The American Association of Petroleum Geologists Bulletin
V. 64, No. 3 (March 1980), P. 438-456

ASSOCIATION ROUND TABLE

AAPG-SEPM-SEG PACIFIC SECTIONS
Annual Meeting, April 9-11, 1980
Bakersfield, California

Abstracts of Papers

ARENDS, ROBERT G., Union Science & Technology Division, Brea, CA

Diatoms and Silicoflagellates From Holocene Sediments, Southern California Continental Borderland

Samples from five basins on the southern California continental borderland were examined for diatoms and silicoflagellates. These basins, Santa Monica, San Pedro, Santa Catalina, San Nicolas, and Tanner, represent a transect of approximately 85 nmi in a southwesterly direction across the continental shelf. The two nearshore basins, Santa Monica and San Pedro, contain the greatest species diversity and the smallest number of reworked specimens. Tanner basin, however, has the greatest abundance of diatoms and silicoflagellates in the study area, and the highest percentage of reworked specimens. The reworked diatoms are mid-Miocene to late Miocene in age. San Nicolas and Santa Catalina basin samples contained both lower species diversity and abundance totals than the other three basins. These two basins also contained a significant number of reworked diatoms.

As might be expected benthic species were common in Santa Monica and San Pedro Basins, however, a large number of benthic species were in the Tanner Basin samples, which was not expected. There was also a disproportionately low number of smaller planktonic diatoms in the sediments when compared to the very large numbers found in the phytoplankton standing crop in this area.

ARMENTROUT, JOHN, Mobil Oil Corp., Dallas, TX

Glaciomarine Depositional Environments and Biofacies, Yakataga District Continental Shelf, Gulf of Alaska

No abstract.

ATWATER, BRIAN F., and DANIEL F. BELKNAP, U.S. Geol. Survey, Menlo Park, CA

Holocene Intertidal Deposits of Sacramento–San Joaquin Delta, California

Rivers draining nearly one third of California reach sea level in the Sacramento–San Joaquin delta. Though tapered toward a constricted outlet and separated from the sea by a chain of estuarine bays and straits, the delta resembles deltas built into open-marine environments in that (1) its principal landforms—tidal wetlands and natural levees—are typical features of such delta, and (2) the fundamental process of deltaic deposition—discharge into standing water—affected the delta during historic floods. Tidal wetlands (marshes and swamps), generally served by fresh water, covered most of the delta (about 1,400 sq km) before agricultural reclamation. Rising sea levels began to create such wetlands at the site of the delta around 7,000 years ago. Continued sea level rise caused the wetlands to spread across flood plains of the Sacramento and San Joaquin Rivers, alluvial fans of lessor tributaries, and fields of eolian dunes. Once established, these wetlands built upward, apparently by accumulation of roots and rhizomes in growth position, to keep pace with sea level. Inorganic sediment largely bypassed the delta and settled instead in the brackish- and salt-water bays to the west. Accordingly, the typical vertical sequence of facies in the delta consists of intertidal peat overlying alluvium or dune sand. Principal exceptions are the sands and muds of channels, the silts of natural levees along distributaries of the Sacramento River, and the clays of tidal wetlands near these distributaries.

Major high stands of the sea during Pleistocene time should have produced intertidal peat at the site of the delta. The scarcity or absence of Pleistocene peat implies removal by streams, wind, exudation, and/or anaerobic decomposition. The latter three agents have removed Holocene peat from farmed, reclaimed wetlands of the delta as rapidly as 7 cm/year.

BACHMAN, S. B., et al, Cornell Univ., Ithaca, NY

Variables Affecting Trench and Trench-Slope Sedimentation Along Active Continental Margins

Studies of active continental margins show the diversity of sedimentation patterns in trenches and on trench slopes. Many variables produce a range of distinctive deposits on the seaward trench slope, the trench axis, and the landward trench slope which can be used to interpret modern and ancient depositional settings.

Deposits along the trench axis are often described as a trench wedge, but the geometry and volume of these deposits vary extensively. The volume is dependent upon a balance between the rate of plate convergence and the rate of sedimentation. Sedimentation rate is a function of many factors such as climate, onshore drainage patterns, sea level fluctuations, the width of the continental shelf, and the amount of sediment trapped in fore-arc basins or behind smaller tectonic ridges along the landward trench slope. Variations in the geometry of trench axis deposits are due to irregularities on the oceanic plate and to sediment transport systems. Turbidites from a single point source may build a massive fan or a long wedge via an axial channel, while a series of smaller submarine canyons may build a set of small fans or a chain of ponded basins.

Sedimentation along the landward trench slope depends on many of the same variables, particularly the size and spacing of canyons and the distribution of basins and ridges on the slope. An apron of hemipelagic muds may cover much of the slope, while locally slope basins receive terrigenous turbidites. Large deep canyons can divert coarse clastics directly to the trench axis, bypassing basins on the lower slope.

