shore conditions of reduced salinity and belongs to the Ca-
vusgnatus-biofacies.

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WIDE-LINE PROFILING

A technique developed and perfected in France by Compagnie
Generale de Geophysique makes it possible to record, process,
and interpret reflected events originating from every direc-
tion.

The field layout is the same as that for conventional, multi-
ple-coverage, seismic-reflection profiling. The only difference is
that shot points are placed along oblique lines, so as to obtain
several parallel, regularly spaced, depth-point lines. After pro-
cessing, these lines yield comparable, although not identical,
seismic sections, and a computer is able to analyze, by the cross
correlation process, the slight shift of reflection events caused
by lateral gradients.

A complete software was developed and the longitudinal
dips, lateral dips, total dips, migration offsets, and time correc-
tions are produced by a Calcomp plotter. The basic document is
a section obtained by back-tracking the individual parallel sections
after removing events which do not correlate laterally. The
Calcomp displays provide the necessary parameters for migrat-
ing all events in three dimensions.

Considerable improvement over old methods was provided in
tectonically complex areas. In other cases, an apparent uncon-
formity resulted from 2 lateral events of opposite dips, a re-
fection on a fault plane beyond the seismic line was identified, and
good results were obtained using lateral dip criteria in an area
where high multiplicity had been unsuccessful.

The advantage of wide-line profiling is that it expands the multipli-
cation in lateral directions at a small cost increase. The
software developed by CGG sorts out the seismic arrivals and
provides tools for migration in a true three dimensional space.

The wide-line profiling technique has now reached the indus-
trial stage and was used successfully in areas with complex
structural geology, such as Spain, France, Italy, Libya, Angola,
and Canada.

MILLER, E. B.

OIL INDUSTRY VIEWPOINT

No abstract available.

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SILURIAN CONODONTS FROM DEATH VALLEY, CAL-
IFORNIA

The northern part of the Panamint Range, Inyo County,
California, contains many early and middle Paleozoic marine
formations, but precise stratigraphic relations are poorly known
for lack of abundant megafossils and because of postdeposi-
tional dolomitization and silicification of the rocks.

The type section of the Hidden Valley Dolomite consists of
1,365 ft of light- to dark-gray, chert-bearing dolomite. On the
basis of megafossil evidence, previous workers considered that
the uppermost 400 ft of the upper 1,000 ft was Early
Devonian.

Approximately 1,000 conodonts were identified from samples
collected in a measured section about 1.5 mi north of the type
section. Specimens from the uppermost 30 ft of the underlying
Ely Springs Dolomite indicate a Late Ordovician or Early
Silurian age. Conodonts from the Hidden Valley Dolomite
represent the presence of the European and eastern North Amer-
ican Neospathagnostus celloni zone and the younger Pteros-
pathodus amorphognathoides zone within the lower 325 ft of
the formation. Both zones are of Llandovery age (Cj- C^) and
represent the first report of Early Silurian conodont zones from
the Death Valley area. The middle part of the formation
yielded no conodonts, but a sparse fauna about 150 ft below
the upper boundary contains specimens Polygnathus linguliform-
is and Icriodus latericrescens, suggesting an Early Devonian
age. No diagnostic Devonian conodonts were recovered from the
lower 100 ft of the overlying Lost Burro Formation.

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TECTONIC AND STRATIGRAPHIC EVIDENCE FOR
MIocene GULF OF CALIFORNIA

The correlation of clasts in Eocene river gravels in Baja
California with the sources for the clasts in Sonora has indi-
cated the necessity for the dilation of the northern Gulf of
California depression prior to, or concurrent with, the 23-18
m.y. opening of the Basin Range province in Sonora. The
appearance of an extensive, basin-filling seaway in Baja Califor-
nia and Sonora during the Miocene is consistent with a regional
subsidence resulting from crustal extension. The presence of
shelf-type lower Miocene marine sediments on both coasts of
Baja California Sur, between Loreto and La Paz, suggests that
the marine warly entered the early Gulf across a shallow,
non-tectonic seaway which opened to the Pacific Ocean.

The recognition of the early Miocene seaway extending into
the northern Gulf, coupled with a later (4-10 m.y.) opening of
the modern Gulf, supports the idea of a Gulf formed in at least
2 tectonic stages.

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GEOLoGic EVOLUTION OF NORTH-NORTHEAST
CONTINENTAL MARGIN OF BRAZIL

The Brazilian north-northeast continental shelf, between 35°
and 47° west, is composed of the offshore Barreirinhas, Piaui,
Ceará and Potiguar basins. The total area within the 200-m
bathymetric contour, excluding the shallow basement area, en-
compasses approximately 51,000 sq km. The sedimentary sec-
tions of these basins can be subdivided in several genetic se-
quences of strata, which, by comparison, from older to younger,
show the tectosedimentary and paleogeographic evolution of
the area.

The Equatorial Atlantic rift (which probably started in Eo-
Cretaceous time) had its great development in Aptian time.
From the beginning of the rift opening to the end of Albian
time, all the coastal basins were of the semigraben type tilted
to the south. From Cenomanian to Santonian time, these basins
gradually evolved into northward-opening marginal-type ba-
sins. At the end of this period, the final separation of South
America and Africa took place, developing a north-south com-
pressional stress in the fracture zones. As a result, folding,
reverse faulting, transcurrent faulting, and grabens developed.
From Campanian to Holocene, these coastal basins maintained
their northward-open, marginal-basin characteristics.

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SEDIMENTARY AND TECTONIC HISTORY OF Creta-
Ceous FLYSCH IN SOUTHWESTERN ALASKA

Cretaceous deep-water sedimentary rocks are discontinu-
ously exposed or have been dredged, along 1,700 km of the
outer continental margin of the Alaska Peninsula-Bering Sea
shelf. In the Shumagin and Sanak Islands, on the continental
shelf near the southwestern end of the Alaska Peninsula, the
deep-sea sediments are comprised of monotonous sections of
thin (4 cm) to thick (10 m) bedded sandstone and mudstone,
showing grading, convolute lamination, groove and flute casts.
The sandstone beds are lithic arenite with more than 40%
vulcanic-derived framework grains. Over 500 measurements of
sole marking in the Shumagin and Sanak Islands show maxima