EITTREIM, STEPHEN L., U. S. Geol. Survey, Menlo Park, CA

Offshore Investigations on Wilkes Land-Victoria Land Margin, Antarctica

In January 1984, the U. S. Geological Survey research vessel *S. P. Lee* carried out investigations of the Antarctic continental margin in the Wilkes Land and Victoria Land areas, using 24-channel and high-resolution seismic, sonobuoy refraction, gravity, magnetic, and bottom-sampling methods. This investigation augmented previous surveys of the Dumont d'Urville area by the French Petroleum Institute and explored new areas west and east to the boundary between the onshore Wilkes basin and the Victoria Land highlands. These surveys defined sediment thickness distribution and seismic stratigraphy in this frontier area. The tectonic style of the boundary between the East Antarctic craton and the younger crust of West Antarctica in the Ross Sea is revealed by one multichannel seismic line across this important boundary.

The initial breakup of Antarctica from Australia occurred as a slowly spreading phase during the middle Cretaceous. According to Deep Sea Drilling Project results on the Tasman Rise, conditions of restricted circulation existed in the growing basin between the continents before the late Eocene. After the late Eocene, the major oceanic circulation pattern was established. Before that time, conditions were favorable for preservation of organic-carbon deposits on the sea floor. Among the questions to be addressed with this data are the following. (1) How do apparent subsidence rates of this passive margin compare with others around the world? (2) Does the onshore subglacial Wilkes basin continue onto the continental shelf? (3) Do Antarctic counterpart basins to the Otway and Ceduna basins of Australia exist? (4) What is the effect of the icecap on the stratigraphy of this margin? (5) Do the two major Tertiary ice advances have conspicuous seismic-stratigraphic signatures?

EMBLEY, ROBERT W., A. MALAHOFF, and R. GANSE, National Oceanic and Atmospheric Adm., Rockville, MD

Pull-Apart Basins Along Blanco Transform

A series of rhombohedral basins along the 300-km (185-mi) long Blanco transform, surveyed recently by Sea Beam, provide good oceanic analogues to pull-apart basins described along major strike-slip/oblique-slip boundaries on the continent such as the San Andreas and Dead Sea areas. In the Blanco region, continual reorientation of the transform in response to changes in plate motion during the past few million years provides a mechanism for the formation of these basins. In plan view, the Blanco transform is similar to the Gulf of California; that is, there is a series of long strike-slip faults separated by short tensional basins (up to 20 km, 12 mi, long) with structures oriented at a high angle to the master faults. There are some preliminary indications that magmatic activity is occurring in some of the Blanco basins. In the region of the Cascadia depression, previous workers have documented at least 1 cm/yr of crustal sinking within the Holocene. The presence of turbidites and ash layers in this region should provide fruitful ground for detailed studies of the interplay between sedimentation and tectonics and lead toward a better understanding of the evolution of pull-apart structures.

ERNST, W. G., Univ. California, Los Angeles, CA

California Blueschists and the Tectonostratigraphic Terrane Concept

Glaucophane and related schists are present as tectonic fragments in ophiolite-decorated suture zones and as discrete lithotectonic belts along the accreted Mesozoic/Tertiary California margin. Occurrences include parts of the Klamath Mountains, the western Sierran foothills, the Coast Ranges, faulted margins of the Mojave Desert, the Transverse Ranges, and the southern California borderland. Blueschist assemblages formed under high-pressure, low-temperature metamorphic conditions, reflecting the thermal regime of subduction zone environments. Considerable underflow accompanied rifting, drifting, and assembly of far-traveled tectonostratigraphic terranes, as documented by sea-floor magnetic anomaly patterns and age relationships of the oceanic crust-capped lithosphere; the eastern limbs of paleo-Pacific plates (Farallon-Cocos, Kula, etc), have been extensively or completely overridden by the westward encroaching North American plate—7,000 km (4,300 mi) since the Early Cretaceous, and nearly 10,000 km (6,200 mi) since the Jurassic. Thus, although substantial northward drift brought exotic oceanic and continental materials to the growing California crust and caused extensive dislocation in the late Mesozoic and Cenozoic, much plate motion evidently involved a large component of convergence and eastward underflow, as indicated by preserved remnants of high-pressure mineral assemblages scattered throughout California, as well as by the construction of roughly contemporaneous calc-alkaline volcanic-plutonic belts. Subduction appears to have been the dominant process attending accretion of the California continental margin.

