



LOGAN INLET AND NORTHERN DARWIN SOUND: SURFICIAL GEOLOGY, QUATERNARY STRATIGRAPHY AND PALEO-SEA LEVELS

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ABSTRACT

Bathymetry, seismic reflection profiles and interpreted piston cores provide evidence of drowned proglacial lakes. The seismic reflection profiles show well-stratified sequences of laminated sediments within bedrock controlled depressions. These sediments have been cored in Logan Inlet and Klunkwoi Bay. The cores have been analyzed for pollen content, diatom and foram assemblages, radiocarbon age, color and texture. Rapidly deposited fresh water sediment rhythmites occur at the base of the core and are interpreted to have originated from local glacial outwash. Sediments become finer upsection, possibly in response to decreasing glacial activity and retreating ice-fronts. The transition to a marine environment in Logan Inlet is marked by the deposition of weakly stratified and bioturbated marine clay at 470 cm depth within core VEC 94A-18. The transition from marine diatoms and foraminifera to the disappearance of forams and the onset of freshwater diatoms, marks the interval of marine incursion over a sill at the bay mouth. Multiple C-14 dates at the transition from freshwater to marine inundation establish the time when sea-level rose above the 77m deep sill of Logan Inlet. These sea-level markers from the marine environment (including results from four adjacent inlets) are combined with dated marine incursions of lakes above the present marine limit (Fedje 1993) and used to construct a sea-level curve which indicates a maximum sea-level rise of 6 cm per year.

