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INTRODUCTION

The seismic stratigraphy of the unconsolidated sediments beneath the Strait of Georgia provides a regional framework for understanding geophysical and geotechnical data, environmental marine geology, the Quaternary history, sedimentary processes and geohazards. This series of time-structure and time-isopach maps delineates the geometry of the unconsolidated sedimentary section beneath the central portion of the Strait of Georgia. The region from Roberts Bank to Hornby Island exhibits the thickest unconsolidated section including modern sediments derived from the Fraser River (Clague et al., 1983) and older glacial strata (Armstrong et al., 1965; Clague, 1976a). Lag facies and older components of the Quaternary stratigraphy dominate further to the NW (Clague, 1976b), to the SE, in the fjords and among the Gulf Islands, where the section is thinner.

The database for this compilation comprises high resolution, 1 second, single channel seismic profiles from cruises: PGC-VEC-82, PGC-VEC-83a&b and PGC-END-84-D (available as GSC OPEN FILE-1514; Hamilton et al., 1987) and selected lines from PGC-PAR-86-8 and PGC-TUL-89-10. The 1985 Terra Surveys Ltd. line WG-04 (Quinn et al., 1988) and the 1969 unpublished multichannel lines from Pan Canadian Oil and Gas Ltd. were used to confirm time to bedrock beneath water bottom multiples.

Seismic sections were interpreted by the author, picking the tops of 4 regionally distinctive acoustic facies shown in profile A-A': TUL-89-10-302-00:40-02:40 or shown in sections in Hamilton and Wigen (1987). This succession of seismic facies is the same used by Hamilton and Luternauer (1983) to map the Quaternary geology and hazards beneath the Strait of Georgia.

The modern seafloor in basinal areas coincides with the top of the **TRANSPARENT FACIES**. This unit is interpreted to be mid-Holocene to Recent hemipelagic silts and muds derived from the plume of the Fraser River. This unit includes: the most hydrous and least dense muds, of lowest strength and most prone to failure in the unconsolidated section. It is equivalent to the upper part of the marine Holocene unit described by Clague (1977) for the northern Strait of Georgia. The geometry and internal character of this facies provide a marine record for interpreting Holocene sea level history and delta growth as discussed for the subaerial Fraser Delta (Williams and Roberts, 1989). Additionally the distribution of this facies describes the average paleo-tidal flow and dispersal of the Fraser River plume (Murty et al., 1990) in the Strait of Georgia.

The top of the flat lying **LAYERED REFLECTOR FACIES** is a Late Wisconsinan or Early Holocene unconformity. The underlying reflectors of this trough-infilling facies are interpreted to be dominantly bathyal proglacial marine turbidites related to deglaciation, an unstable coastline and a floating ice shelf. Wedging of some reflectors suggests some hemipelagic components as well. This facies is usually buried and has very limited outcrop on the seafloor (Hamilton and Luternauer, 1983). The lower part of the marine Holocene unit in northern Georgia Strait (Clague, 1977) is equivalent. The distribution, thickness and internal character of this facies provide a basinal stratigraphic record of postglacial isostatic and eustatic changes for the entire region (Mathews et al., 1966), for the distribution of deglacial and early post-glacial sources and for the initial bathyal progradation of the Fraser Delta whose shallower and more easterly regimes have been documented (Clague et al., 1983). This unit appears to be somewhat diachronous between the separate sub-basins within Georgia Strait and the fjords.

A Late Wisconsinan erosional unconformity rests on acoustically complex, chaotic to stratified deglacial and older dominantly glaciomarine deposits called the **ICE ERODED FACIES**. Lying beneath the basal Wisconsinan unconformity, these older glacial deposits comprise thick sequences whose individual reflectors are thicker than most of the glacial formations defined on land. Dominant lithologies are diamictons and glacio-marine turbidites with minor sands and gravels. This unit includes the densest, least hydrous, strongest and most overcompacted substrates. This facies is equivalent to the reflector package called Pleistocene by Clague (1976b). In places like the subtidal platform around Thormanby Island, the uppermost reflectors of this facies include the Early Wisconsinan Quadra sand formation described by Clague (1976a), and equivalents to the various thin and older drift formations recognized subaerially (Armstrong et al., 1965).

The top of the **BEDROCK FACIES** (the base of the unconsolidated section described herein) is a subsided unconformity formed during prolonged Late Tertiary erosion. This surface has been modified and incised during times of cordilleran ice advance; defined on land by Clague et al., 1980). This facies includes all Tertiary and older rock formations defined on land and in wells.

This collection is presented as time structure and time isopach maps for ready comparison to other seismic data and because interval velocities are only approximately known. The structure contour maps are paleogeomorphic maps, in the sense that they represent a succession of earlier seafloor configurations. The interval maps provide a sense of facies thickness and distribution.

