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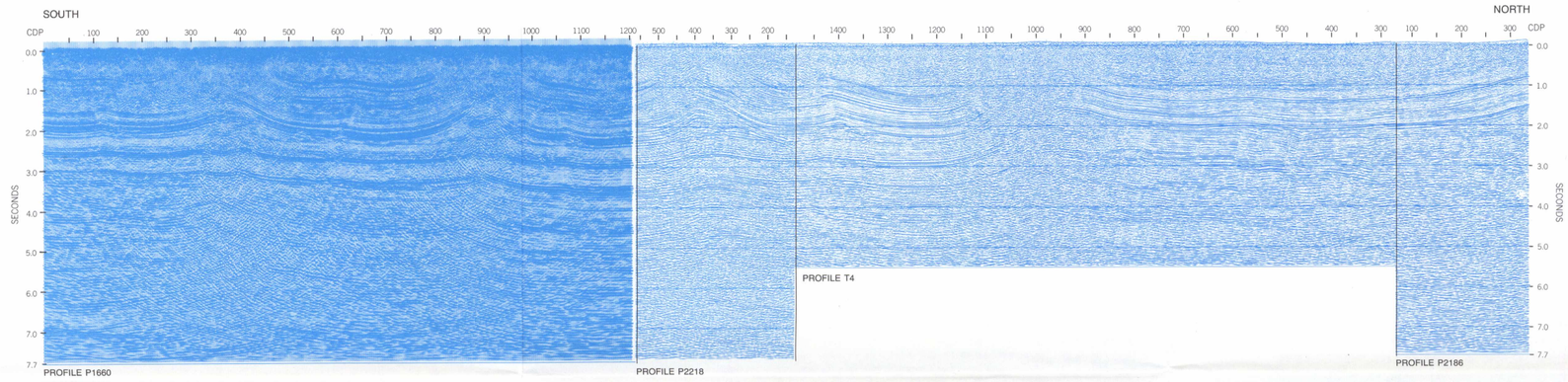
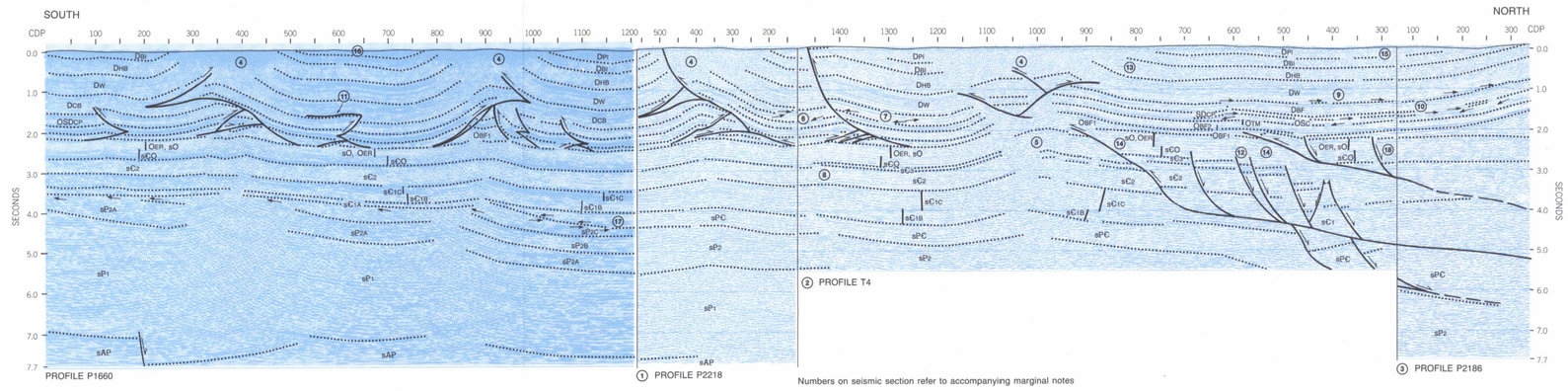
GEOLOGICAL SURVEY OF CANADA / COMMISSION GÉOLOGIQUE DU CANADA

