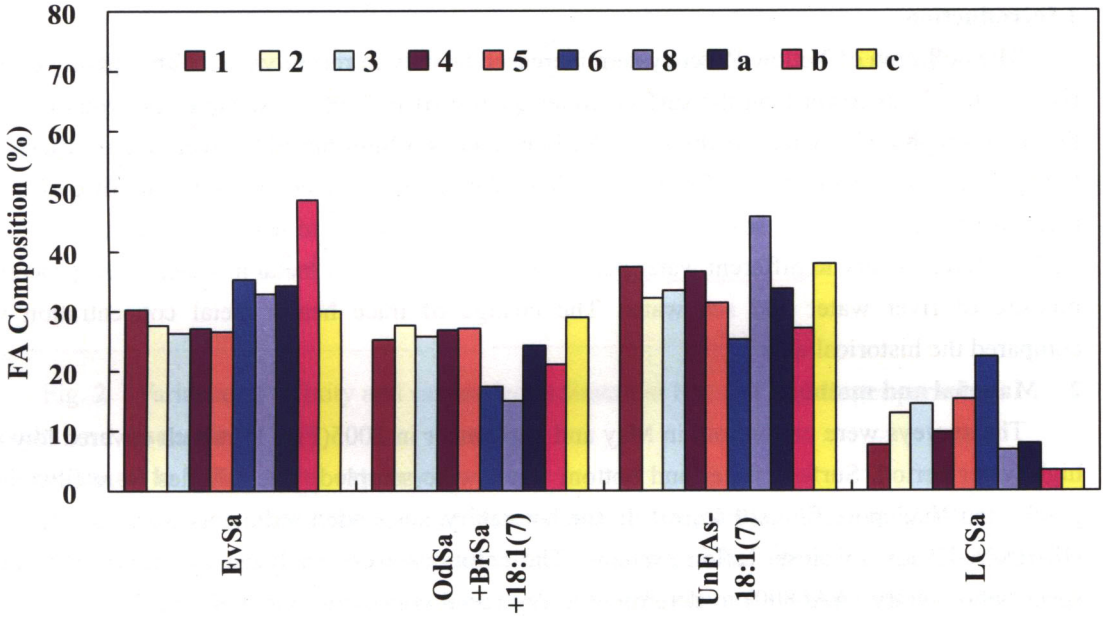



4.2 Composition of fatty acids:




4.3 Potential sources:




It could be deduced that, fatty acids were primarily contributed by phytoplankton, bacteria, and high vascular plant. Low long chain FAs indicated low source from high plant even in the river waters. Phytoplanktonic sources are a little higher than bacteria sources, in all sampling site, suggested phytoplankton domination. Results of HMW-DOM via FAs and saccharide implied bacteria domination. LCFAs lower in sea areas. This result is comparable with that Bigot did 20 years ago in the old Yellow River Estuary.