Geophysical Research Abstracts
Vol. 12, EGU2010-1150-1, 2010
EGU General Assembly 2010

Evolution of sedimentary organic matter in a closed system at high pressure and temperature

Jianguo Du (1), Chuanyuan Wang (2), and Wanchun Wang (3)

(1) Institute of Earthquake Science, China Earthquake administrion, Beijing 100036, China (jianguodu@hotmail.com), (2) Yantai Institute of Coastal Zone Research for Sustainable Development, CA S, Yantai 264003, China, (3) Lanzhou Research Center of Oil & Gas Resources, Institute of Geology and Geophysics, Chinese Academy of Sciences, Lanzhou 730000, China

Abstract

Evolution of organic matter was discussed based on the experimental data of lignite-water in a closed system under the conditions of 373-973 K and 1-3GPa. Geochemical parameters of saturated, aromatic hydrocarbons and carbon isotope ratios of individual n-alkanes for the original lignite and pyrolysates were determined. The experimental data indicated that high pressure significantly retarded maturation of organic matter, especially at lower temperature (<773 K), but favored cyclization, polymerization and aromatization of decomposed organic compounds and preservation of biomarkers and carbon isotopic records. Temperature effect on evolution of organic matter became more evident when temperature was higher than 873 K at high pressures. The biomarkers, petroleum compounds and carbon isotopic records were retained at the experimental conditions. The results indicate that gases and relative abundance of high molecular weight hydrocarbons and aromatic hydrocarbon may exist under the conditions of the lower lithosphere in the subduction zone, and also are significant for understanding the accumulation, preservation of petroleum in deep reservoirs and identifying early and extraterrestrial life.