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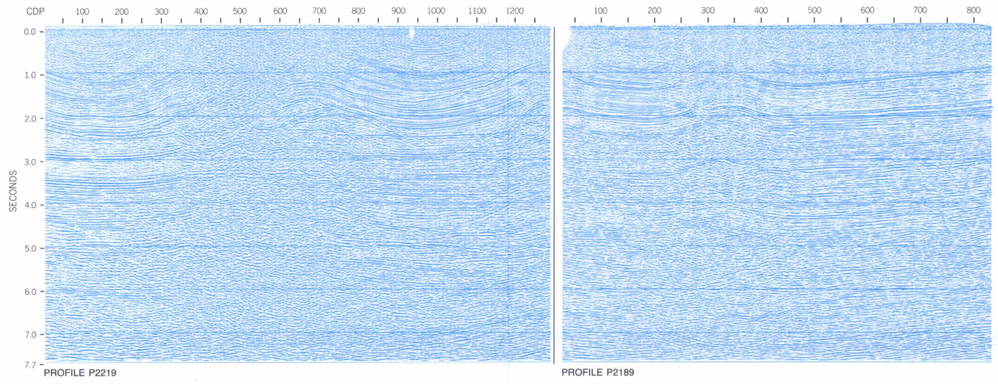
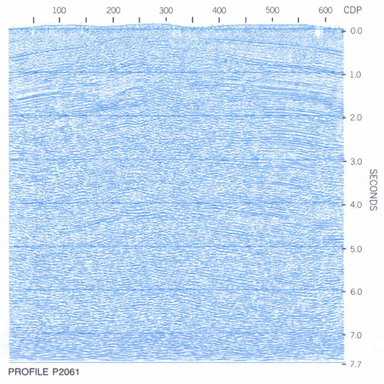
GEOLOGICAL SURVEY OF CANADA | COMMISSION GÉOLOGIQUE DU CANADA