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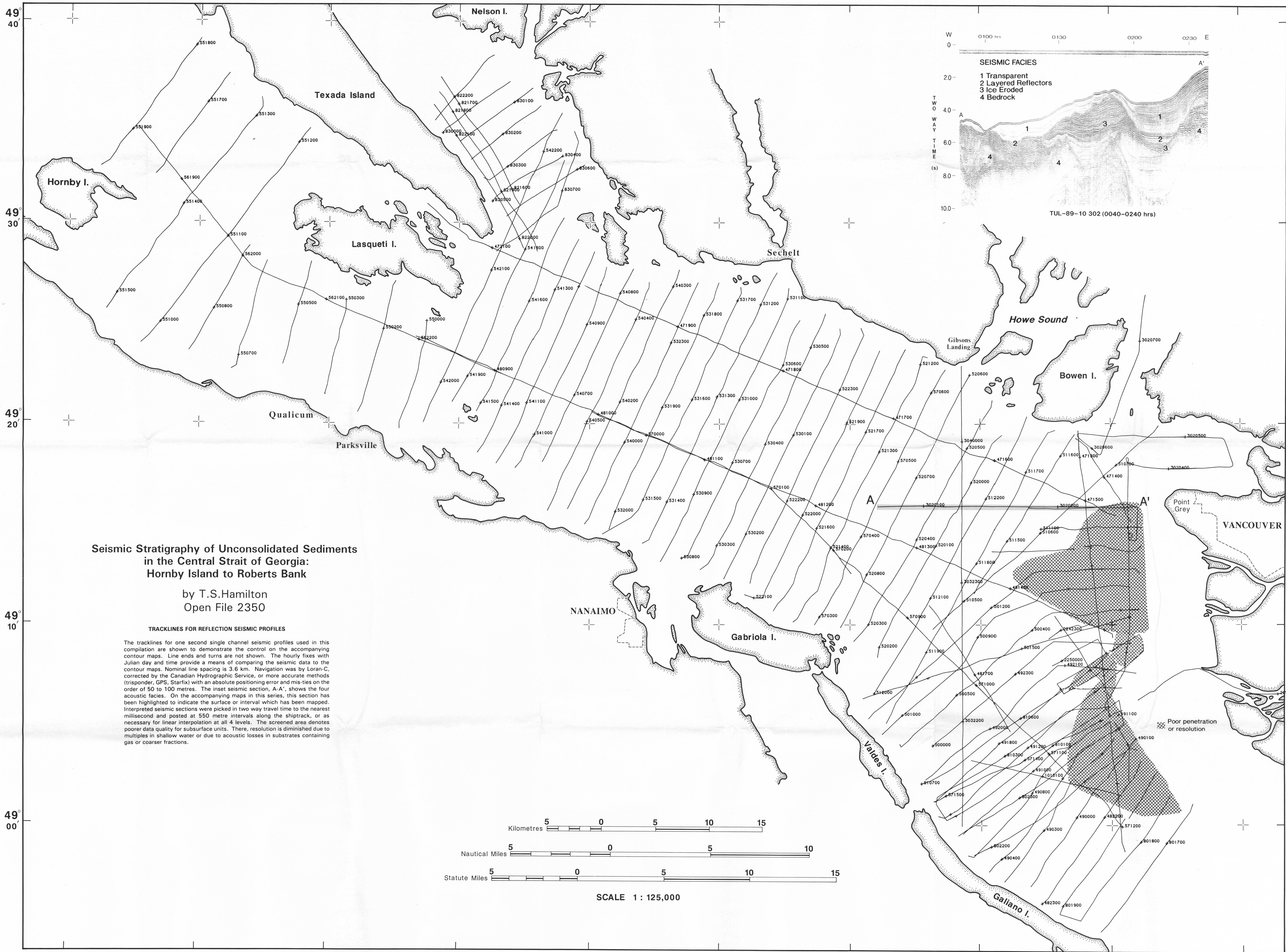

Seismic Stratigraphy of Unconsolidated Sediments in the Central Strait of Georgia: Hornby Island to Roberts Bank

by T.S.Hamilton

Open File 2350

TRACKLINES FOR REFLECTION SEISMIC PROFILES

The tracklines for one second single channel seismic profiles used in this compilation are shown to demonstrate the control on the accompanying contour maps. Line ends and turns are not shown. The hourly fixes with Julian day and time provide a means of comparing the seismic data to the contour maps. Nominal line spacing is 3.6 km. Navigation was by Loran-C, corrected by the Canadian Hydrographic Service, or more accurate methods (trisponder, GPS, Starfix) with an absolute positioning error and mis-ties on the order of 50 to 100 metres. The inset seismic section, A-A', shows the four acoustic facies. On the accompanying maps in this series, this section has been highlighted to indicate the surface or interval which has been mapped. Interpreted seismic sections were picked in two way travel time to the nearest millisecond and posted at 550 metre intervals along the shiptrack, or as necessary for linear interpolation at all 4 levels. The screened area denotes poorer data quality for subsurface units. There, resolution is diminished due to multiples in shallow water or due to acoustic losses in substrates containing gas or coarser fractions.

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