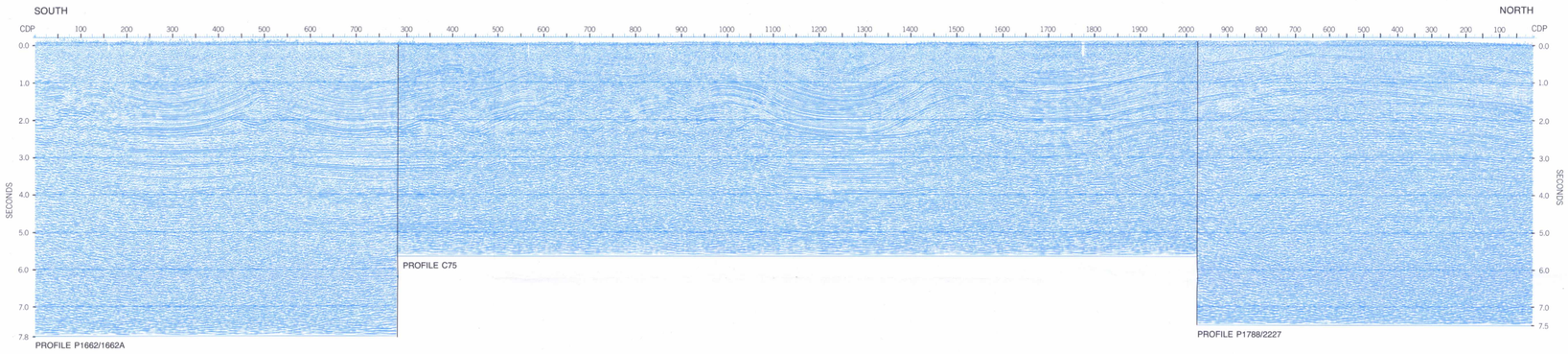
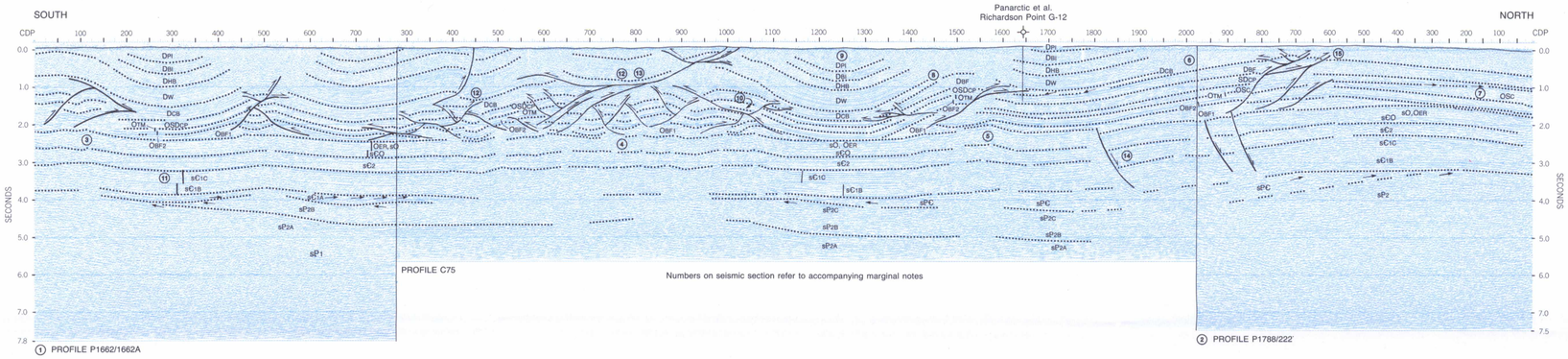
Natural Resources Canada / Ressources naturelles Canada