ERNST, W. G., Univ. California, Los Angeles, CA, C. S. HO, Mining Research & Service Org., Taipei, Taiwan, and J. G. LIOU, Stanford Univ., Stanford, CA

Rifting, Drifting, and Crustal Accretion in Taiwan

Permian and younger rocks in Taiwan record the effects of rifting plus passive margin deposition, sea-floor spreading, convergence and/or oblique closure, volcanic plus plutonic arc construction, arrival of ophiolitic materials, and suturing of exotic trench-argillite and andesitic arc assemblages. Large portions of the sialic crust formed essentially in situ, then were deformed and thrust landward during subsequent tectonic events; however, far-traveled terranes and oceanic fragments played a substantial role in the accretionary process. Recognized and suspected exotics include: (1) lower or middle Mesozoic amphibolites plus serpentinites (now high-rank metaophiolites), situated anomalously in the upper Mesozoic Tailuko metamorphosed miogeoclinal and/or continental slope belt; (2) upper Mesozoic Yuli high-pressure, low-temperature metamorphic trench-argillite melange complex; (3) Mio-Pliocene tectonic blocks of blueschistic ophiolite emplaced in the east-central part of the Yuli terrane; (4) ophiolitic olistostromal debris supplied in the Pliocene to the Lichi Melange of the Coastal Range from Miocene oceanic crust of the South China Sea; and (5) the Neogene calc-alkaline Luzon arc which collided with the sialic crust-capped Asiatic plate in the Plio-Pleistocene. The Cenozoic slate series is an additional, largely fault-bounded parautochthonous terrane deposited as the Tertiary miogeoclinal cover along the Asiatic continental margin and thrust westward during the Plio-Pleistocene arc collision. Taiwan thus represents an intricate Phanerozoic collage of lithotectonic belts, produced by various accretionary processes.

EWING, THOMAS E., Bur. Econ. Geology, Austin, TX

Late Paleozoic Structural Evolution of Permian Basin

The Permian basin of West Texas and New Mexico is one of the premier hydrocarbon provinces of the world; nonetheless, little regional subsurface structural information about it has been published. Mapping at 1:250,000 on the Ellenburger horizon (Lower Ordovician), compiled for the Tectonic Map of Texas, discloses the overall geometry of Paleozoic deformation in the area.

The southern Permian basin is underlain by the NNW-trending Central Basin disturbed belt of Wolfcamp age (Lower Permian), the deep Delaware basin to its west, and the shallower Midland basin to its east. The disturbed belt is highly segmented with zones of left-lateral offset. Major segments from south to north are: the Puckett-Grey Ranch zone; the Fort Stockton uplift; the Monahans transverse zone; the Andector ridges and the Eunice ridge; the Hobbs transverse zone; and the Tatum ridges, which abut the broad Roosevelt uplift to the north. East-west compression is inferred, with shortening increasing from the Tatum ridges south to the Fort Stockton uplift. The segment boundaries and transverse elements are inferred zones of strike-slip faulting. These fault zones extend both southeast and west of the disturbed belt into discrete strike-slip faults with local uplifts in compressive bends (such as the Big Lake uplift). The Midland basin is much shallower than the Delaware basin, and the uplift-to-basin transition is gradual. A belt of subtle domes and anticlines, extending northeast from Andrews County, overlies a major basement discontinuity (the Grenville Front).

The disturbed belt may have originated along rift zones of either Precambrian or Cambrian age. The extent of Lower and Middle Pennsylvanian deformation is unclear; much of the Val Verde basin-Ozona arch structure may have formed then. The main Wolfcamp deformation over-