# SUBSURFACE MAPS OF THE CONTINENTAL MARGIN AROUND NEWFOUNDLAND

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This report presents regional "basement" and "base event" maps for the continental margin around Newfoundland (Fig.1), and sediment thickness maps between these surfaces and the seafloor. These maps are based primarily on interpretation of industrial multichannel seismic data, released to 1987 by the Canada Oil and Gas Lands Administration and the Canada Newfoundland Offshore Petroleum Board, complimented by assorted lines of single channel seismic data in deeper water and in nearshore areas of thin sediment cover (Fig. 2). These maps were prepared as control for regional geologic studies of the continental margin, especially as a framework for comparative study of the subsurface Mesozoic-Cenozoic sedimentary basins on and around the Grand Banks and east of Newfoundland. Compiled originally in seismic reflection time, the maps have been converted to depth and thickness in metres using velocity control from exploratory wells, velocity data from multichannel processing procedures, and velocities from sonobuoy observations (Tucholke and Fry, 1985). Map scale is 1:5,000,000.

Basement structure and the distribution of the overlying sediments are portrayed by a "basement" map and a "base event" map. The concept of a "base event" is illustrated in Figure 3; this map (Fig. 4) depicts the deepest seismic horizons that are regionally mappable, and provides a datum surface connecting the various sedimentary basins. Drilling results indicate that this surface corresponds approximately to the base of the Late Cretaceous; in intra-basin areas it depicts a major peneplain. The basement map (Fig. 5) shows depths to deepest detectable seismic reflectors (Fig. 3). Because it depicts basement structures that controlled deposition of younger sediments, it may be provisionally regarded as a map of "economic" basement.

The thickness map of sediments in the interval sea floor to base event (Fig. 6) indicates the distribution and thickness of sediments that have accumulated on the continental margin since the Early Cretaceous. Total sediment accumulation on basement is shown in Figure 7.

The base event surface (Fig. 3) in some areas is coincident with basement. These areas are mapped in Figure 8 to provide a simplified tectonic map that shows the principal positive structural elements and basins. In Figure 9 the interpreted age of the rocks underlying the base event surface has been plotted to yield a map of "geology" beneath that surface.

Part of the basement map (Fig. 5) has been published and discussed in Grant (1987), and parts of the basement map (Fig. 5), base event map (Fig. 4) and geology map (Fig. 9) have been published and discussed in Grant et. al. (1988). The illustrations in this report (except for Figures 2 and 3) are contained in Grant and McAlpine (in press), and in that publication subsurface relationships are illustrated by a series of cross sections and the maps are discussed in some detail.

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FIGURE CAPTIONS

Figure 1. Generalized bathymetric map of the continental margin around Newfoundland (depth contours in metres). Dots mark the locations of exploratory wells. Scale 1:5,000,000.

Figure 2. Seismic coverage used to construct the maps in this report. Scale 1:5,000,000.

Figure 3. a) Diagram of a hypothetical multichannel reflection seismic line across the continental margin. b) The dotted line indicates the reflectors mapped as the "base event"; the dashed line indicates reflectors mapped as "basement".

Figure 4. Base event map for the continental margin around Newfoundland, contour interval 1 km. The dashed line is the 500 m water depth contour. Scale 1:5,000,000.

Figure 5. Basement map for the continental margin around Newfoundland, contour interval 2 km. The heavy dashed line is the 500 m water depth contour. The thin dashed line is the landward edge of Cretaceous-Tertiary sediments. Scale 1:5,000,000.

Figure 6. Sediment thickness map, seafloor to base event, contour interval 1 km. The dashed line is the 500 m water depth contour. Scale 1:5,000,000.

Figure 7. Sediment thickness map, seafloor to basement, contour interval 2 km. The dashed line is the 500 m water depth contour. Scale 1:5,000,000.

Figure 8. Simplified tectonic map showing the principal positive structural elements and basins (shaded) underlying the continental margin around Newfoundland. The dashed line (heavy) is the 500 m water depth contour. The thin dashed line is the landward edge of Cretaceous-Tertiary sediments. Scale 1:5,000,000.

Figure 9. "Geology" mapped at the level of the base event surface. Symbols are explained in legend. Scale 1:5,000,000.