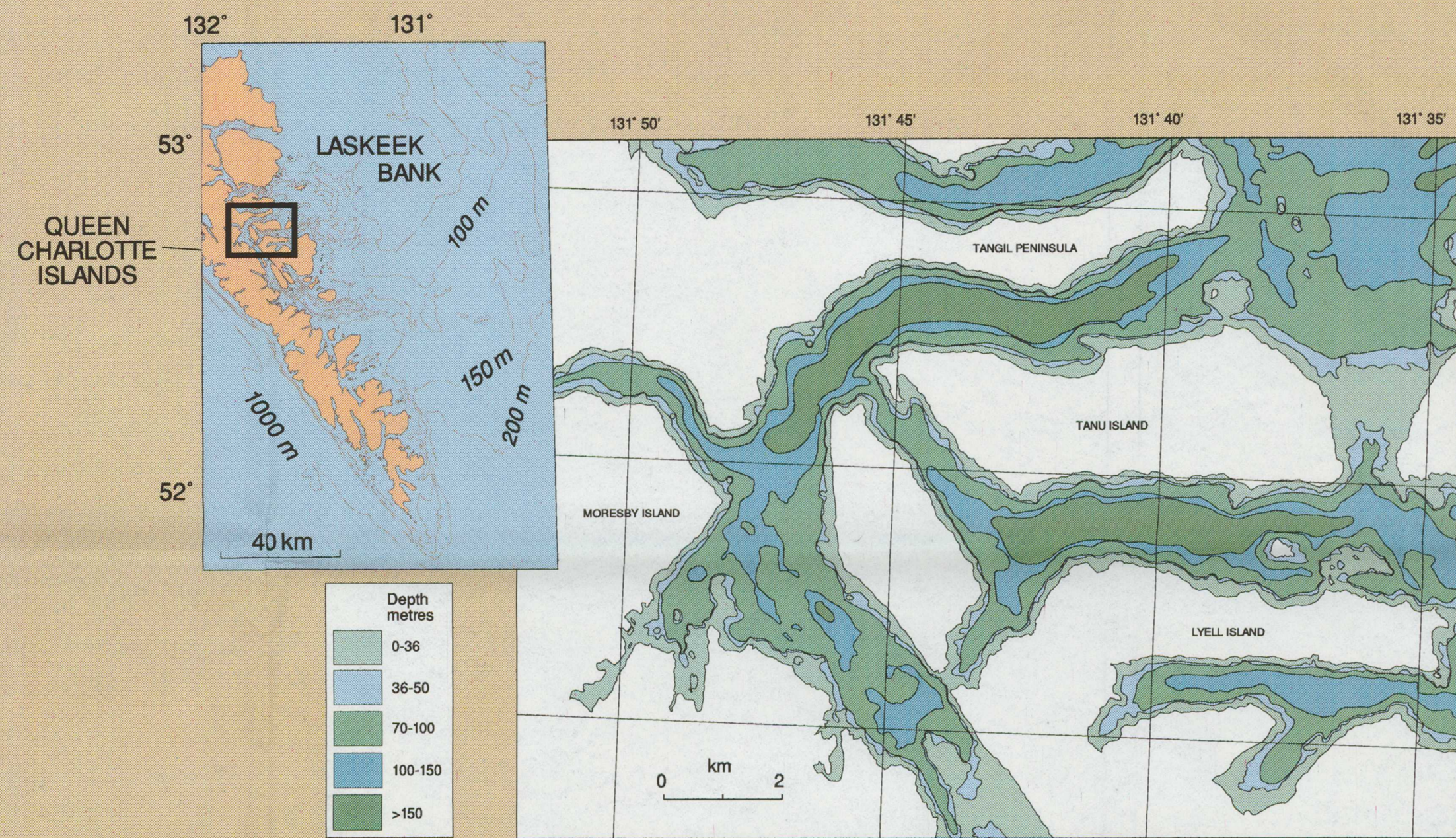


Figure 2. Bathymetry of Logan Inlet to northern Darwin Sound.

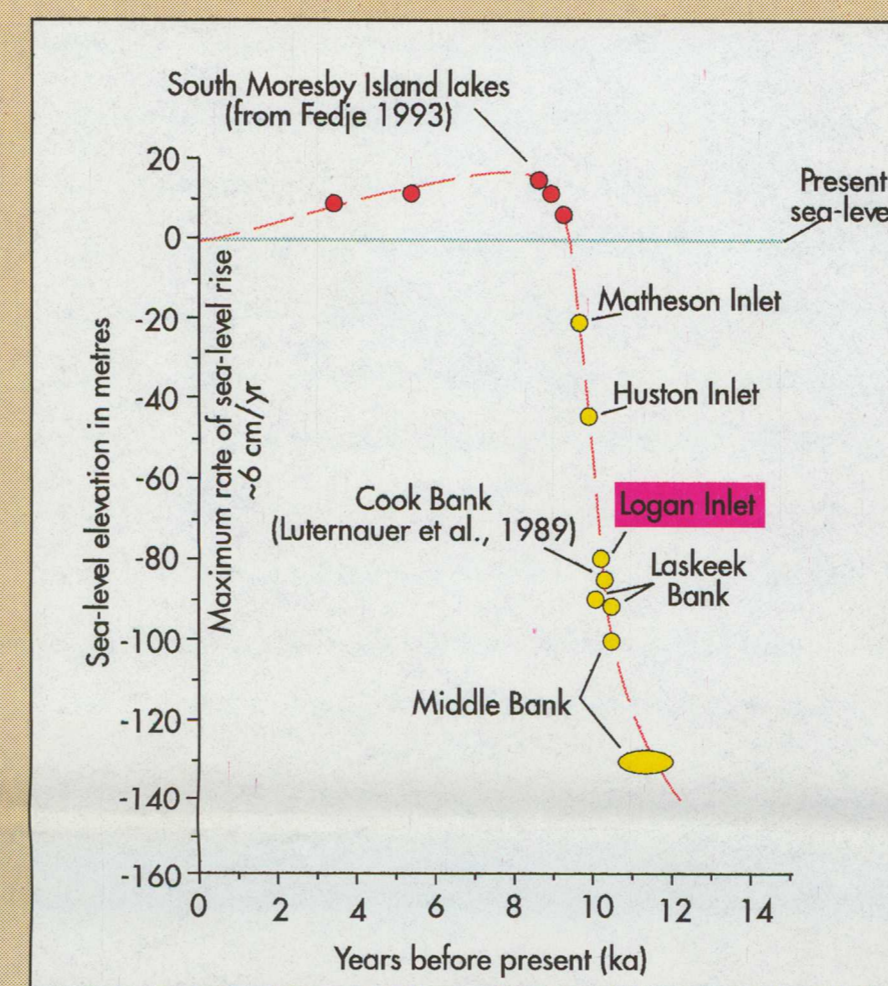


Figure 3. Sea-level curve for Queen Charlotte Islands based on radiocarbon dated marine inundation of four isolated lake basins with different sill elevations.

