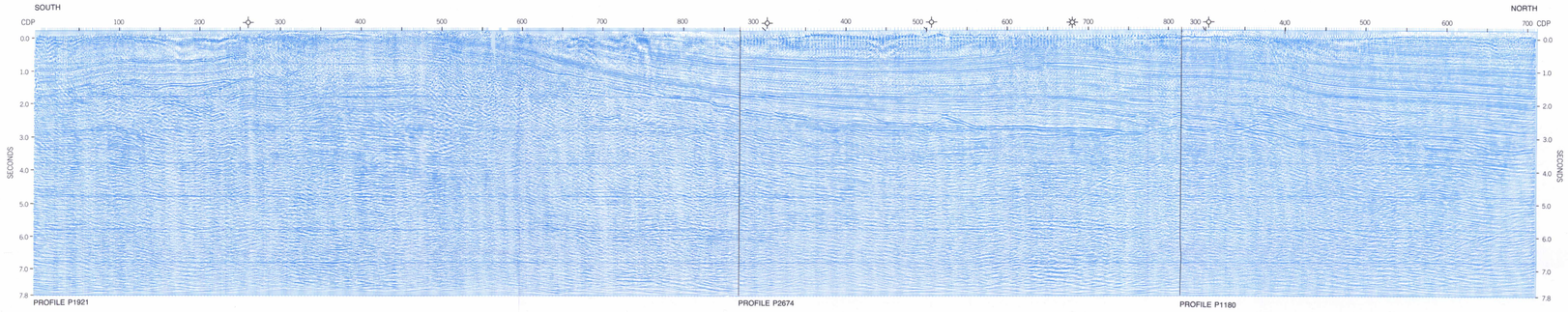
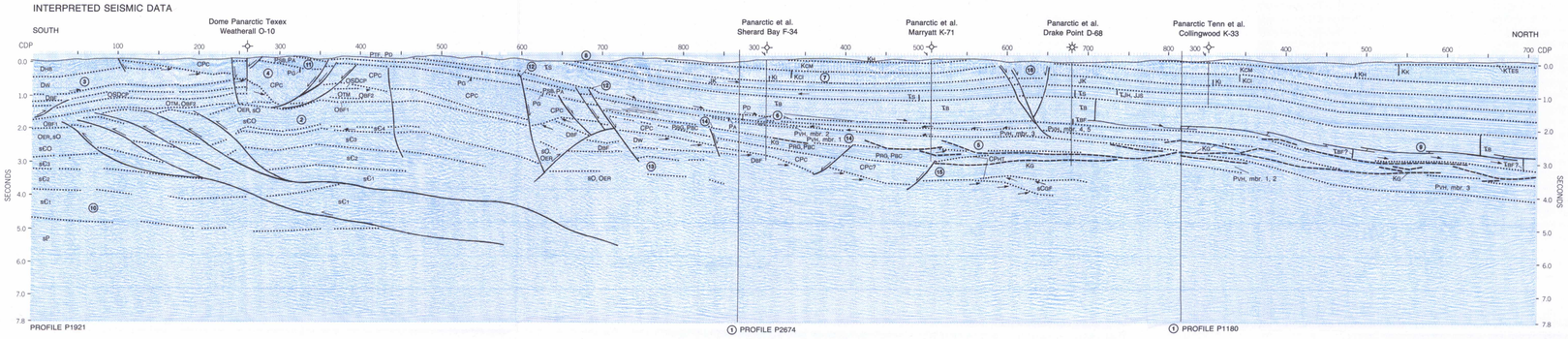
Natural Resources Canada | Ressources naturelles Canada