SEISMIC REFLECTION DATA

SOUTH

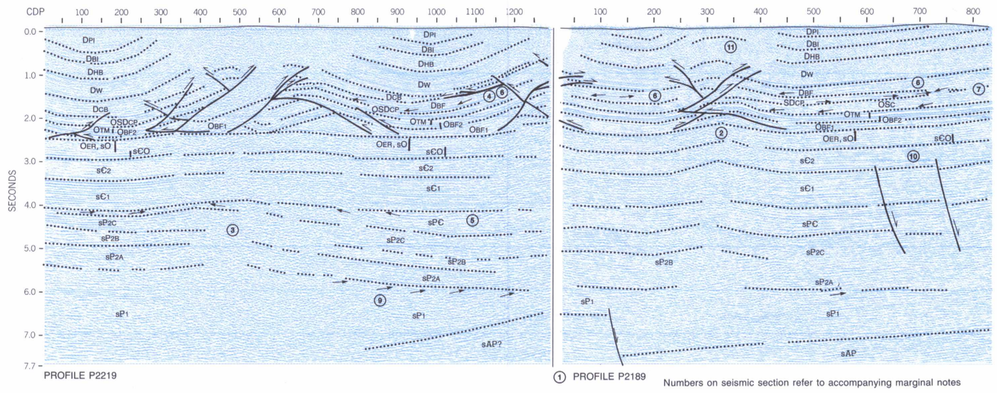


NORTH



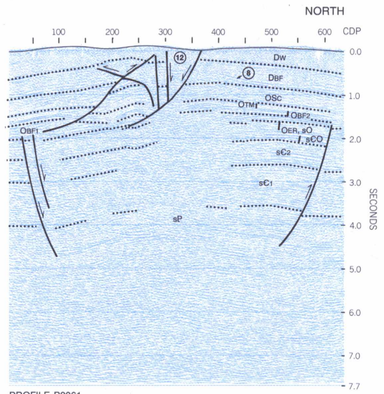
INTERPRETED SEISMIC DATA

SOUTH



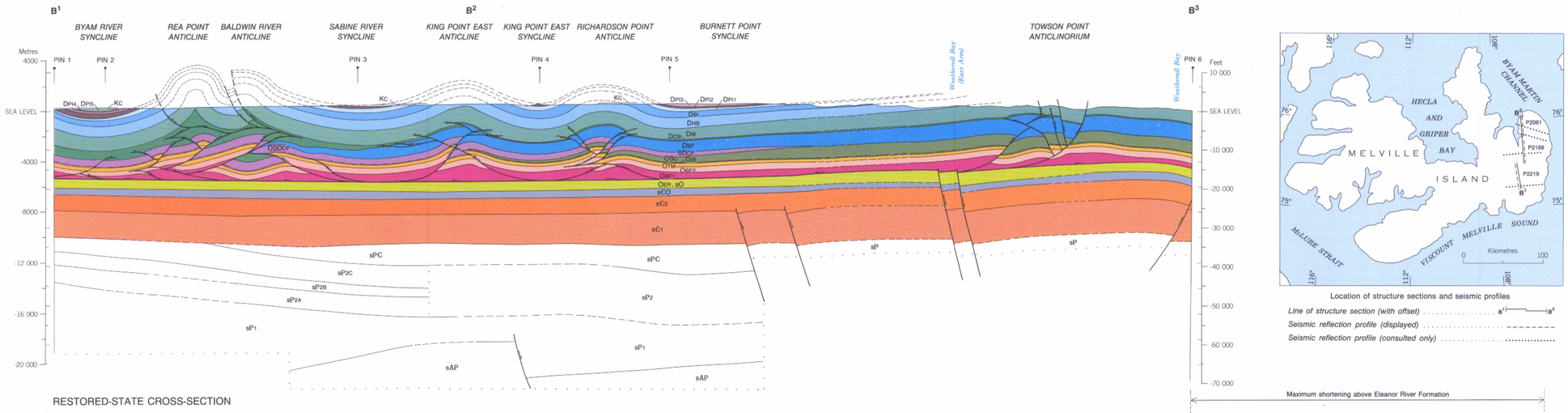
Numbers on seismic section refer to accompanying marginal notes

NORTH



DEFORMED-STATE CROSS-SECTION

SOUTH — NORTH



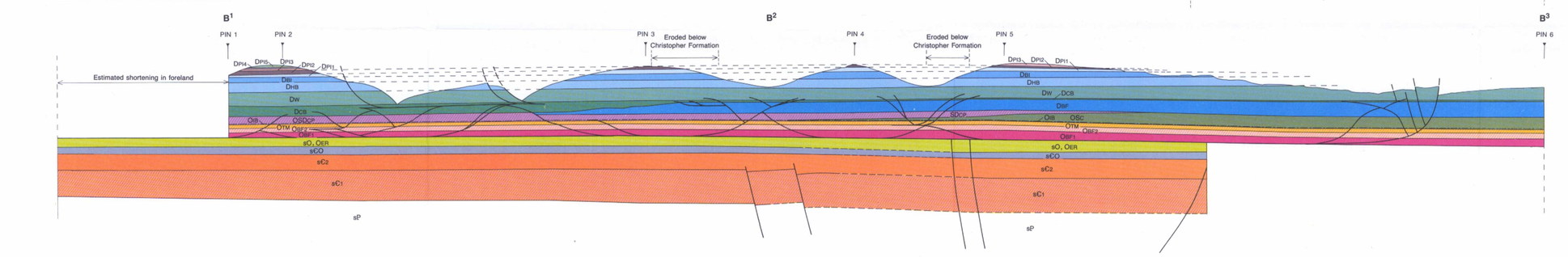
Location of structure sections and seismic profiles

Line of structure section (with offset) ..... B1 — B3

Seismic reflection profile (displayed) .....

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

RESTORED-STATE CROSS-SECTION



NOTES TO ACCOMPANY SECTION B
(Seismic profiles P2219, P2189, and P2061)

Acquisition and processing

1. Profiles P2219 and P2189 do not intersect. Physical splice is made at closest points of the two surveys. The splice point on P2189 (CDP 25), is 9 km east and along strike from the splice point on P2219 (CDP 1284). Offset of surveys has resulted in some mismatch of deeper reflectors.
2. The apparent relief on and below the Eleanor River Formation (OER) and unit sO interval and centred on CDP 325, profile P2189, is interpreted as residual velocity pull-up, complicated by over migration hyperbolae deeper in the section.
3. Correlation of ?Proterozoic reflections between CDP 250 and 800, profile P2219, must take into account up to 200 ms of velocity pull-up and the masking effects of over migration hyperbolae.