A model of trench and trench slope facies must account for the many variables recognized in modern subduction complexes. The model proposed here, based on the facies defined for deep sea and channel deposits, relates associations of facies to various trench and trench slope settings.

BRUER, WESLEY G., Consulting Geologist, Bakersfield, CA

Mist Gas Field, Columbia County, Oregon

The Mist gas field is still in the development stage. Although the field is complexly faulted and contains a submarine gorge, the general structure and stratigraphy are not unusual compared with other oil and gas fields in Tertiary basins of the West Coast. It is unique in one respect: it is the first commercial oil or gas accumulation to be discovered in the state of Oregon. More than 200 dry holes had been drilled in the state prior to the Mist discovery, May 1, 1979.

Production is from the Clark and Wilson (C and W) sands of Eocene (upper Narizian) age. The structure is a faulted anticline which is an en echelon continuation of the Portland Hills anticline.

Initial production rates range from 865 to 6,500 Mcf per day with an average of 3,400 Mcf per day for the first 5 wells completed in the field.

COLAZAS, XENOPHON C., Dept. Oil Properties, Long Beach, CA, DONALD D. CLARKE, California State Lands Comm., and DENNIS R. SMITH, Dames & Moore, Los Angeles, CA

Computer Sand Volume Determinations in Long Beach Unit, Wilmington Oil Field

A determination of the volume of productive oil and/or gas sand under each of the 91 tracts of the Long Beach Unit is necessary for the establishment of equity assignments.

Sand thickness is determined using electric logs. Nearly all of the wells are directionally drilled so the sand thickness must be corrected for hole angle and formation dip. This results in a net vertical sand thickness which is assigned to the midpoint of each sand interval. Productive limits based on the oil-water interfaces are then determined for each sub-interval sand by using electric log and core data. Isopach maps are prepared after the addition of fault boundaries.

In 1977, under the direction of the participants of the Long Beach Unit, the Department of Oil Properties of the City of Long Beach and the Long Beach Operations staff of the California State Lands Commission began discussion with Dames & Moore to determine a computer mapping technique which could be used to process the data, prepare the isopach maps, and calculate the oil sand volume underlying each 1,000 ft grid square for each of the 91 Long Beach Unit Tracts. There was an abundant supply of computer programs which could plot isolines utilizing one algorithm or another; however, there was no system or set of programs readily available which would do all that was desired for this particular application.

Dames & Moore worked with the city and state representatives for about 9 months, developing the necessary techniques and programs which could: input the oil sand thickness data; plot a map of the well data points; draw an isopach map through the data points; input the isopach data in the pinch-out zone; and calculate and report volumes in 1,000 ft grid cells under each of the 91 tracts.

Standard programs in Dames & Moore's library were utilized to perform most of the functions and these programs were modified and linked into one system. However, a difficult problem became apparent when attempting to utilize grid cells to accurately calculate volumes in the pinch-out zone under each tract. Many procedures were tried and one was finally selected. The selected procedure combines the techniques of polygon overlay with those of area-moment calculations. In practice, the technique parallels the method previously utilized by the Long Beach Unit, thus permitting an accurate check. The procedure was tested for one sand interval and was found to vary less than 0.01% from the previous manual calculation.

At present, the system is performing accurately, efficiently, and in a timely manner for the participants of the Long Beach Unit.

COOPER, ALAN K., DAVID W. SCHOLL, MICHAEL S. MARLOW, et al, U.S. Geol. Survey, Menlo Park, CA

Hydrocarbon Potential of Aleutian Basin, Bering Sea

The Aleutian basin is the deep-water (more than 3,000 m) basin that lies north of the Aleutian Islands adjacent to the Bering Sea continental shelf. The basin, about the size of Texas, is underlain by a flat-lying sequence of mostly Cenozoic sediment 2 to 9 km thick that rests on an igneous oceanic crustal section. Prior to 1974, marine investigations in the Aleutian basin were directed at understanding the basin's regional geologic and geophysical framework; more recent investigations by the U.S. Geological Survey have been aimed at assessing the basin's hydrocarbon potential. Preliminary results suggest that the four major requirements for hydrocarbon accumulations may be present—structural and stratigraphic traps, source rocks, reservoir beds, and an adequate thermal and sedimentation history.

The recent energy resource studies indicate that: (1) numerous structural features (gentle folds, diapirs, basement ridges) are present in the central and eastern parts of the basin; (2) acoustic features called VAMPs (velocity amptitude features) are common (over 350 identified) in the central basin; these features may be caused by pockets of gases and possibly other hydrocarbons that have been trapped in the sedimentary section; (3) the sedimentary section consists of diatomaceous sediment overlying indurated mudstones; high porosities (58 to 85%) and good permeabilities (10 to 35 md) in the diatomaceous sediment suggest that it is a potential reservoir unit and the thick section of underlying mudstone may contain the source beds; (4) concentrations of organic gases, primarily methane, in the upper 1 to 3 m beneath the seafloor are very small, increase with depth, and are highest in areas near VAMPs; (5) the thermal gradient and the sediment thickness are suffi-