Oil imprints from lake sediments and their origins in Songliao Basin, China

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Songliao Basin, in the northeast of China, is a large non-marine sedimentary basin characterized by Mesozoic and Cenozoic hydrocarbon systems. We collected samples from lake sediments in Songliao Basin, and then the organic matter was extracted from samples and analyzed by GC-MS. The results showed that the samples near the Daqing city presented very low OEP values, and the average OEP value was 1.3 which was closed to the OEP value of oil. Abundant UCM and geologic hopanes were detected from these samples as well. All the above geochemical characteristics indicated that some oil had ever polluted the lake environments.

According to the previous recognition, the lake environmental pollutions were artificial and from the oil industry. But recent study found that the origins of the oil imprints were natural possibly and from underground. Because of the westward subduction of the Pacific Plate and the northward compression of the Indian Plate against the Eurasian Plate, most of the sedimentary basins in China were tectonically active with common block uplifting, folding, and faulting. These tectonic factors had induced various types of hydrocarbon migration and accumulation to form petroleum reservoirs, with subsequent release of oil and gas to earth's surface. Such oil seeps were sporadically studied and reported before. So because of the different origins of pollutions, it was considerable to take different measures to dealing with the lake environmental problems. Besides, there were often some gases, such as CO_2 and methane (a potent greenhouse gas), released into atmosphere within the petroleum seepage system. In the following work, more and further research needs to be did in order to deal with the climate change and environmental problems. This research was supported by Natural Science Foundation of China (No.41202093).