where $HC^{12}O_3^-$ is preferentially removed by reduction of CO_2 to methane during methanogenesis. A controlling factor in these reactions is the sedimentation rate which dictates both the preservation of organic matter on the sea floor and the depth distribution of subsurface zones of organic matter decay.

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New Eustatic Sea Level Curve from Oceanographic Data

A eustatic sea level curve can be obtained by combining marine geophysical, geologic, and tectonic data. Eustatic sea level variations result from changes in the volume of the world oceans. Volume decreases can be ascribed to increased spreading rates of the mid-ocean ridge system, and of small ocean basins, the presence of hot spots beneath oceanic crust, and an increase in the volume of sediments deposited in the oceans. Orogenic activity results in increased ocean volume as does contraction of the mantle due to increased subduction rates. The formation of major ice sheets offsets eustatic sea level by lowering the volume of water present in the ocean system. A eustatic sea level curve will be obtained, taking into account all of the above effects. This will include an analysis of the error introduced by geologic uncertainties.

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Fluidized-Bed Combustion of Oil Shales

Oil shales from Colorado, Israel, Morocco, and the eastern U.S. Devonian and Mississippian were burned in a fluidized-bed combustion unit. The oil shales are devolatilized or retorted in the fluidized bed; the volatiles are burned over-bed for maximum heat recovery and/or the volatile can be condensed downstream for hydrocarbon fuels production.

An oil shale energy recovery process is proposed wherein pseudo, two-state combustion in a high freeboard fluidized-bed combustion unit is used. In this design, the volatiles are driven off with minimum calcination taking place in the spent shale. The volatiles are burned in the freeboard for maximum heat recovery. The burning fluidized bed will be shielded from the radiation heat generated by the freeboard combustion by a cloud of elutriating dust particles.

Experiments and analytical data leading to the conceptual design will be presented. Some of the oil shales have an inordinate amount of inert material with a high concentration of calcium carbonates. The amount of calcium sulfates exceeds the calcium carbonate required for sulfur retention.

When heating up to the temperature where the calcination of carbonates is taking place, considerable amounts of heat of combustion will be consumed by the heat from calcination. The conceptual design will heat the oil shale to a temperature at which the devolatilization or retorting is taking place without appreciable calcination. The control of calcination will reduce the heat consumption and increase the heat recovery.

The spent shale from fluidized-bed combustion can be used for cement manufacturing, the major component of construction materials. The use of oil shales as a source of cementitious material will help to solve the troublesome solid waste disposal problem.

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Generic Predominance Facies Among Deep-Water Benthic Foraminifera of Gulf of Mexico

A synthesis of published and unpublished records of benthic foraminifera from the continental slope, rise, and the abyssal plains of the Gulf of Mexico reveals environmentally influenced facies of generic predominance. Circum-Gulf facies of predominant *Brizalina, Uvigerina,* and *Bulimina* are present on the continental slope and appear to be associated with water mass patterns or hydrostatic pressure changes. The *Glomospira* facies, which is patchily distributed on the continental slope and rise appears to be a result of geochemical conditions on bottom prominences. In abyssal depths, the *Eponides-Nuttallides* and *Cibicides* facies are associated with contrasting substrates on the Sigsbee Plain and Mississippi fan, respectively. Trends in the diversity of generic predominance facies mimic species diversity trends in other silled basins, and decrease from seven facies on the slope, to two facies on the Sigsbee Plain.

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Chronostratigraphic Sequences Beneath Northeastern United States Continental Margin

Chronostratigraphic sequences of wide areal extent beneath the United States Atlantic margin north of Cape Hatteras have been delineated by: (1) examination of four COST (Continental Offshore Stratigraphic Test) wells, 1 exploratory well (Shell, Blk. 272, No. 1, OCS A 0096), 14 shallow AMCOR (Atlanctic Margin Coring) core holes, and eight ASP (Atlantic Slope Project) core holes; (2) analysis of multichannel seismic reflection profiles collected along several thousand kilometers of track lines; and (3) comparison of these interpretations to the Canadian offshore chronostratigraphy. In the Baltimore Canyon Trough and Georges Bank basin, seismically identified regional unconformities are associated with Lower Jurassic, Middle Jurassic, Upper Jurassic-Lower Cretaceous, upper Hauterivian, Cenomanian, Turonian-Coniacian, Upper Cretaceous-lower Paleocene, Oligocene, and upper Miocene-Pliocene rocks. The Tertiary unconformities are identified best in the Baltimore Canyon Trough where the thickness of Tertiary rocks exceeds 1,400 m. There, seismic profiles near the COST B-3 well reveal several probable unconformities of Miocene to Pliocene age that are not documented in the wells. Across the Georges Bank basin, subtle Jurassic unconformities appear to be present on seismic records within a thick, poorly dated section of interbedded limestone, dolomite, and anhydrite.

Microfossil records from the deep wells and shallow core holes reveal seven unconformities of regional extent, forming chronostratigraphic gaps in the early to middle Cenomanian, late Turonian-early Coniacian, late Maestrichtian-early Paleocene, late Eocene-early Oligocene, early Miocene, late Miocene-early Pliocene, and late Pliocene-early Pleistocene. These gaps in the fossil record are comparable with the gaps found in wells in the Scotian basin, and correspond to unconformities inferred from the seismic profiles.

The chronostratigraphic sequences bounded by these unconformities help to better define the curve of coastal onlap during the Cretaceous and to support the major trends in sea level change during the late Mesozoic and Cenozoic noted by Vail, Pitman, and others.