yons 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.

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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.

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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.

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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 amplitude 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 sufficiently large to allow hydrocarbon maturation at depth, if suitable organic material is present.

Our initial results suggest that the Aleutian basin deserves further exploration as a site for possible hydrocarbon accumulations.

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Speculations on Hydrocarbon Potential of Deep-Water Basins in Outer Southern California Borderland

Significant accumulations of hydrocarbons may be present within Miocene and younger strata that fill several deep-water basins in the outer southern California borderland. Multichannel seismic reflection and sonobuoy refraction profiles across one of these basins (informally termed Patton basin) reveal a moderately thick sedimentary section overlying acoustic basement. Patton basin lies between the northern segments of the Patton and Santa Rosa-Cortes Ridges and has an average seafloor depth of about 1,200 m. The sedimentary section within Patton basin ranges from 1.6 to 3.5 km in thickness, with the thickest part (2 to 3.5 km) located at the northern end of the basin. Tanner basin, which joins Patton basin at the south, probably contains a greater thickness of sediment.

Strata that crop out on the adjacent ridges can be traced beneath Patton basin on acoustic-reflection profiles. Based on samples from these ridges, acoustic basement within the basin consists of rocks that are assigned to the Franciscan assemblage. Acoustic basement is overlain unconformably by about 1,500 m of lower and middle Miocene strata. These strata are faulted and folded and are in turn unconformably overlain by as much as 2,000 m of less deformed late middle Miocene and younger strata. Overall, the basin appears to have stratigraphic and structural characteristics that are similar to the hydrocarbon-producing parts of the onshore Santa Maria basin.

Several characteristics of the Patton basin sediment make this basin and adjacent outer borderland basins favorable targets for hydrocarbon exploration: (1) Organic geochemical analysis of bottom samples from outcrops and well data indicate that the lower and middle Miocene strata filling the lower half of the basin are good to excellent potential source rocks. (2) Based on seismic reflection profiles and a nearby DSDP Site, sandstone of good reservoir quality may unconformably overlie the older strata. (3) Data from DSDP Site 467 suggest that strata within the borderland basins have been subjected to higher temperatures than time-equivalent, marginally mature strata that crop out on adjacent ridges. (4) Numerous structural and stratigraphic traps are present.

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Palynomorphs From Holocene Sediments of Basins in Southern California Continental Borderland

A suite of 17 box core samples taken along an onshore-offshore transect across the southern California continental borderland representing Tanner, Santa Monica, San Pedro, Santa Catalina, and San Nicolas basins were analyzed for palynomorph content. Dinoflagellate cysts, acritarchs (organic-walled phytoplankton), and spores and pollen of terrestrial plants are present in all samples. Dinoflagellate cysts and acritarchs are more common in samples from Santa Monica and San Pedro basins, and show a general decrease in abundance with increasing distance from shore. Cyst genera include *Leptodinium*, *Lingulodinium*, *Nematosphaeropsis*, and *Spiniferites* (referrable to the thecate genus *Gonyaulax*) and species of *Peridinium*. *Lingulodinium machaerophorum* Deflandre and Cookson (= *Gonyaulax polyedra* Stein) is the dominant species in all samples. Spores, pollen, and other plant tissue fragments provide an indication of the terrestrial component of these sediments.

Evidence of reworking of older material into recent sediments is suggested by differential stain uptake observed among individual specimens of phytoplankton and pollen.

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Basin-Edge Tectonics and Stratigraphic Development, Southern San Joaquin Valley, California

No abstract.

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Modern and Ancient Coastal Sedimentary Facies, Monterey Bay, California

Depositional processes and sedimentary structures in both barred and non-barred nearshore environments of the Pacific Coast vary systematically with water depth. These variations allow the construction of idealized progradational sequences of sediments deposited along a wave-dominated coastline. The idealized sequences are very similar to the vertical sequences of sedimentary structures preserved in Pleistocene marine terrace deposits exposed along the margin of Monterey Bay.

The central Monterey Bay coastal region has been a subsiding depocenter for marine, fluvial, and eolian sedimentation throughout the Quaternary. It provides an opportunity to study the role of climatic change (including fluctuating sea level) in controlling patterns of Quaternary sedimentation and terrace formation along the non-uplifted portions of the California coastline. Most of the fluvial sediment in these regions was deposited during intervals of rising sea level, hence is out of phase with marine and eolian sediments deposited mainly during intervals of lowering sea level. In combination, however, these deposits form suites of sediments by which glacio-eustatic cycles can be recognized. Evidence of at least 11 such cycles is present within the Quaternary deposits in the north-central Monterey Bay region.

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Holocene Foraminiferal Distribution Patterns on Shelf and Slope, Yakataga–Yakutat Area, Northern Gulf of Alaska

Foraminiferal distribution patterns in the northern Gulf of Alaska are interpreted as representing seven faunal assemblages. Three sublittoral and three bathyal