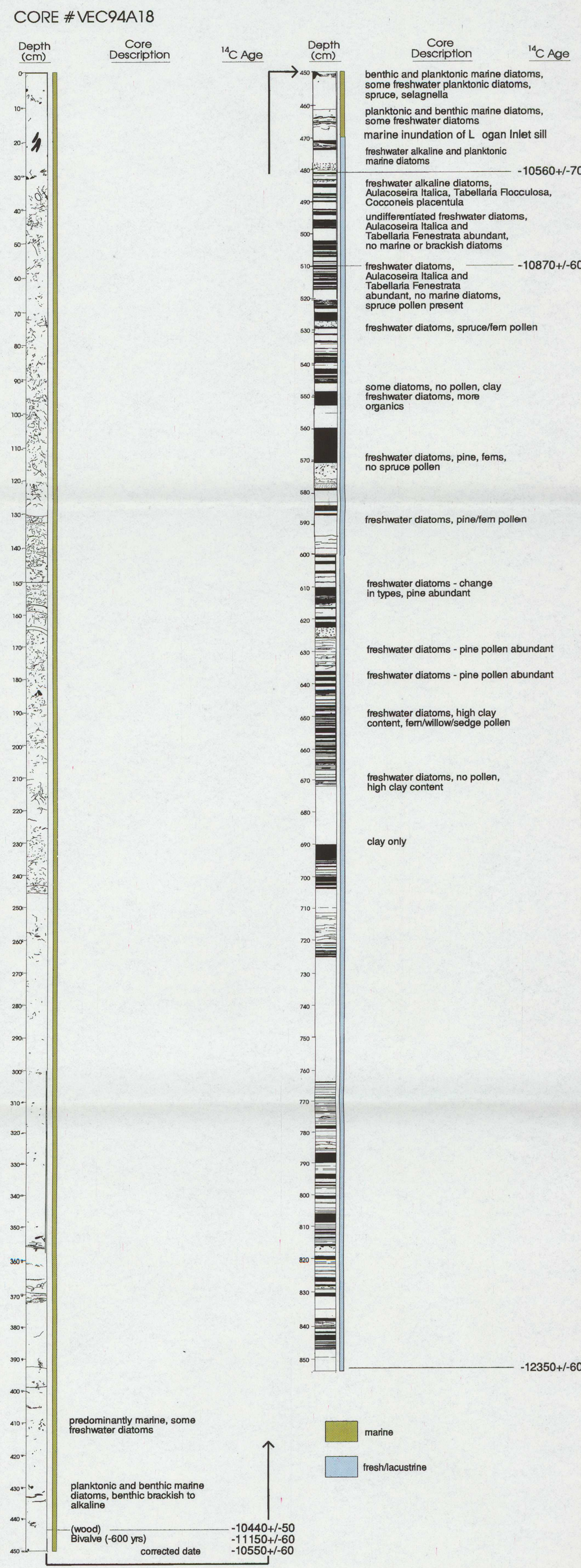


Figure 1. Detailed description and age of sediments collected from Logan Inlet.

