

22. ORGANIC GEOCHEMICAL ANALYSES OF FROZEN SAMPLES FROM DSDP LEG 8 CORES

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Four frozen samples from three holes, 73, 74 and 75, of the Deep Sea Drilling Project Leg 8 cruise were analyzed for their organic carbon, extractable bitumen, and heavy (C₁₅₊) hydrocarbon, and gasoline-range hydrocarbon contents. These four samples were selected because they were generally darker or had more organic carbon (as revealed by Woods Hole Oceanographic Institution's indirect carbon analyses) than others of the frozen samples. The procedures we applied to these samples have been reported earlier (Dunton and Hunt, 1962; Gehman, 1962).

As the table shows, the samples contained only very small quantities of the organic materials being investigated. In fact, the extracts were too small to permit subsequent column chromatographic separation into saturated hydrocarbons, aromatic hydrocarbons, and nitrogen, sulfur and oxygen (NSO) compounds. Of course, this ruled out gas chromatographic analysis of saturates, and mass spectrometric characterization of both saturates and aromatics.

Because of the low amounts of pentane-soluble bitumens, which include the C₁₅₊ hydrocarbons, it is apparent that none of these samples contain enough

hydrocarbons to be rated as petroleum source rocks according to the criteria of Philippi (1957). Moreover they contain such low quantities (less than 0.04 ppm) of gasoline-range hydrocarbons that their organic systems, as expected, would be classified as very immature; i.e., they have not experienced any appreciable thermal diagenesis.

The C₁₅₊ hydrocarbon contents of these samples, inferred from their pentane-soluble bitumen contents, are still in the range of the contents in other DSDP samples reported on by Bray and Evans (1969), Koons (1971), and McIver (1971). So far, deep ocean samples have generally had only small amounts of organic matter and hydrocarbon. Still, locally, some deep-sea sediments must have some source characteristics. This is evidenced by the oil saturation at the Sigsbee Knolls (Gealy and Davies, 1969) and the possible embryonic Pleistocene hydrocarbon accumulation on the flank of the Shatsky Rise (McIver, 1971).

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TABLE I

Leg	Hole	Core	Section	Depth in Section cm	Total Organic Carbon		Gasoline-Range (C5-C7) Hydrocarbons ppm	Benzene Solubles	
					Direct ^a per cent	Indirect ^b per cent		Pentane Solubles Hydrocarbons Plus NSO's ppm	Pentane Insolubles Asphaltenes ppm
8	73	13	6	(60-150)	0.05	0.09	<0.04 ^c	11	10
8	74	9	2	(60-150)	0.09	0.19	<0.04	6	7
8	74	12	2	(50-150)	0.10	0.51	<0.04	39	35
8	75	9	6	(60-150)	0.04	0.05	<0.04	11	28

^a Combustion to CO₂ after acid treatment to remove carbonate carbon (Gehman, 1962).

^b Difference between total carbon dioxide from ghh temperature combustion of duplicate samples after one of them has been heated at 500°C for 3 hours to burn off organic carbon (Hunt, 1970).

^c <0.04 is the background level of the procedure (Dunton and Hunt, 1962).

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