SHALLOW GEOLOGIC FEATURES OF THE OUTER CONTINENTAL SHELF AND UPPER CONTINENTAL SLOPE OFF SOUTHWEST LOUISIANA IN ATLAS FORMAT

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ABSTRACT

The Late Pleistocene and Holocene geologic history of a 210 km segment of the outer shelf and upper slope off southwest Louisiana has been interpreted from 8140 km of high-resolution seismic reflection profiles arranged in a 4.8 by 4.8 km grid of east-west and north-south lines. Aspects relevant to the geologic history and evolution of the shelf edge are shown by a series of 12 topical maps. The maps are designed to be used as overlays in showing cause and effect relationships and in demonstrating the rate of shelf edge accretion as a function of sea-level fall. Topics in the series are: bathymetry, geologic features expressed topographically at the sea floor; location of faults, location of diapirs and fold axes; depth to diapirically deformed sediments; location of buried stream channels; distribution of shallow gas, surficial slumping and buried older slumps; relative bottom hardness based on acoustical response; and maps showing the thickness of the upper 3 seismic stratigraphic units.

Comparison of the various topical maps shows the extent to which sea-level fluctuation, diapirism and faulting have interacted to control the distribution and thickness of sediments along the shelf edge. Repeated movement or variations in the rate of upward motion of diapirs and movement of associated faults led to the formation of interdiapiric basins that became the primary depocenters for sediment carried to the shelf edge during low stands of sea level. The terrestrial sediments that prograded into the interdiapiric basins to form deltaic sedimentary bodies in turn caused differential loading that resulted in further diapiric movement. The ancient stream patterns reveal that structural adjustments during shelf edge sedimentation occasionally forced streams to divert from one depocenter to another. Slumping of bottom sediments has taken place mainly at the shelf edge down the front of outbuilding deltaic lobes. The apparent occurrence of gas in the sediments is typically associated with diapirs, with buried slumps, and with the sediments filling the buried stream channels.

The basal contacts of the three seismic stratigraphic units are unconformable. Unit A, of probable late Holocene age appears, on the basis of regional distribution, to represent mainly sediments from the Mississippi River system deposited since sea level reached its present position. Unit B, of probable early Holocene age, seems to represent shelf transgressive deposition during the rise of sea level from the last low stand. Unit C, which lies on a prominent erosional unconformity, is of probable late Pleistocene age.

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