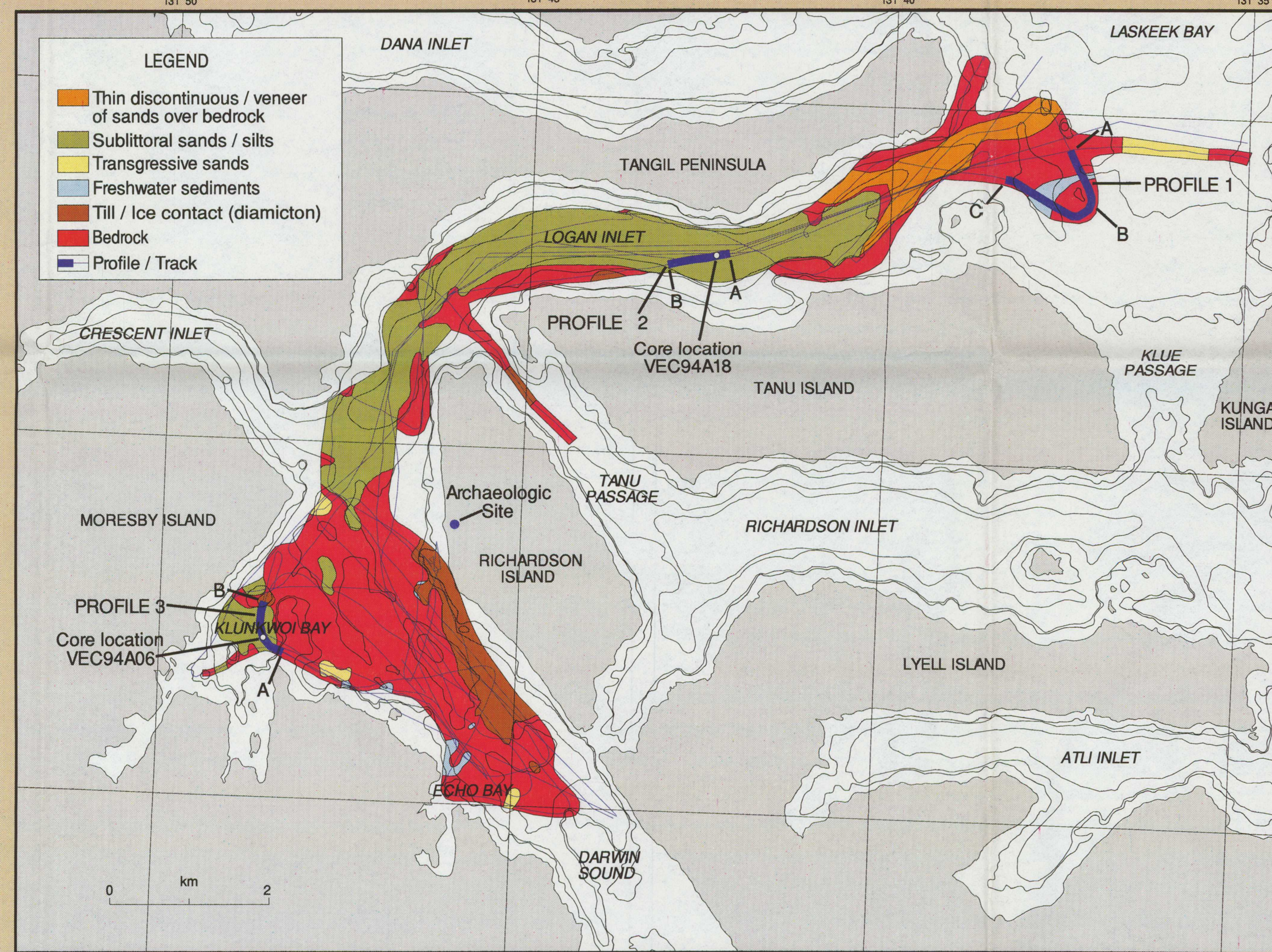


Figure 4. Surficial geology of Logan Inlet and northern Darwin Sound (area shown in Figure 2, above).

