INTERNATIONAL EXPLORATIONISTS GROUP EVENING MEETING—MAY 21, 1986

DESIREE BEAUDRY—Biographical Sketch

Desiree Beaudry is a senior research geologist with Exxon Production Research Company in Houston. She has been working for Exxon since 1984 in seismic stratigraphic studies of sedimentary basins around the world, including the western straits of Florida, the Andaman Sea (Mergui, Martaban, and South Burma basins), the Sumatra forearc, and the East Natuna Basin. At present she is using seismic-stratigraphic techniques to explore for prospects in East Central Texas. Desiree received her B.A. in geology from Rice University in 1977 and her Ph.D. in Earth Sciences from Scripps Institution of Oceanography of the University of California in 1983.

While Desiree was a research geologist at Scripps Institution of Oceanography, 1979-1983, she collected and processed seismic reflection data across the forearc basin of west Sumatra, Indonesia and established a 3-dimensional model of the basin using seismic-stratigraphic analysis and mapping techniques, combined with well-log data. Results of this study were published in 1983 and 1985 in the AAPG Bulletin. In 1983-1984, Desiree worked for Nekton, Inc. in San Diego, California interpreting seismic reflection data and mapping offshore geology and structure of the Santa Barbara and Santa Maria basins. Aspects of this work were published in abstract in 1984 in the SEPM Pacific Section Proceedings.

Desiree Beaudry is a member of the American Association of Petroleum Geologists, the Geological Society of America, the American Geophysical Union, and Sigma Xi.

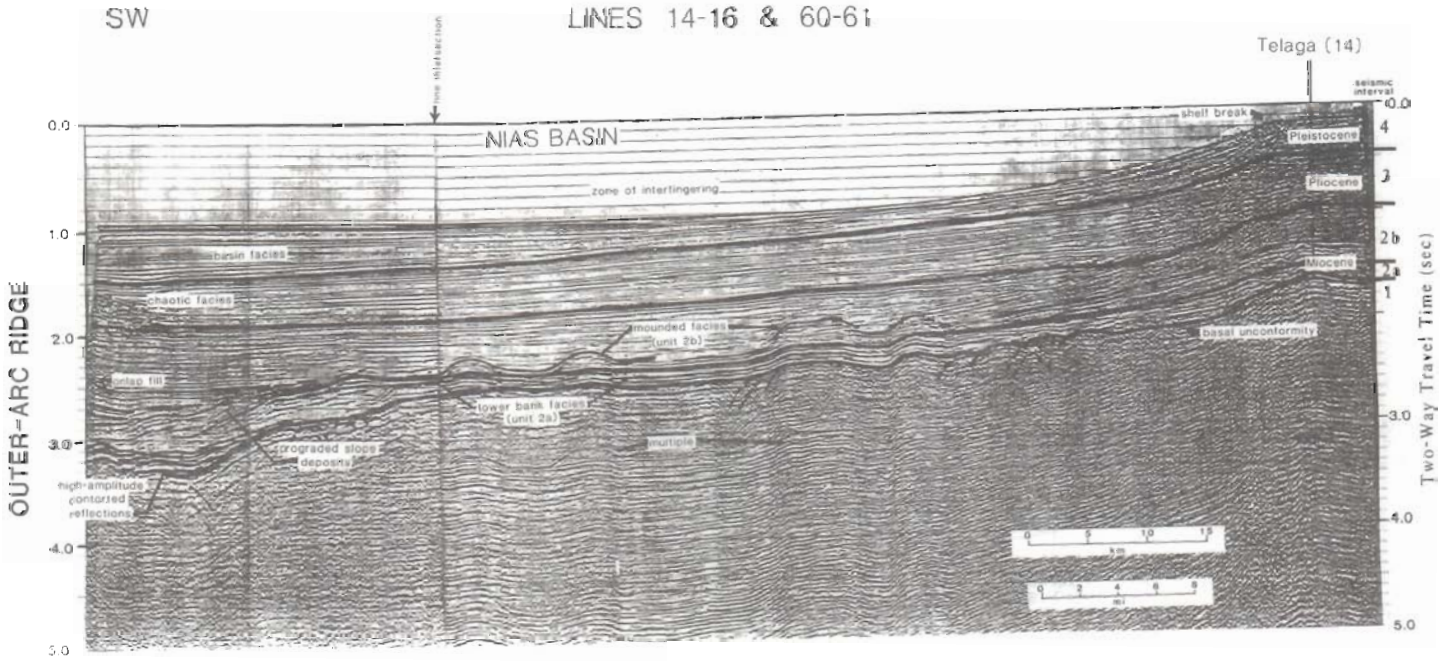
SEISMIC STRATIGRAPHY AND CENOZOIC EVOLUTION OF THE WEST SUMATRA FOREARC BASIN

The western Sunda Arc of Indonesia is a continental-margin arc-trench system characterized by oblique subduction along an irregular crustal edge and by transcurrent faulting within the arc terrane. Offscraping and accretion of material along the base of the landward trench slope have led to formation of a prominent outer-arc ridge that has trapped sediment in basins between the volcanic arc and the trench. Sedimentary strata deposited in these forearc basins record the Cenozoic evolution of the arc-trench system and preserve many of the original structural and stratigraphic relationships.

Along the western margin of Sumatra, Indonesia, relatively-shallow transverse structures subdivide the forearc region into several discrete sedimentary basins. Multichannel seismic reflection profiles reveal the structural style of two prominent transverse highs that separate Nias basin of west central Sumatra from the deeper Meulaboh and Mentawi troughs to the north and the south, respectively.

Late Tertiary sediments deposited in these basins reveal the stratigraphic evolution of this active plate margin. A dense grid of multichannel seismic reflection data and 17 exploratory wells were used to establish a detailed seismic stratigraphic framework of the forearc region from 0° to 6° N. Several important tectonic cycles are recognized: Paleogene orogeny, Neogene subsidence, and late Tertiary tectonism. Superimposed on these regional tectonic events are three major cycles of sedimentation related to changes in sea level and provenance.

The Paleogene orogeny represents an important change in tectonic and sedimentary style attributed to major changes in rates and directions of subduction in this region. Subsequent erosion of basement rocks was enhanced by a worldwide lowering of sea level in the Oligocene. The continental shelf was subaerially exposed approximately 25 to 30 Ma and basin deposits were restricted offshore.



The Neogene history of forearc basin development is characterized by subsidence and nearly continuous sedimentation. A basal transgression began in latest Oligocene or earliest Miocene time and culminated in the middle Miocene. Alternating sequences of limestone and shale comprise two second-order cycles of sedimentation that are superimposed on an overall transgressive event. A major offlapping sequence followed in the Pliocene, owing to an influx of siliciclastic clay, silt, and sand derived from Sumatra. Sedimentation rates were high, and large volumes of terrigenous material were deposited in deltaic systems on the shelf. The shelf-slope break prograded basinward nearly 10 km (6 mi) through lateral accretion and aggradation during a relative highstand or stillstand of sea level.

The results of this study show how changes of sea level, subsidence, and tectonics affect patterns of sedimentation in the west Sumatra forearc basin. The seismic-stratigraphic framework allows depositional cycles of the same general age to be compared to other basins in southeast Asia, facilitating regional interpretations. This integrated stratigraphic approach is an invaluable tool in exploration because it helps to predict the distribution and lateral extent of potential source intervals, reservoir units, and shale seals.