GEOLOGICAL SURVEY OF CANADA / COMMISSION GÉOLOGIQUE DU CANADA

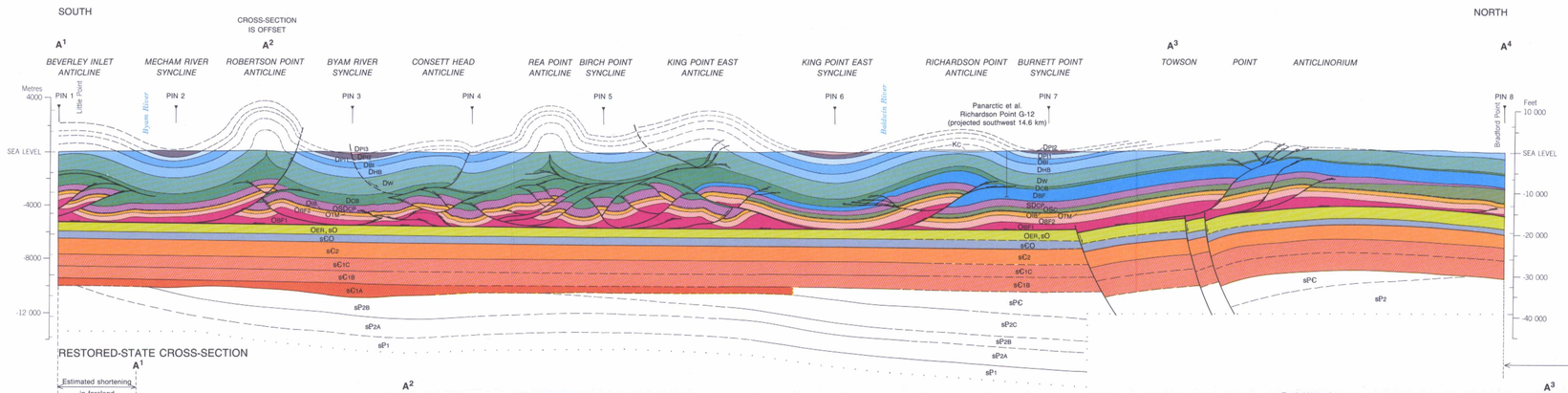
SEISMIC REFLECTION DATA



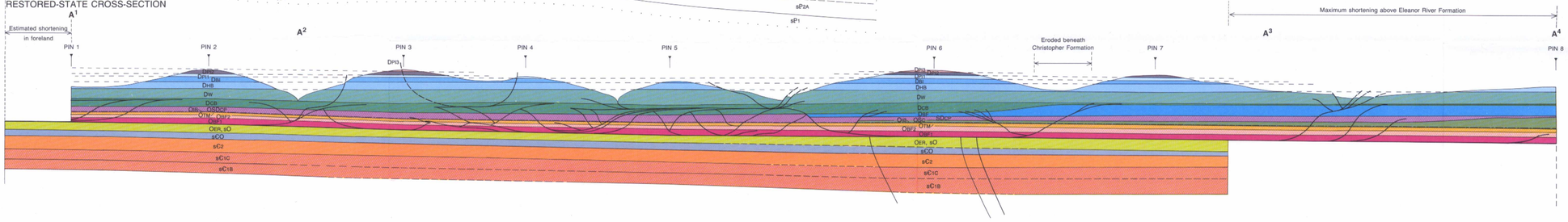
INTERPRETED SEISMIC DATA

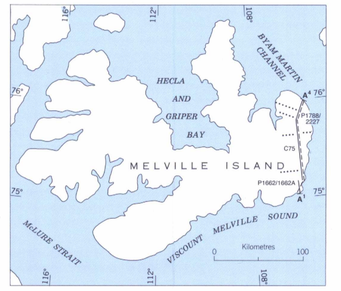


DEFORMED-STATE CROSS-SECTION



RESTORED-STATE CROSS-SECTION





Location of structure sections and seismic profiles

Line of structure section (with offset) ..... A1—A4

Seismic reflection profile (displayed) .....

Seismic reflection profile (consulted only) .....

Maximum shortening above Eleanor River Formation

NOTES TO ACCOMPANY SECTION A
(Seismic profiles P1662/1662A, C75, and P1788/2227)

Acquisition and processing

1. Profiles P1662 and P1662A have been blended after stacking and before migration. Renumbering of CDP traces was executed after blending. The blend intersection is at CDP 530.
2. Profiles P1788 and P2227 have been blended after stacking and before migration. Renumbering of CDP traces was executed after blending. The blend intersection is at CDP 585.
3. Diffractions at the south end of profile P1662/1662A were not entirely eliminated by time migration. Line of section is 20° away from perpendicular to structure.
4. Break up of reflectors below 2.4 seconds and between CDP 1075 and CDP 400 of profile C75 is attributed to large lateral velocity variations and complex structure higher in the section.
5. There are 250 ms of residual velocity pull-up below the top of the Eleanor River Formation (O_{ER}) reflector at CDP 1575, profile C75. Regional apparent dip is to the south below the Bay Fiord Formation (O_{BF1}). Over-migration hyperbolae are also present in this area and become increasingly prominent deeper in the section.
6. Reduced data quality extending from surface to depth between CDP 1925 and 2025, profile C75, is attributed to a 50% reduction in the fold of the stacked traces.

Seismic stratigraphic features

7. An example of hummocky and chaotic internal reflection character occurs in unit OSc on profile P1788/2227 north of CDP 575. Onlapping reflections mark the overlying transgressive base of unit SD_{CP}. The internal patterns of unit OSc are interpreted to be generated by an organic buildup of basin-edge carbonates of Silurian and/or Late Ordovician age. The carbonates are interpreted as passing laterally into basinal and basin slope deposits immediately to the south of this location.
8. The Blue Fiord Formation (D_{BF}) thins dramatically in a southerly direction between CDP 1525 and CDP 1250 on profile C75. The thickness of the overlying Cape De Bray Formation (D_{CB}) and the height of the clinoform reflectors in the Cape De Bray increase to the south in the same area. The thinned portion of the Blue Fiord is interpreted as having been deposited on the local basin slope. The Cape De Bray has subsequently prograded into and filled the basin. Maximum paleowater depth is readily calculated.
9. An excellent example of the seismic character of the Devonian clastic wedge, including all formations from the Cape De Bray Formation (D_{CB}) to the Parry Islands Formation (D_{PI}), occurs between CDP 1125 and 1450 on profile C75.
10. The medial reflection typical of the upper Bay Fiord (O_{BF2}) interval is absent in the overthrust structure between CDP 975 and 1075, profile C75.
11. Unit sC_{1C} is nearly reflection free along profile P1662/1662A. Continuous parallel reflections increase progressively in the unit to the north along the line of section. In contrast, units sC_{1B} and sC_2 are more extensively reflection free.

