

**AAPG Annual Convention
Salt Lake City, Utah
May 11-14, 2003**

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Near-Surface Depositional Framework of the Central Scotian Slope, Atlantic Canada

Data varying in vertical resolution (frequency content) from a large (~ 2500 km²), conventional 3-D seismic survey (50-60 Hz) to 2-D subbottom profile data (>500 Hz) were used to investigate the near-surface interval of the central Scotian Slope of Canada in 1500 m to 3000 m of water depth. The investigation resulted in a detailed evaluation of the near-surface depositional framework in the uppermost 1000 m of the section. Geologic elements of this framework include glacially influenced deepwater sedimentation, submarine canyons, shallow faults, seafloor instability features, and mobile salt.

The Scotian Slope is part of a passive continental margin, with thick Jurassic and Cretaceous strata overlying Triassic salt. A significant canyon-cutting episode occurred in the Mid Pliocene, followed by progradation of prodelta sediments and renewed canyon cutting in the Late Pliocene and Early Pleistocene. Glacially influenced slope deepwater sedimentation began about the middle of the Pleistocene. The seafloor morphology is influenced by a variety of features, including large-scale canyons, debris flows, and massive slides.

The primary purpose of this near-surface geologic evaluation was the identification and assessment of drilling hazards in the deepwater central Scotian Slope. Additionally, the study adds to the current knowledge and understanding of effects of marine glaciation proximal to a deepwater slope setting. In particular, this effort better addresses the issue of unstable seafloor conditions, associated with a glaciated deepwater setting.