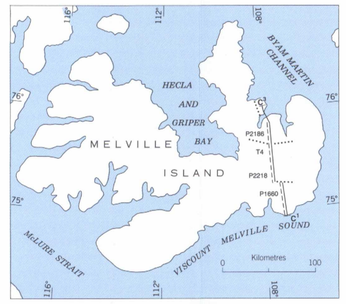
SEISMIC REFLECTION DATA



INTERPRETED SEISMIC DATA



Numbers on seismic section refer to accompanying marginal notes



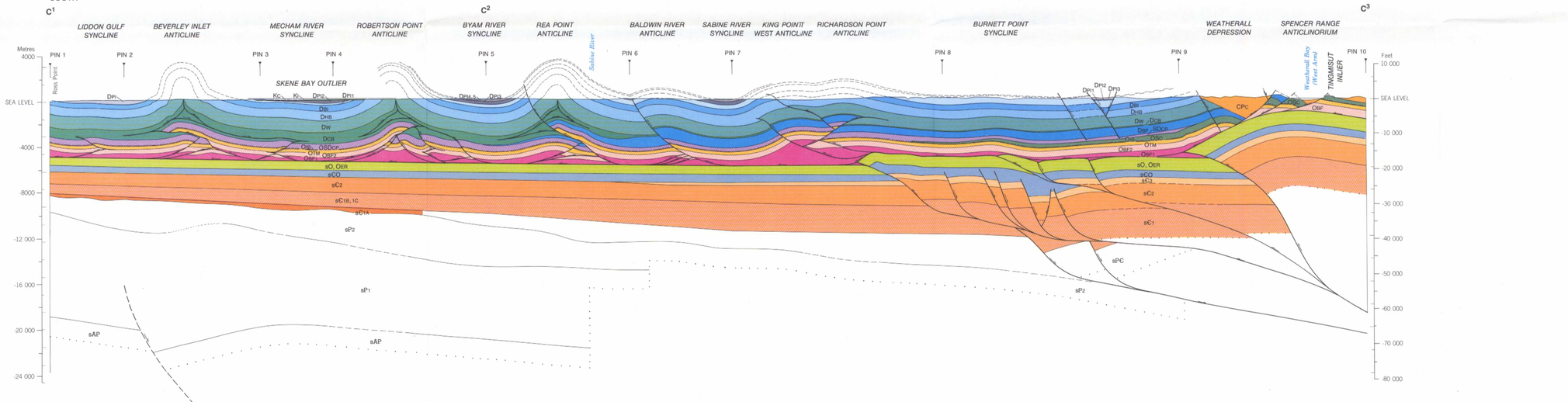
Location of structure sections and seismic profiles

Line of structure section (with offset) ..... C^1—C^3

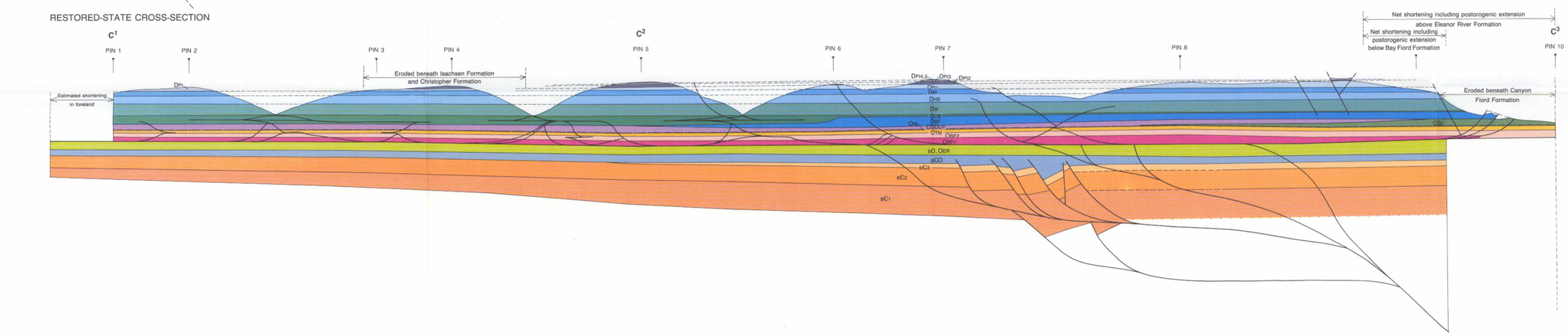
Seismic reflection profile (displayed) .....