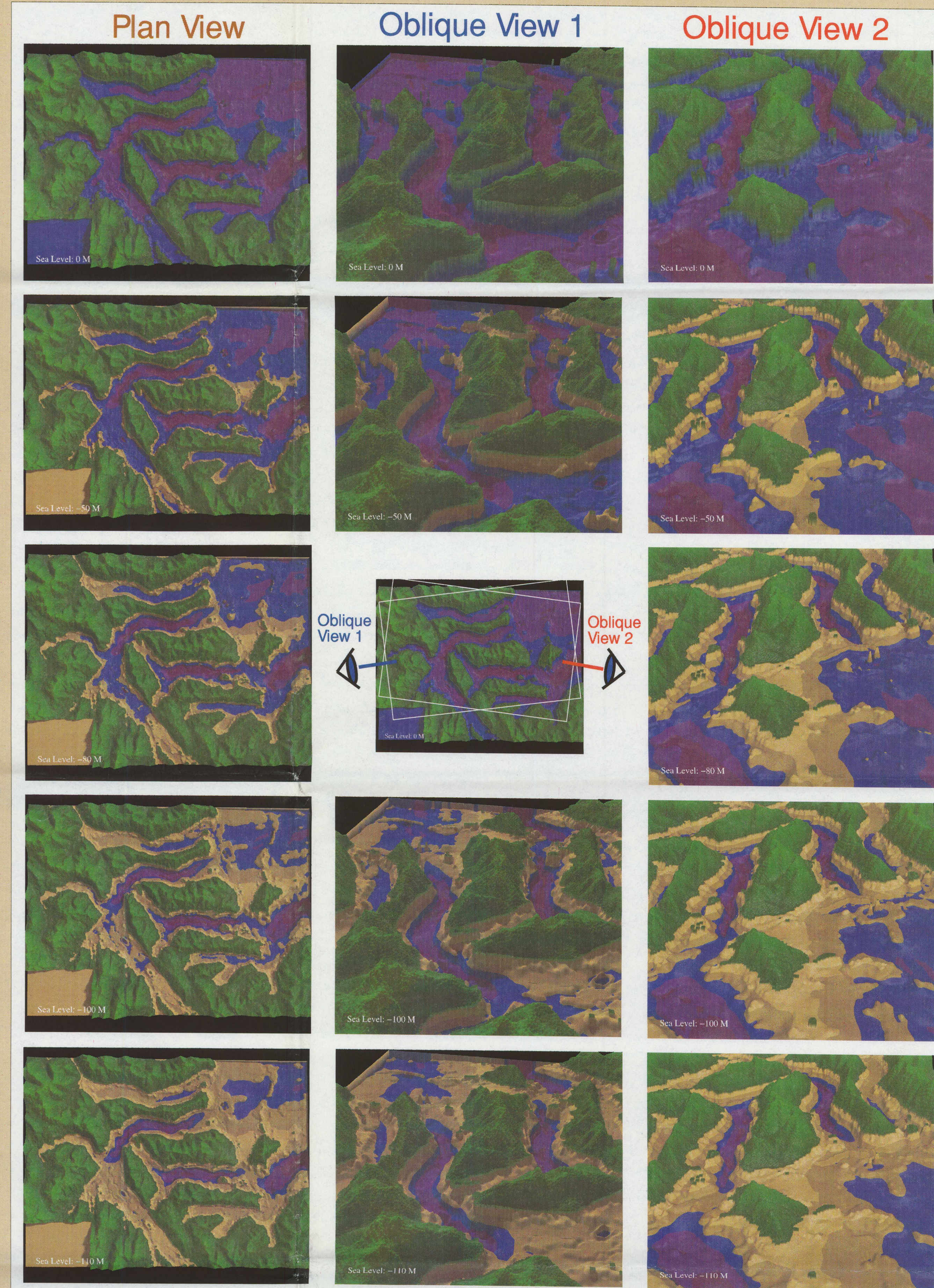