Seismic stratigraphic features

4. A chaotic internal reflection configuration with an irregular upper bounding reflector typifies the southern limit of the Blue Fiord Formation (DBF) between CDP 950 and 1150, profile P2219. The Blue Fiord thins and passes laterally to the south into a condensed interval with parallel continuous internal reflections. In these areas the thinned Blue Fiord section is overlain by a greatly thickened Cape De Bray Formation (DCB) interval. North of CDP 1150, the equivalent section of the Blue Fiord is also characterized by continuous parallel reflections but the overlying Cape De Bray unit is thin.
5. An excellent example of the Proterozoic(?) and Cambrian(?) seismic units and all the Ordovician to Devonian seismic stratigraphy is documented on profile P2219 between CDP 800 and 1200.
6. Clinoform reflectors with downlap and apparent toplap reflections are observed at three locations in the medial Blue Fiord Formation (DBF) interval. These features testify to the overall progradational character of the unit.
7. Weak clinoform reflectors with downlap and apparent toplap patterns occur in unit OSC on profile P2189 (CDP 350 to 750). A strong upper reflection with basal onlap patterns marks the transgressive base of overlying unit SDCP.
8. The reflection at 500 to 750 ms beneath CDP 375 to 500, profile P2061, may be a pegleg multiple of the top DBF primary reflection.

Structural features

9. A possibly unique example of an apparent structural discordance between units sP2A and sP1 occurs at 5700 to 6000 ms, CDP 750 to 1250, profile P2219.
10. Features near CDP 610 and 735, profile P2189, can be interpreted as growth faults active during deposition of unit sC2. Change in unit thickness may also have been caused by lateral movement on the faults.
11. A good example of a pop-up structure is observed beneath CDP 325, profile P2189.
12. Kinematic data from surface geology in the Blue Fiord Formation (DBF) interval of the poorly imaged structure beneath CDP 275 to 375, profile P2061, indicate the existence of both thrusts and sinistral strike-slip faults. The normal fault below CDP 370, profile P2061 is probably a Carboniferous extensional structure continuous with a similar fault on the south side of the Tingmisut Inlier.

Depth conversion

DPI, DBI: 3.1 km s^{-1} (south)–3.6 km s^{-1} (north)
DHB: 4.2 km s^{-1}
DW: 4.0 km s^{-1} (south)–4.2 km s^{-1} (north)
DCB: 3.9 km s^{-1}
OSDCP: 5.0 km s^{-1} (south)–5.5 km s^{-1} (north)
DBF, OSC, SDCP: 6.1 km s^{-1} (south)–5.0 km s^{-1} (north)
OTM, OBF2: 6.4 km s^{-1}
OBF1: 5.3 km s^{-1}
sC1A–OER: 5.7 km s^{-1}
below sC1A: 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, OSDCP between pairs of adjacent pin lines.

Bed length measurement of the contacts above OER and DHB (or DCB, where DHB is absent north of pin line 5).

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

Results

Section length: 91.1 km

Bed length of OTM (this section): 105.8 km
Shortening of OTM (this section): 105.8 - 91.1 = 14.7 km (14.0%)
Estimated shortening in foreland*: 13.6 km
Total shortening of OTM from foreland: 14.7 + 13.6 = 28.3 km (10.4%)

Bed length of OER (this section): 91.1 km
Shortening of OER (this section): <0.1 km
Estimated shortening in foreland*: nil
Total shortening of OER from foreland: <0.1 km

Deformed-state bed length of DHB: 97.2 km
Apparent shortening of DHB (this section): 97.2 - 91.1 = 6.1 km (6.2%)
Estimated apparent shortening in foreland*: 7.9 km
Total apparent shortening of DHB (from foreland): 6.1 + 7.9 = 14.0 km (5.4%)

Range of assumed tectonic thickening of DW–DPI (approximate): 3–19%

*Foreland shortening is carried over to this section along the axial trace of Byam River Syncline from pin line 5 on Section C.

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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 B
(MAP 1844A)

HEADWATERS OF BYAM RIVER TO DOMETT POINT (ON WEATHERALL BAY), MELVILLE ISLAND

DISTRICT OF FRANKLIN
NORTHWEST TERRITORIES
Scale 1:250 000

Kilometres 5 0 5 10

Canada