must be displayed or printed out so that data manipulations can be reviewed critically.

Having achieved a rigid quality control, explorationists should now feel comfortable with initial reservoir estimates based on these data sets. Financial planning and forecasting can then proceed on a more secure basis earlier in the exploration and development of a prospect.

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Application of Three-Dimensional Computer Modeling for Reservoir and Ore-Body Analysis

Three-dimensional computer modeling of reservoirs and ore bodies aids in understanding and exploiting these resources. This modeling tool enables the geologist and engineer to correlate in 3 dimensions, experiment with various geologic interpretations, combine variables to enhance certain geologic attributes, test for reservoir heterogeneities and continuity, select drill sites or perforation zones, determine volumes, plan production, generate geologic parameters for input to flow simulators, calculate tonnages and ore-waste ratios, and test sensitivity of reserves to various ore-grade cutoffs and economic parameters. All applications benefit from the ability to update rapidly the 3-dimensional computer models when new data are collected.

Two 3-dimensional computer modeling projects demonstrate these capabilities. The first project involves modeling porosity, permeability, and water saturation in a Malaysian reservoir. The models were used to analyze the relationship between water saturation and porosity and to generate geologic parameters for input to a flow simulator. The second project involves modeling copper, zinc, silver, gold, and specific gravity in a massive sulfide ore body in British Columbia. The 4 metal models were combined into one copper-equivalence model and evaluated for tonnage, stripping ratio, and sensitivity to variations of ore-grade cutoff.

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Geomorphic Features of Oregon-Washington Project EEZ-SCAN

During Leg 4 of Project EEZ-SCAN, long-range side-scan sonographs and seismic-reflection profiles were collected off Oregon and Washington, from the edge of the continental shelf to the boundary of the United States Exclusive Economic Zone (375 km from shore). The survey was extended seaward where necessary to include the Juan de Fuca Ridge. The project utilized the British GLORIA side-scan sonar system. The records were slant-range corrected and anamorphosed, and mosaics were constructed at a scale of 1:375,000.

The sonographs display precise geometry of the major geomorphic features of the area: accretionary ridges, submarine canyons, and fan valleys on the continental slope; deep-sea fans and channels in Cascadia basin; and elongate volcanic ridges making up Gorda and Juan de Fuca Ridges. Canyons with gullied walls deeply incise the upper continental slope off Washington. On the lower slope, the regime apparently changes from one of downcutting to one of overbank deposition. Cascadia basin and Cascadia Channel record intricate and complex drainage histories. The channel is not evident as a major feature on Nitinat Fan but becomes more prominent to the south, especially where it crosses Blanco Fracture Zone and enters Tufts Abyssal Plain.

Recent tectonic deformation of oceanic crust in the vicinity of Gorda Ridge is evident in the sonographs. For example, long, linear volcanic ridges flanking the spreading center are distorted and rotated westward at the north end where the Gorda Ridge meets the Blanco Fracture Zone.

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Lacustrine Deposits in Rifted Deep Basins of Yellow Sea

The central Yellow Sea is a typical intracratonic rifted basin that consists of 4 major depressions bounded by aligned listric faults along horst blocks of uplifted basement (Kunsan, West Kunsan, Yellow Sea subbasins, and Central Trough). The depressions are half grabens caused by pull-apart extensional stresses.

Core analysis and micropaleontologic study indicate that more than 5 km of lacustrine sediments were accumulated in the central part of the West Kunsan basin. Two distinctive sedimentary successions are recognized in the core descriptions: alternation of reddish-brown siltstones and sandstones containing evaporites and marlstones, and an overlying progradational sequence including minor limestone beds in the lower part of the sequence. The progradational sequence is interpreted as lacustrine deltaic deposits. Abundant palynofloral occurrence of freshwater green algae, *Pediastrum*, and absence of marine fauna such as dinoflagellates are also supporting evidence for a lacustrine environment. The lithofacies and tectonic framework of the Yellow Sea are very similar to those of Cretaceous lacustrine sediments of the Korea Peninsula onshore and Pohai coastal basin in China.

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Late Paleozoic Foreland Deformation in Northern Mexico: Paleogeographic and Tectonic Implications

Deformation in north-central Mexico reflects the existence of an actively evolving foreland basin during the late Paleozoic. The Pedregosa and Orogrande basins formed the northern extensions of this north-northwest-trending foreland basin, which was flanked on the north and west by several large block uplifts. Deformation along the southeastern margin of the basin, in Coahuila, is postulated to represent part of a foreland fold-thrust belt, while structures in Chihuahua and adjacent parts of New Mexico and Texas are related to basement-involved block uplifts. The unconformities, sedimentation patterns and deformation styles of several localities in Chihuahua, southern New Mexico, and west Texas indicate similar, but not necessarily time-equivalent, deformational histories.

Uplift began in Late Mississippian and culminated between latest Pennsylvanian (in the north) and Late Permian (in the south). The geographic distribution and sequential timing of deformation are consistent with our knowledge of the Ouachita system in the U. S. The distribution of the fold-thrust belt and basement-involved uplifts of the Ouachita foreland in northern Mexico is not only similar to other parts of the Ouachita system but also to portions of the Laramide in the northern Rocky Mountains. These similarities and the distribution of late Paleozoic calc-alkaline igneous rocks in the region suggest that a subduction zone and associated magmatic arc were present in eastern Mexico during the late Paleozoic.

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Western Desert of Egypt: Geology and New Petroleum Exploration Concepts

The Western Desert of Egypt has had a sporadic history of exploration. Production has been continuous since the discovery of the Alemein field in 1967, but the emergence of the Gulf of Suez as a giant oil field province has overshadowed Western Desert production.

Recent discoveries in the Abu Gharidig subbasin, and better quality seismic data from the basin to the north, indicate that there are significant untested structures. A simple extension tectonic model may not completely answer the history of basin evolution. However, by invoking a tectonic model with some wrenching components, both facies and structure can be placed in a coherent regional framework. This new model introduces significant new exploration play concepts.

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Cambridge (UK) Arctic Shelf Programme Palinspastic Map Series

The Cambridge Arctic Shelf Programme has been a team effort since 1975. Its objective has been to summarize Arctic stratigraphy and tectonics. During the last 2 years, palinspastic maps for the whole Arctic have been checked systematically against stratigraphic data and the favored reconstructions are being computerized. The program has been financed