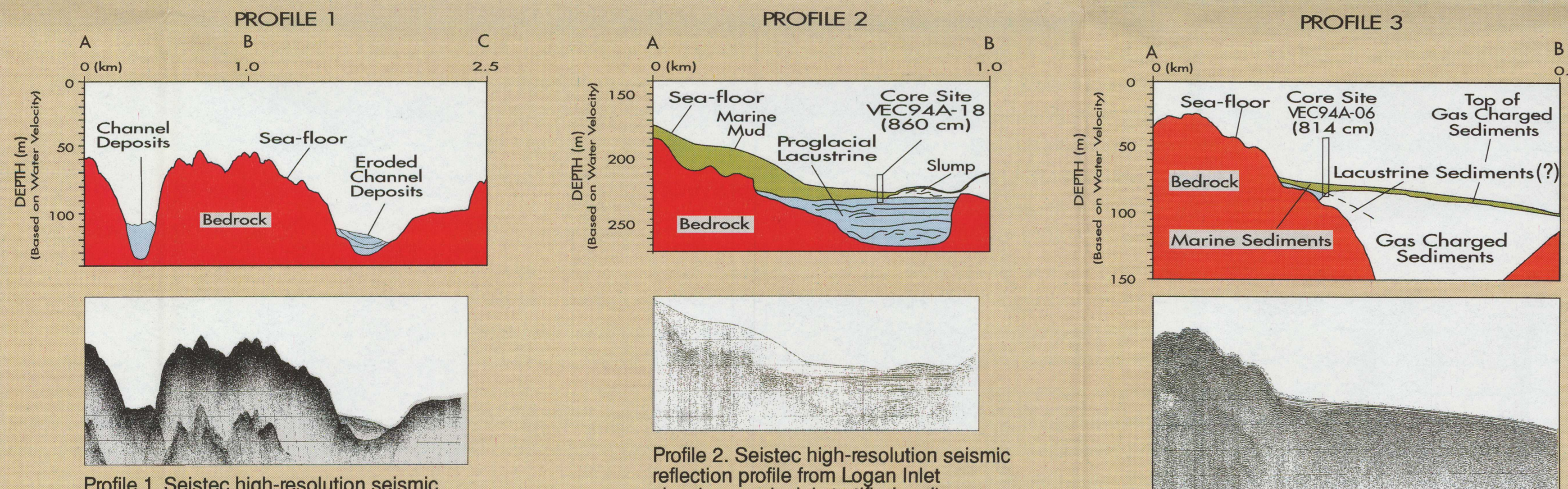
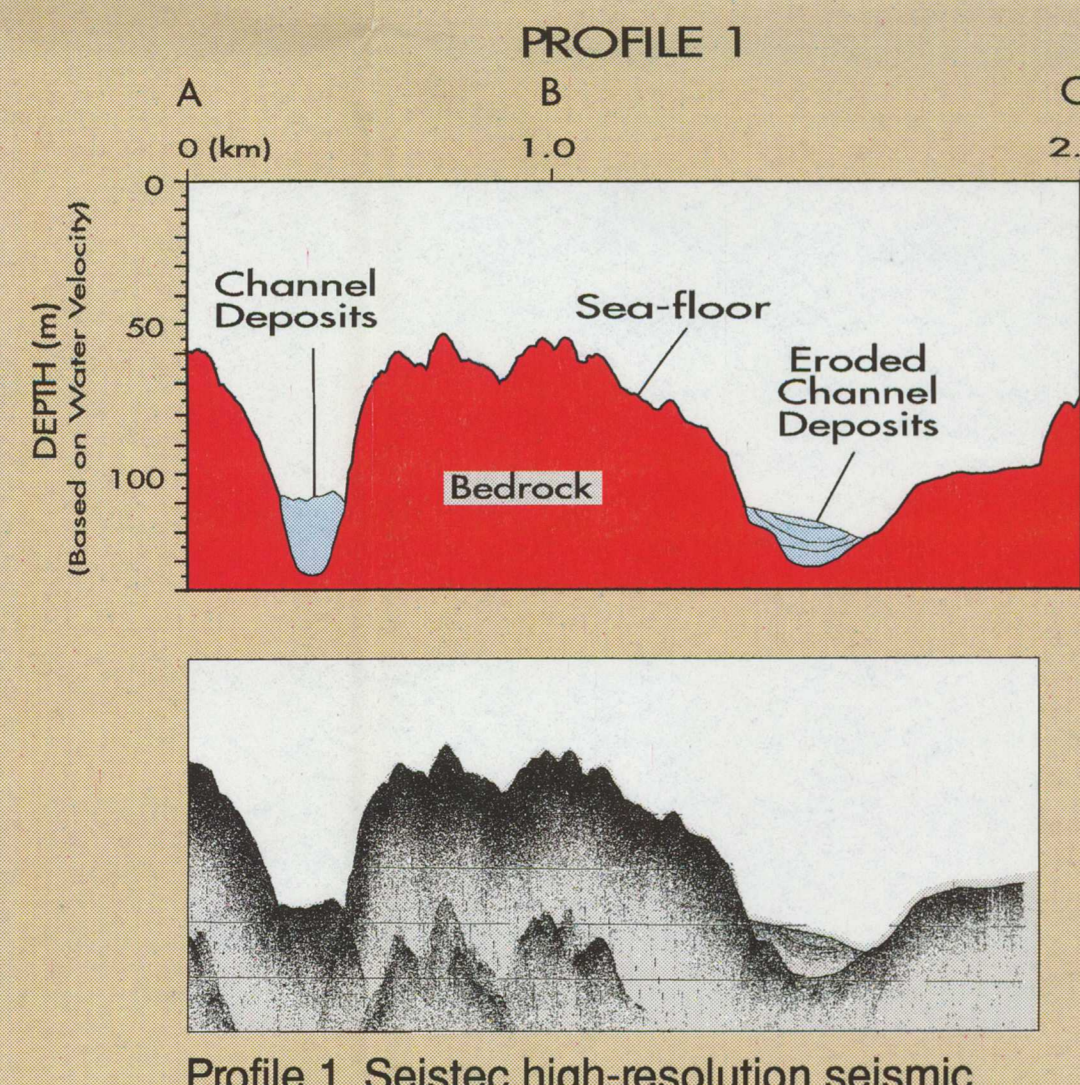