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

DEFORMED-STATE CROSS-SECTION



RESTORED-STATE CROSS-SECTION



NOTES TO ACCOMPANY SECTION C
(Seismic profiles P1660, P2218, T4 and P2186)

Acquisition and processing

1. Profiles P1660 and P2218 do not intersect. Physical splice is made at closest points of the two surveys. The splice point on P1660 (CDP 1206) is 7.3 km east and along strike from the splice point on P2218 (CDP 560). Offset of surveys has resulted in some mismatch of deep reflectors. The dark aspect of P1660 results from the variable area wiggle trace type of plot. On the other lines, the wiggle has been omitted.
2. Intersecting profiles T4 and 5500 ms of P2218 have been blended after stacking and before migration. Renumbering of CDP traces was executed after blending. The blend intersection is at CDP 1410. A separately migrated 7700 ms portion of P2218 was then physically spliced to the blended and migrated T4/P2218 profile. For simplicity of display and description, the contact between surveys is drawn at the splice line.
3. Intersecting profiles T4 and 5500 ms of P2186 have been blended after stacking and before migration. Renumbering of CDP traces was executed after blending. The blend intersection is at CDP 280. A separately migrated 7700 ms portion of P2186 was then physically spliced to the blended and migrated T4/P2186 profile. For simplicity of display and description, the contact between surveys is drawn at the splice line.
4. Dramatic loss of signal above 1000 ms at four locations on Section C is associated with steep to vertical bedding of near-surface strata, complex near-surface structure, and the tendency for wave fronts to diverge and be scattered by convex (anticlinal) reflectors.
5. As well as residual velocity pull-up and over migration hyperbolae, there is significant structural relief on seismic units below the top of the Eleanor River Formation (OER) everywhere north of CDP 1150, profile T4.

Seismic stratigraphic features

6. The chaotic internal reflection configuration of the Blue Fiord Formation (DBF) beneath CDP 1475, profile T4, is attributed to organic buildup of carbonates at a local basin margin. The overlying Cape De Bray Formation (DCB) thickens dramatically immediately to the south, and the Blue Fiord passes laterally into a condensed interval of continuous subhorizontal reflectors of basinal association.
7. Inclined (clinoform) internal reflections, with downlapping and toplapping patterns, indicate that the Blue Fiord Formation (DBF) interval consists of progradational strata (north end of P2218, south end of T4).
8. The obvious southern limit of unit sC3 on this line of section is located near 2800 ms, CDP 1425, profile T4.
9. Onlapping reflections above the Blue Fiord Formation (DBF) are important evidence indicating the existence of a sequence boundary near the base of the thin Cape De Bray Formation (not shown).
10. Downlapping reflections at three locations in unit OSC (P2186 and north end of T4) are believed to be associated with sloping and progradational strata of Upper Ordovician and Silurian age. The upper reflection surface of unit OSC bears onlapping reflection patterns which define a depositional sequence boundary beneath unit SDCP.