Structural features

12. Thrust ramps have apparently occupied bedding plane clinoforms in the Cape De Bray Formation (D_{CB}) at three locations on profile C75. The topset strata represent an upper detachment level.
13. The near-surface syncline beneath CDP 650 to 850, profile C75, masks an unusual number of thrusts and complex geology below the Cape De Bray Formation (D_{CB}). The importance of the Cape De Bray as a zone of apparent ductile flow is well defined along much of profile C75, CDP 275 to 1150.
14. Syndepositional growth can be interpreted across a fault within unit sC_2 and the lower Bay Fiord (O_{BF1}) near CDP 1850, profile C75. Alternatively, thickening of the lower Bay Fiord and/or sC_2 could arise from lateral movements on this steeply-dipping fault.
15. Faults are common at the surface between CDP 600 and 800 on profile P1788/2227. Kinematic data indicate that both thrusts and sinistral strike-slip faults are present within the Blue Fiord Formation (D_{BF}).

Depth conversion

D_{PI}, D_{BI}: 3.3 km s^{-1} (south) to 3.6 km s^{-1} (north)
D_{HB}: 4.3 km s^{-1}
Dw: 4.2 km s^{-1}
D_{CB}: 3.9 km s^{-1}
OSD_{CP}: 5.0 km s^{-1} (south) to 5.7 km s^{-1} (north)
D_{BF}, OSc, SD_{CP}: 6.1 km s^{-1} (south) to 5.0 km s^{-1} (north)
O_{TM}, O_{BF2}: 6.4 km s^{-1}
O_{BF1}: 5.3 km s^{-1}
sC_{1A}–O_{ER}: 5.7 km s^{-1}
below sC_{1A}: 6.2 km s^{-1}

Method of cross-section construction and restoration

Bed length measurement and balancing of the contacts above O_{BF1}, O_{BF2}, O_{TM}, OSc and OSD_{CP} between pairs of adjacent pin lines.

Bed length measurement of the contacts above O_{ER} and D_{HB}.

Area measurement and restoration of O_{BF1}, D_{CB}, Dw, D_{HB}, D_{BI}, and D_{PI} between pairs of adjacent pin lines. This method assumes that horizontal shortening of units O_{BF1}, and D_{CB}–D_{PI} is the same as that expressed by bed lengths of contacts above O_{BF1}–OSD_{CP}.

Results

Section length: 106.1 km

Bed length of O_{TM} (this section): 128.8 km
Shortening of O_{TM} (this section): 128.8 - 106.1 = 22.7 km (16.9%)
Estimated shortening in foreland*: 5.7 km
Total shortening of O_{TM} from foreland: 22.7 + 5.7 = 28.4 km (11.1%)

Bed length of O_{ER} (this section): 106.1 km
Shortening of O_{ER} (this section): <0.1 km
Estimated shortening in foreland*: nil
Total shortening of O_{ER} from foreland: <0.1 km

Deformed-state bed length of D_{HB}: 113.3 km
Apparent shortening of D_{HB} (this section): 113.3 - 106.1 = 7.2 km (6.3%)
Estimated apparent shortening in foreland*: 1.9 km
Total apparent shortening of D_{HB} (from foreland): 7.2 + 1.9 = 9.1 km (3.8%)

Range of assumed tectonic thickening of Dw–D_{PI} (approximate): 10–23%

*Foreland shortening is carried over to this section along the axial trace of Liddon Gulf Syncline from pin line 2 on Section C.

ESIC CIST
OCT 2 2003
Earth Sciences Sector / Secteur des sciences de la Terre

Published 1994

Geology by J.C. Harrison 1984, 1985 and 1987

Geological cartography by the Institute of Sedimentary and Petroleum Geology, Geological Survey of Canada

Any revisions or additional geological information known to the user would be welcomed by the Geological Survey of Canada

SECTION A
(MAP 1844A)

LITTLE POINT (ON VISCOUNT MELVILLE SOUND) TO BRADFORD POINT (ON BYAM MARTIN CHANNEL), MELVILLE ISLAND

DISTRICT OF FRANKLIN
NORTHWEST TERRITORIES
Scale 1:250 000

Kilometres
5 0 5 10

Canada

Section A
Sheet 3 of 12 (Map 1844A)
GSC Bulletin 472

NOT TO BE TAKEN FROM LIBRARY
NE PAS SORTIR DE LA BIBLIOTHÈQUE
1844A 3of12

MAP LIBRARY / CARTOTHÈQUE

This map has been produced from a scanned version of the original map
Reproduction par numérisation d'une carte sur papier