STRUCTURE AND EVOLUTION OF THE BERING SEA SHELF

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The Bering shelf is underlain by two Cenozoic structural provinces, an inner and generally coastal one of essentially undeformed Cenozoic basins that occupy the large reentrants of this sea, and an outer continental-margin province with parallel basement ridges and basins overlain by as much as ten kilometers of Cenozoic sediment. The inner provinces includes three major structural sags of Mesozoic and older basement rock: Bristol, Anadyr and Norton basins, containing three kilometers or more of neritic Cenozoic strata. A fourth basin, St. Matthew, trends NE-SW between St. Lawrence and St. Matthew Islands. It may be associated with the offshore extension of the Kaltag fault. The sedimentary fill in the basin (as much as 1.3 km) is not appreciably disturbed, suggesting that the Kaltag fault has not been active since the Early Tertiary.

The outer structural province comprises ten elongate basins. These are grabens or half-grabens and they contain up to ten kilometers of Mesozoic(?) and Cenozoic sediment. The basins are bounded by active normal (growth) faults, suggesting that the outer shelf area may be collapsing and rifting away from the inner shelf. We speculate that the outer structural province is a fragmented and submerged Mesozoic fold belt that formed above oceanic crust along an oblique convergence zone extending northwestward from Alaska to Siberia. A belt of highly magnetic volcanic and plutonic rocks that passes through St. Matthew Island is the magmatic arc associated with the Mesozoic subduction zone. The inner province basins, like those of the outer province, appear to be superimposed above inherited late Mesozoic trends, but they are in part or wholly underlain by Mesozoic and older continental crust.