Structural features

11. The small convex reflector within the Cape De Bray Formation (DCB) interval beneath CDP 590, profile P1660, could be either a mound-shaped sedimentary feature or a mesoscopic intraformational fold associated with slip on an underlying detachment surface.
12. Faults imaged on profile T4 between CDP 565 and 695 appear to display growth and have been active during deposition of unit sCO.
13. Thickening of the Hecla Bay Formation (DHB) interval south of CDP 600, profile T4, could be due to either rapid lateral variations in rates of sedimentation, or tectonic thickening caused by local volume redistribution.
14. Thrust ramps in Cambro–Ordovician units (sC1–sC3 and sCO–OER) at two locations on profile T4 (CDP 500 and 800) merge upward into the detachment at the base of the lower Bay Fiord (OBF1) interval.
15. Faults of unknown attitude are common at the surface above a region of reduced data quality near the T4 and P2186 splice. The correct method of interpreting and projecting these faults to depth is unknown.
16. Outliers of the Isachsen Formation (Ki) are known at the surface between CDP 540 and 740, on profile P1660. The outliers appear to be fault bounded at surface. However, no corresponding faults are interpretable on the seismic data. The preferred interpretation is that the Isachsen is preserved in ancient channels on the sub-Cretaceous peneplain surface.
17. The structural relation at 4200 to 4400 ms (CDP 1000 to 1200, profile P1660) is interpreted as one in which an angular unconformity developed above eroded unit sP2 prior to onlap of unit sPC.
18. Down-to-the-north extension on two deep-seated faults that die out upward in the lower Bay Fiord Formation (OBF1) is assumed to be balanced by comparable extension above the Bay Fiord during Carboniferous syntectonic sediment accumulation and faulting within Weatherall Depression. Similar young deep-seated faults are recorded on Sections A, B and D.

Depth conversion

CPC: 3.7 km s^{-1}

DPI, DBI: 3.6 km s^{-1}

DW, DHB: 4.3 km s^{-1} (south)–4.0 km s^{-1} (north)

DCB: 3.9 km s^{-1}

OSDCP: 4.8 km s^{-1} (south)–5.5 km s^{-1} (north)

DBF, OSC, SDCP: 6.0 km s^{-1} (south)–5.0 km s^{-1} (north)

OTM, OBF2: 6.4 km s^{-1}

OBF1: 5.3 km s^{-1}

sPC–OER: 5.7 km s^{-1}

below sPC: 6.2 km s^{-1}

Method of cross-section construction and restoration

Bed length measurement and balancing of the contacts above OBF1, OBF2, OTM, OSC and OSDCP between pairs of adjacent pin lines.

Bed length measurement and balancing of the contacts above sC1, sC2, sC3, sCO, and OER between pairs of adjacent pin lines.

Bed length measurement of the contact above DHB.

Area measurement and restoration of OBF1, DCB, DW, DHB, DBI, and DPI. This method assumes that horizontal shortening of units OBF1, DCB–DPI is the same as that expressed by bed lengths of contacts above OBF1–OSDCP.

Results

Section length: 115.7 km
Postorogenic extension: 4.2 km
Pre-extension section length: 115.7 - 4.2 = 111.5 km

Bed length of OTM (this section): 127.3 km
Shortening of OTM (this section): 127.3 - 111.5 = 15.8 km (9.4%)
Estimated shortening in foreland*: 5.5 km
Total shortening of OTM from foreland: 15.8 + 5.5 = 21.3 km (8.6%)

Bed length of OER (this section): 123.1 km
Shortening of OER (this section): 123.1 - 111.5 = 11.6 km (9.4%)
Estimated shortening in foreland*: nil
Total shortening of OER from foreland: 11.6 km

Deformed-state bed length of DHB: 120.8 km (includes 10.45 line km existing prior to CPC deposition)
Apparent shortening of DHB (this section): 120.8 - 111.5 = 9.3 km (7.7%)
Estimated apparent shortening in foreland*: 1.9 km
Total apparent shortening of DHB (from foreland): 9.3 + 1.9 = 11.2 km (4.7%)

Range of assumed tectonic thickening of DW–DPI (approximate): 2–9%

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

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 C
(MAP 1844A)

ROSS POINT (ON VISCOUNT MELVILLE SOUND) TO TINGMISUT LAKE (NEAR WEATHERALL BAY), MELVILLE ISLAND

DISTRICT OF FRANKLIN
NORTHWEST TERRITORIES
Scale 1:250 000

Kilometres
5 0 5 10

Canada