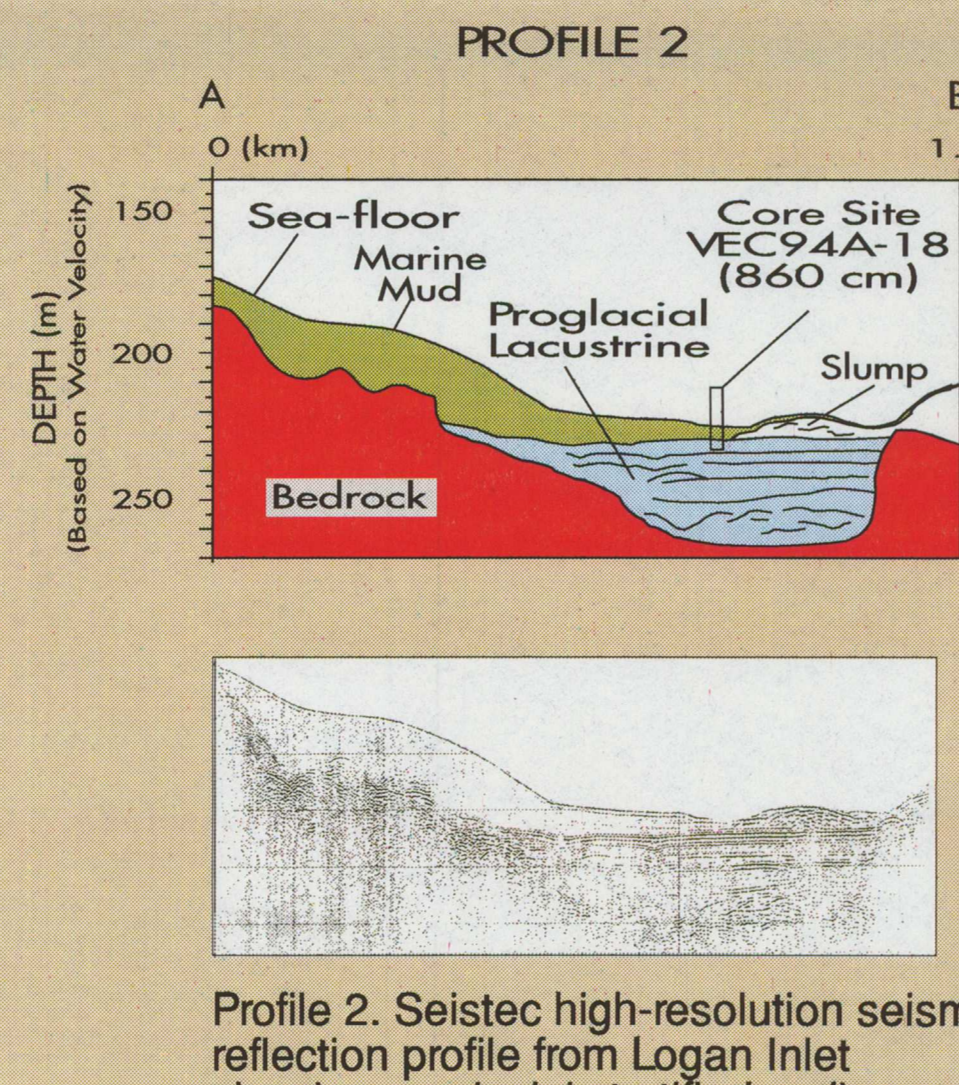


