youngest stratigraphic units. This lithology, typical of the Key Largo Limestone of the northern keys, is interrupted by a single thick horizon of mollusk-rich quartz sand derived from paleohighlands to the north. On Big Pine Key, the youngest stratigraphic unit grades laterally from an ooid grainstone (Miami Limestone) in the northwest to a skeletal-peloid packstone/grainstone (Key Largo Limestone) to the southeast. The latter facies also characterizes older underlying units which are again defined by paleo-exposure surfaces.

Vadose diagenesis during sea-level lowstands has largely resulted in alteration of the sediments to low-Mg calcite, but minor amounts of aragonite remain in the youngest stratigraphic unit. Pervasive development of secondary moldic and irregular dissolution porosity has accompanied this mineralogic transformation. Submarine cementation is insignificant, and freshwater phreatic lenses, if and where present, have failed to leave a distinctive petrographic imprint.

Overall, the Florida Keys (as manifest by the youngest stratigraphic unit) represent relatively high-energy deposits which accumulated on a slight but significant break in slope. Water depths were not great, and it is unlikely that a major contemporaneous reef barrier lay seaward at that time.

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Comparative Organic Geochemistry of Shales and Coals from Cherokee Group and Lower Part of Marmaton Group of Middle Pennsylvanian Age, Oklahoma, Kansas, Missouri, and Iowa

Mid-Continent middle Pennsylvanian rocks are a complex assemblage of coal-cyclothem lithologies. Organic-matter-rich rocks in the section include coals (33 to 76% organic carbon—org. C), marine, dark-gray to gray-black shales (1 to 8% org. C), and laminated, phosphatic black shales (4 to 28% org. C). Organic matter in these rocks came mostly from peat swamps, as shown by similarities between coal and shales in organic petrography, hydrogen (H) and oxygen (O) indices (Rock-Eval pyrolysis), pyrolysis-gas chromatographic analyses, and gas chromatographic analyses of saturated hydrocarbon fractions of $CHCl_3$ extracts. A halocline, resulting from the river waters that transported the dissolved and fine particulate organic matter from the extensive swamps, may have been the principal mechanism for restricting circulation in the shale-depositing environments.

Some organic geochemical properties vary significantly within and between the coal and shale lithologies, reflecting inferred differences in intensity of depositional and diagenetic anoxic conditions and degree of thermal maturation. For shales with comparable thermal maturities, deposition and diagenesis under more intense anoxic conditions result in higher org. C, P, U, Se, Mo, V, Ni, Ag, and Cr contents, H indices, saturate/aromatic and NSO/asphaltene ratios in $CHCl_3$ extracts, and lower O indices, pristane/phytane ratios, and organic carbon $\delta^{13}C$ values (more negative by 1 to 2 per mil). H and O indices in coals resemble those of shales deposited under the most intense anoxic conditions. In contrast, saturate/aromatic, NSO/asphaltene, and pristane/phytane ratios in coal extracts, trace- and minor-element contents, and organic carbon $\delta^{13}C$ of coals resemble shales deposited under relatively oxic conditions. A few coals are overlain by black phosphatic shales and have been subjected to more intense anoxic diagenesis. These coals have higher U, Se, Mo, V, Ni, and Cr contents, lower pristane/phytane ratios, and more negative (~ 1 per mil) organic carbon $\delta^{13}C$ values. When normalized to n-C_{18}, most pristane/phytane variability in all rock types appears to be related to variation in amounts of pristane, phytane content remaining relatively constant. With increased degree of thermal maturity, (1) H and O indices decrease in both coals and shales; (2) total bitumen/org. C and pristane/phytane ratios increase in shales but decrease in coals; and (3) saturate/aromatic ratios increase significantly only in shales that were subject to high levels of anoxic diagenesis. The black phosphatic shales contain extractable organic matter that is most similar to Cherokee crude oils from northeast Oklahoma and southeast Kansas.

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Mesozoic Paleo-Oceanography of Atlantic and Western Interior Seaway

Mesozoic oceans were filled with warm, salty water formed in marginal seas in the arid zones, rather than by cold water from polar sources as is the modern ocean. The early Atlantic and Gulf of Mexico were sites of significant salt extraction, serving as evaporative basins refluxing dense brine to the world ocean. As connection with the world ocean became better established, salt deposition in these basins ceased but sea level rose in response to growth of the mid-ocean ridge system, resulting in extensive flooding of the continents. Marginal seas and that part of the seaway through the Western Interior of North America lying in the arid zone then became sites of formation of plumes of dense, warm, salty, oxygen-poor water. These dominated the structure of the adjacent oceans. Periodic filling of individual basins by especially dense warm salty bottom water caused partial overturning and high productivity, followed by temporary stagnation and oxygen depletion, with the result that organic carbon-rich sediments were preserved. Because such "anoxic events" were dependent on local climatologic factors they were not necessarily synchronous in different basins.

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Continental Lower Cretaceous Stratigraphy, Sweetgrass Arch Area, Southern Alberta and Northern Montana

An integrated regional scheme of lithostratigraphic nomenclature is proposed to encompass the Lower Cretaceous strata on both sides of the international border. The Blairmore Group, defined in the southern Alberta Foothills, is extended to encompass the entire Sweetgrass arch area. The informal Cut Bank sandstone member of northern Montana is raised to formation status and extended into southern Alberta. The Cut Bank Formation is correlated with the Cadomin Conglomerate of the Alberta Foothills.

The Mannville Group formerly was extended to the Lower Cretaceous continental strata of the southern Alberta plains. This name is now restricted to strata occurring north and east of the Sweetgrass arch area which resemble the type Mannville. The Kootenai Formation (Group?) nomenclature, formerly used in Montana, is discarded because of continued confusion with the older, formally defined Kootenay Group of the Alberta Foothills. Most of the informal members defined in various oil fields should be confined strictly to the areas in which they are defined.

The present configuration of the Sweetgrass arch is the product of Late Cretaceous–Early Tertiary Laramide deformation, but the presence of a paleotectonic high coinciding with the present arch trend can be documented from the early Paleozoic. Sedimentation and erosional patterns were greatly affected by the ancestral arch and produced marked stratigraphic variations