the basin it overprints, the Northern New Guinea basin. Consideration of
plate kinematics suggests convergence became increasingly oblique
during the Cenozoic. We have calculated an average convergence of 6° E at
11.9 cm/year (4.7 in./year) during the Paleocene to Eocene, N60°E at 6.8
cm/year (2.7 in./year) during the Eocene to Miocene, and N60°E at 9.3
cm/year (3.7 in./year) during the Miocene to Holocene. Present-day
Australian and Pacific plate vectors indicate predominantly left-lateral
strike-slip motion in northern New Guinea.

The sinistral Northern New Guinea fault system defines this zone of
plate interaction and represents a suture between continental crust to the
south and intermediate crust to the north. The fault system extends more
than 3,000 km (1,900 mi) from the Huon Gulf of Papua westward into
eastern Indonesia, and is comprised of the Ramu-Markham (Papua) and
Sorong (Indonesia) faults. This system is particularly well defined along
the Ramu-Markham valley by recent earthquakes of focal depths
between 41 and 300 km (25 and 186 mi). First motion studies of these
earthquakes indicate both compressional and strike-slip events. Maxi-
mum compressive stresses delineated from conjugate shear fractures
studied in the field closely agree with the first motion solutions. When
combined with the trend analyses of surface fold axes and reflective seis-
mic structural information, these data are consistent with the regional
left-lateral deformation of this Tertiary basin.

Hydrocarbon exploration strategies within the Northern New Guinea
basin must address not only sedimentation, but also must deal with the
basin's complex structural and tectonic evolution. A static tectonic classi-
fication will not adequately define the Northern New Guinea basin. It is
better described as an evolving basin being overprinted by wrenching.

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Microcomputer Geoscience Software

As an increasing number of geoscientists acquire microcomputers, it
becomes evident that most geoscientists do not have time to learn to pro-
gram or to write programs specific to their professional tasks.

Acting as a worldwide clearing house, GEOWARE solicits descriptions
of geoscience software and will publish catalogs of private, commercial,
and public domain software descriptions. The catalogs will include the
name, address, and phone number of the owner of the software so he may
be contacted directly to discuss the software, negotiate for purchase, or
arrange for custom programming.

Geoprogammers are encouraged to contact GEOWARE to receive forms
for describing their software.

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Architecture and Production Characteristics of Strand-Plain Reservoir
Facies, Matagorda County, Texas

The North Markham–North Bay City field, Matagorda County, Texas,
is one of the major multiple-reservoir oil fields of the central Texas
Coastal Plain that produce from stacked Frio barrier/strand-plain sand-
stones. The three principal oil reservoirs in the field are interpreted to be
transgressed strand-plain (Carlson), progradational strand-plain (Corne-
lus), and composite progradational strand-plain/wave-dominated delta
(Cayce) systems. Production characteristics of strand-plain facies are
modeled using these reservoirs as examples.

Reservoir continuity is greatest in transgressed and progradational
strand-plain sandstones where crosscutting channel facies are of minor
importance. Hydrocarbon distribution is laterally continuous in both res-
ervoir types. Broad edgewater incision indicates an absence of internal
facies barriers. Progradation of the Cornelius strand plain resulted in a
composite reservoir in which the older sands and contained hydrocarbons
pinch out against the overlying offlapping sequence.

In contrast, reservoir continuity in the Cayce is poor. Crosscutting fla-
vial sands produce oil at lower rates, act as conduits for early water
influx, and provide facies boundaries against which hydrocarbons in
adjacent progradational facies are pooled. Facies changes and pinouts
in heterogeneous reservoirs such as the Cayce are in part responsible for
limiting ultimate recovery from major clastic reservoirs along the Texas
Gulf Coast to approximately 50% of the original oil in place.

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Dedolomitization and Calcitization of Gypsum in Mississippian Arroyo
Penasco Group, North-Central New Mexico

The Espejito Santo Formation of the Mississippian Arroyo Penasco
Group represents the oldest Paleozoic stratigraphic unit preserved in
north-central New Mexico. The Espejito Santo Formation is a dia-
genetically complex carbonate unit that exhibits a well-developed cement
stratigraphy reflecting changes from meteoric fresh to marine-phreatic
environments. Recrystallization of the algal-laminated sediments
occurred during subaerial exposure of the overlying Macho Member of
the Terero Formation, a collapse breccia produced by the dissolution
and removal of gypsum. The breccia and recrystallized limestone are
indicative of broad, low-relief topography and shallow water table.

Cathodoluminescent petrography reveals the presence of pseudo-
morphs of dolomite and gypsum throughout the Espejito Santo carbon-
ates. Typical dedolomite morphologies are: inclusion-rich cores
surrounded by limpid rims; corroded Mn-rich rhombs within calcite
pseudomorphs; highly zoned rhombs; and uniformly luminescent rhombs
enclosed in gypsum pseudomorphs. Calcitized gypsum, occurring as
bladed to hexagonal crystals and nodules, varies from highly zoned to
uniformly luminescent crystals. The varying luminescence is a possible
relict of the original trace-element distribution and/or the diagenetic
environment.

Meteoric waters migrating from the Macho Member were enriched,
but undersaturated, in dissolved CaCO₃ and have low Mg/Ca ratio. Thus
these pore fluids within the Espejito Santo carbonates dissolved gypsum
dolomite. The solution, supersaturated with respect to CaCO₃, pre-
cipitated calcite. Therefore, the dissolution of gypsum and dolomite and
the precipitation of calcite occurred simultaneously during diagenesis.
The reaction terminated once the supply of gypsum was exhausted.

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South American Sedimentary Basins

More than 64 sedimentary basins have been identified on the South
American continent. According to their regional structural character and
tectonic setting, they are classified in 4 super groups.

1. About 20 interior or intracratonic basins occur on South American
    cratons (Guayanas, Brazilian, and Patagonian). In most cases, their
    sedimentary fill is Paleozoic or early Mesozoic. Rift or transverse grabens
    resulting from incipient sea floor spreading extend towards the continental
    margin.

2. 17 basins are located along the Atlantic stable margin, and consist
    primarily of half grabens with downfaulted seaward blocks. These rifts
    (or pull-apart basins) were separated as results of the migration of the
    African and American continental blocks. Therefore the sedimentation is
    chiefly Cretaceous and Tertiary Paleozoic basin.

3. On the western edge of South American cratons, almost 20 basins of
    downwarped blocks extend from Orinoco down to the Malvinas pla-
    teau in a relatively uninterrupted chain of retroarc basins, bordered by
    the Andean orogeny. They lie on a flexured Precambrian and Paleozoic base-
    ment, and are highly deformed in the west (Subandean belt) due to the
    action of compressional forces caused by the tectonic influence of the
    Mesozoic Andean batholith.

4. Westward, the Pacific margin is bordered by 27 foreland and fore-
    arc basins, which alternate from north to south on an unstable or quasi-
    stable margin, fringed by a trench and slope complex where the ocean
    crust is subducted beneath the continental plate.

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Episodic and Cyclic Sedimentation

At the 1982 meeting of the SEPM in Calgary, Robert H. Dott, Jr., of
the University of Wisconsin gave a very thought-provoking presidential
address on episodic sedimentation. He defined episodic sedimentation as
punctuated or discontinuous deposition. He concluded that sediments
are deposited episodically and are controlled by such factors as the local
storms, floods, and tides. Considered by itself, the concept implies that
one basin has no predictable relation to another. Thus, when applying the