

R. F. FLEGE, L. J. PARKINSON, Standard Oil Company of California; J. E. BEITZEL, California Institute of Technology; R. J. SONTAG, University of Utah: Magnetic Characteristics of California Basement Rock Types

Twenty-seven areas of basement outcrop in California were systematically examined in an attempt to correlate rock type and magnetic susceptibility with observed magnetic response. The investigation was performed by traversing selected areas of basement outcrop with a portable total intensity magnetometer, mapping lithologic contacts along the traverses, and sampling the different rock types for later petrographic identification and susceptibility determination in an induction bridge.

In general, results from 275 samples support the established relationships between magnetic susceptibility and rock composition; i.e., acidic igneous rocks and metasediments are less susceptible than basic igneous rocks. However, magnetic susceptibility is primarily a function of magnetite and ilmenite content, and susceptibilities of individual samples within a given rock type were found to vary widely and in direct relation to the percentages of these minerals.

Good over-all correlation is shown between magnetic response and rock magnetic susceptibility, but theoretical susceptibility contrasts calculated from the magnetometer profile gradients are usually very much higher than the laboratory measured susceptibilities. This discrepancy is most probably due either to weathering effects on the surface rocks or to an insufficient number of samples. Serpentinite yielded the highest mean susceptibilities both by laboratory measurement and analysis of gradients measured in the field.

GERALD A. FOWLER, University of Southern California: Submarine Geology of Lasuen Bank

Lasuen Bank is a prominent feature of the Continental Borderland located between Dana Point and the south end of Catalina Island. It is elliptical in plan, elongate NW-SE, and asymmetrical in profile. Rocks ranging in age from Middle Miocene to Late Pliocene are exposed over most of the Bank's surface. The most distinctive lithology present is contained in a group of sedimentary rocks very similar to the Altamira, Valmonte, Malaga, and Capistrana Formations cropping out on the nearby mainland. Abundant volcanic rocks are interpreted as interbeds within these sediments. There is no evidence to support the presence of "Franciscan" Basement. Rock fragments of this type are referred to the San Onofre Formation. Representatives of the Topanga, Repetto, and Pico Formations are also present. Exposures become progressively younger toward the east. Lasuen Bank is a result of block faulting originating in the Late Pliocene or Early Pleistocene and continuing to the present. A system of fractures trending N 30° W is visible on profiles. Several terraces and associated features occurring down to 360 meters indicate the Bank was very near or above sea-level at least once during the Pleistocene.

R. J. GRAEBNER and D. F. BRENNAN, Geophysical Service, Incorporated: Analysis Techniques and Signal Enhancement Methods Applied to Bellshill Lake Stratigraphic Trap Program

A test program was conducted in the Bellshill Lake field, Alberta, Canada, to investigate the application of seismic techniques to finding the stratigraphic trap formed by the irregular sand bar type build-up within the Basal Quartz section controlling production in the field.

The seismic interpretative criteria were postulated from synthetic seismograms.

Controlled field tests were conducted to find the factors which influenced record quality, to examine the effect of each factor on the signal-to-noise ratio, and to evaluate the field techniques developed from the test results. Critical field techniques were the selection of charge sizes and hole depths yielding both suitable shot wave forms and a means for attacking the ghost reflection problem, the attenuation of shot generated boundary waves through wave length filtering with arrays of multiple seismometers, and the preservation of true amplitude information in the recording procedure. Special data processing techniques included the application of a velocity filter, the "pie-slice" process, to improve the signal-to-noise ratio without signal distortion and the stacking of vertically distributed charges with a process designed to eliminate the ghost over a broad frequency range without signal distortion.

The emphasis in the experimental survey was in the methods of investigation and the particular balance in techniques which must be struck to solve an exploration problem rather than in a demonstration of techniques as such.

OTTO HACKEL and ROBERT D. HOFFMAN, consulting geologists: Subsurface Geology of the Northern San Joaquin Valley

For several years, the Northern San Joaquin Valley has been one of the most active wildcat areas in California. This activity has resulted in the discovery of the McMullin Ranch and Lathrop gas fields and the extension of the Vernalis gas field.

The present extensive exploration continues to be encouraged by several factors among which are a thick marine sedimentary section of variable stratigraphic conditions and relatively low land and drilling costs.

The clastic stratigraphic section consists of continental Plio-Miocene overlying marine Eocene. The Eocene in turn overlies a thick section of marine upper Cretaceous. On the west margin of the basin, the upper Cretaceous rests on lower Cretaceous. Eastward the upper Cretaceous rests on granitic basement. Due to uplift of the "Stockton Arch," the Eocene and some of the upper Cretaceous were eroded from the northernmost portion of the area before deposition of the Continental Plio-Miocene.

Structurally the area has a northwest-southeast grain. From west to east the major features include: (1) the relatively steep outcropping west flank of the basin, (2) the Tracy-Vernalis anticline and fault trend, (3) the central basin syncline, and (4) the long platform-like east flank. The basin plunges south from the cross-trending Stockton Arch fault.

HIDEYO HAGA, University of Southern California: Distribution of Foraminifera in the Gulf of Thailand Sediments

The area investigated is mainly a shallow shelf environment including the Gulf of Thailand and part of the South China Sea. Large amounts of precipitation and runoff cause marked seasonal variations in the temperatures and salinities of the sea water in the area. The Gulf sediments are dominated by olive brown muds, and the shelf sediments are dominated by yellow-brown sands.

The foraminiferal number, species number, and the percentage of planktonic Foraminifera increase with depth and distance off shore and toward mid-gulf.

Species of *Globigerina* constitute the eurythermal planktonic fauna and are relatively common in the