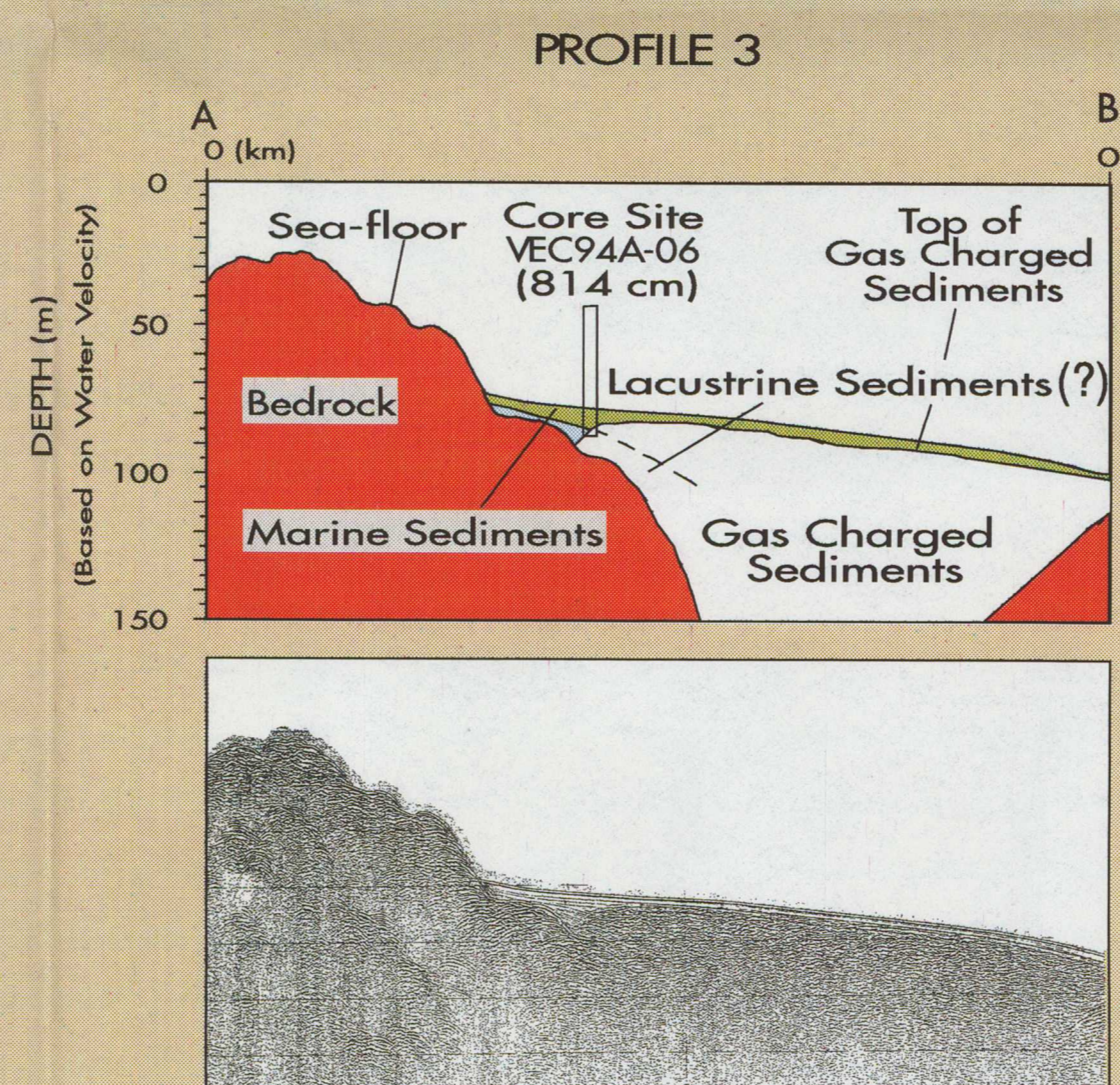
Figure 5. Computer generated plan and three dimensional views of the study area illustrating the paleo-topography and location of paleo-shorelines during various episodes of lowered sea-levels. The terrestrial relief information is derived from 1:20,000 TRIM data set and the offshore data represents a combination of 1:40,000 nearshore navigation charts together with the 1:250,000 NRM offshore bathymetry. The data was digitally gridded and displayed by Interactive Visualization Systems.



Profile 1. Seismic high-resolution seismic reflection profile across Logan Inlet sill showing channel deposits formed by a paleo-river system which drained glacial Lake Logan.



Profile 2. Seismic high-resolution seismic reflection profile from Logan Inlet showing proglacial stratified sediments at the base of the inlet and stratigraphic relationships at the core site.



Profile 3. Seismic high-resolution seismic reflection profile from Klunkwoi Bay showing stratigraphic location of core site.

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