ing of an upper mantle plume to produce two NNE weak fracturing zones, resulting in a series of intraplate and epicontinental rifting-depression basins.

The depositional models and sea-level variations of these basins are interpreted from the drilling records and seismic profiles. They can be explained by the tectono-eustatic changes in sea level and Cenozoic climate changes of China.

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Seismic Stratigraphy and Sea Level Changes in Active Margin Settings: An Example from Luzon, Philippines

Controversy arises when attempting to relate unconformities on a tectonically active margin to global changes in sea level. Seismic stratigraphy studies on active margins generally concentrate on defining large seismic packets and do not directly relate unconformities and their correlative conformities to global sea level changes. In the Central Valley of Luzon, we determined sequence boundaries in the basin and developed an age model that strongly suggests that sea level change is the major factor affecting shorter term (less than 5 m.y.) changes in sedimentation on this active margin.

The Central Valley is a Cenozoic fore-arc basin bounded by an arc complex and the left-lateral strike-slip Philippine fault on the east and by an east-dipping subduction zone adjacent to the Manila Trench on the west. Multichannel seismic reflection, well, and outcrop data were used to determine the depositional history of the basin. Because much of the 13 km (8 mi) thick basin fill consists of deep-water marine sediments, conventional criteria such as coastal onlap and erosional truncation could not always be used. Instead, evidence for pulses of submarine fan deposition during lowstands of sea level (suggested by Vail and Hardenbol in 1979, and by Shanmugan and Moiola in 1982) was used to identify some of the sequence boundaries. The ages of the major boundaries, predicted from comparisons with Cenozoic Sea level curves, agreed very well with established ages from well and outcrop data.

The supposed difficulty in determining sea level changes in active margins is that tectonic effects override and cloud the effects of global sea level changes. We agree that major regional tectonic events such as the initiation of subduction or strike-slip movement that creates or destroys basin morphologies clearly are the dominant factors in the overall stratigraphy of the basin. However, episodic tectonic events during continued basin evolution result in discrete changes in local basin morphology and sediment source areas which may lead to local unconformities or local increase or decrease in sediment influx. These effects are probably small compared to the basin-wide effects of global sea level changes. Such is the case in the Luzon Central Valley where the effects of global sea level changes can be seen throughout the basin.

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Mesozoic-Cenozoic Deposition Along Atlantic Continental Shelf From Scotian Shelf, Canada, To Baltimore Canyon Trough, United States

In 1982, geologic data from 17 wells in the Baltimore Canyon Trough were released to the public. These wells provide sufficient data for definition of regional stratigraphic units in the Baltimore Canyon Trough. Prior to 1982, the only publicly available data from deep wells on the northern United States outer continental shelf were from two COST wells in the Georges Bank basin and two COST and three exploratory wells in the Baltimore Canyon Trough. Lithologic similarities between the Scotian Shelf formations and the rock units penetrated by these COST wells have been observed in the past. In this study, the stratigraphic terminology developed for the Scotian Shelf is extended through the Georges Bank basin and is informally applied to the Baltimore Canyon Trough strata as homotaxial equivalents.

The Late Triassic(?) to Jurassic salt, carbonate, clastic, and carbonate sequence penetrated in the Georges Bank basin is correlative with the Argo, Iroquois, Mohican, and Abenaki Formations on the Scotian Shelf. Exploratory wells in the Baltimore Canyon Trough were not deep enough to penetrate equivalent rocks. However, previous seismic studies of the trough suggest that a carbonate complex equivalent to the Abenaki Formation may exist beneath the present-day slope. Upper Jurassic to Lower Cretaceous strata in the Georges Bank basin and Baltimore Canyon Trough are equivalent to the Scotian Shelf deltaic sandstones and shales of the Mohawk, Mic Mac, Missisauga, Naskapi, and Logan Canyon Formations. These deltaic deposits are overlain by upper Lower Cretaceous to Upper Cretaceous marine mudstones and shales that are equivalent to the Scotian Shelf Dawson Canyon Formation. The Cenozoic strata in the Georges Bank basin and Baltimore Canyon Trough consist of shale, mudstone, chalk, and unconsolidated sand. On the Scotian Shelf, the Cenozoic section is generally sandier and consists of the Banquereau Formation, an interbedded mudstone and sandstone sequence, and the Laurentian Formation, which consists of glacial and proglacial sediments.

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Submarine Cementation Patterns of Holocene Reefs Provide Models for Porosity Development in Ancient Reef Reservoirs

An understanding of processes of formation and postdepositional alteration of Holocene carbonate buildups can aid the explorationist in locating and predicting reservoir facies in subsurface analogs. In the subsurface, ancient shelf-edge reefs may contain primary porosity that has escaped shallow subsurface cementation. This preserved primary porosity is commonly enhanced later by carbonate dissolution associated with widespread subsurface fluid migration and/or dissolution fronts along permeable stylolite zones. Therefore, given a burial history of continued subsidence, knowledge of early submarine cementation patterns is important for understanding reef facies distribution of late subsurface diagenesis.

In reef systems, submarine cementation is controlled by size of sedimentary components, facies energy setting, and reef growth history. Cements are acicular aragonite and dentate Mg-calcite rims, and more commonly thin crusts and geopetal skeletal infills of Mg-calcite peloids. Rapid facies accumulation during reef growth limits submarine cementation to thin rims and incomplete skeletal infilling. Extensive back-reef sediment apron deposits are generally mud free and composed of well-sorted skeletal fragments, that undergo only minor submarine cementation. Reef core (framework) facies contain large amount of in-situ skeletons and increasing mud and peloidal submarine cements within the core matrix. High energy fore-reef facies are extensively cemented by fibrous aragonite druses and dense peloidal Mg-calcite infill. The best potential reservoir facies are usually back-reef packstone-grainstones, which have greater porosity and permeability because high accumulation rates and moderate energy conditions limited submarine cementation.

Following a reef's demise and submergence, submarine cementation of the upper reef surface may form an effective diagenetic