GEOLOGICAL SURVEY OF CANADA | COMMISSION GÉOLOGIQUE DU CANADA

SEISMIC REFLECTION DATA

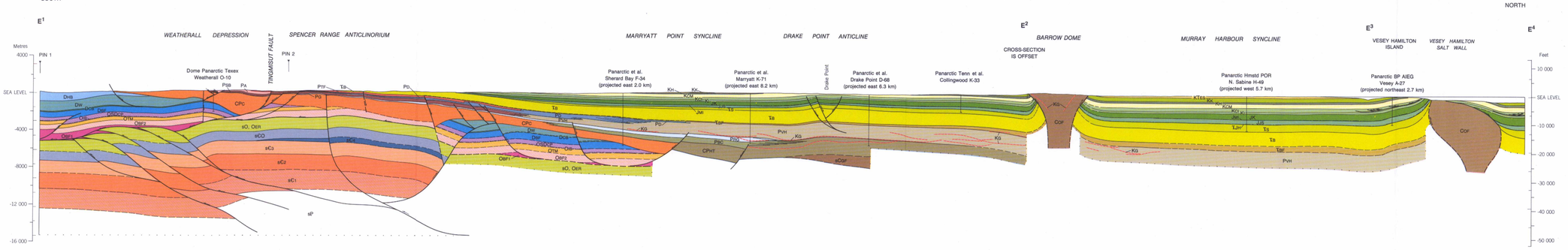


INTERPRETED SEISMIC DATA

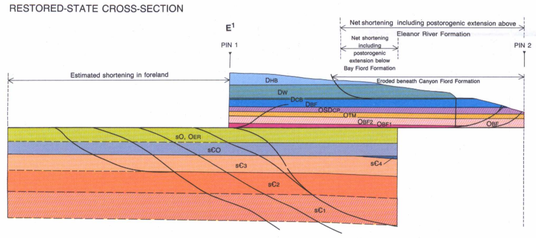


Numbers on seismic section refer to accompanying marginal notes

DEFORMED-STATE CROSS-SECTION



RESTORED-STATE CROSS-SECTION



NOTES TO ACCOMPANY SECTION E
(Seismic profiles P1921, P2674 and P1180)

Acquisition and processing

1. All seismic profiles along the section intersect at each of the physical splice points.

Seismic stratigraphic features

2. The seismic interval at 1500 to 2300 ms north of CDP 200, profile P1921, is only tentatively correlated with units sCo, sO and OEr. Unlike the equivalent interval to the south, these units are dominated by mildly divergent internal reflections. Onlap patterns at the base are associated with the basin marginal limit of unit sC4 (see also note 11, Section I).
3. Onlapping reflections occur above the Blue Fiord Formation (DBF) interval below CDP 50, profile P1921. These patterns are associated with the transgressive Cape De Bray Formation (DCB) which in this area is a marker unit less than 100 m thick.
4. Divergent reflections are associated with the Canyon Fiord Formation (CPC) interval between CDP 240 and 360, profile P1921. Other examples occur basinward on this section. This reflection pattern, associated with one or more bounding listric faults, is evidence of sedimentation synchronous with faulting. The thick development of low-velocity CPC strata in this area has caused a 200 ms velocity sag of all reflections below the top of the Eleanor River Formation (OEr).
5. A strong reflection assemblage is associated with the Belcher Channel Formation (PBC) and Raanes and Great Bear Cape Formations (PRG). These three units reach their maximum thickness near the Marryatt K-71 well (CDP 506, profile P2674). The units terminate downdip by apparent toplap truncation beneath the lowest part of the Van Hauen Formation (PVH, mbr. 1). The truncation could be tectonic. Alternatively, the truncation may be an apparent one produced at the depositional limit of shallow-marine carbonates where they pass laterally into an age-equivalent basinal condensed interval.
6. At least three strong continuous reflectors are typical of the Degerböls Formation (PD) interval south of CDP 415, profile P2674. The higher reflections terminate basinward of the lower reflections. This indicates a general progradational tendency for the unit. Onlap patterns in the age-equivalent Van Hauen Formation (PVH, mbrs. 3 to 5) indicate two or more higher order sequences in the section.
7. North and basinward of CDP 365, profile P2674, the top of unit JK is marked by a strong continuous reflection. In contrast, the same contact is reflection-free south of this point. The shelfward termination of the top JK reflector is believed to occur where Isachsen Formation (IK) sandstones cut out mudrocks of the upper Deer Bay Formation (JDD) and rest directly on Awingak Formation (JA) sandstones. Examples of channelling occur in seismic unit JK, notably beneath CDP 375 and 470 on profile 2674.
8. The Isachsen Formation (unit Ki) cuts out most if not all of the Ringnes and Awingak Formations (unit JK) in the surface exposures of these intervals. Also at the surface along this line of section, the entire Heiberg (TJH) and Schei Point (TS) Groups are believed to be cut out by the Jameson Bay Formation (JJS).
9. Strong reflection segments at 2100 to 3000 ms north of CDP 750, profile P2674, are assumed to represent the diachronous and progradational contact between the sandstone-dominated Bjorne Formation (TB) and the mudrock-dominated Blind Fiord Formation (TBF).

Structural features

10. Although not apparent on this part of profile P1921 (CDP 0 to 250) evidence of normal faulting is more obvious in this area and at this stratigraphic level on the adjacent portion of Section D (profile P2185).
11. Unit thickness variations across the faults beneath CDP 350 and 360, profile P1921 imply fault motion during deposition of (1) the CPC interval, (2) the PSS and PA interval, and (3) probably the lower PTF, and PD interval.
12. Evidence of growth faulting occurs within the Degerböls (PD) and Trold Fiord (PTF) Formations interval at CDP 600 and between CDP 665 and 680 on profile P1921. The fault below CDP 680 also displays growth in the Sabine Bay (PSS) and Assistance (PA) Formations interval.
13. The strong discontinuous subhorizontal reflectors at 2300 to 3200 ms between CDP 675 and 865, profile P1921, could be due to either stratigraphic impedence contrasts or impedences generated by igneous sills that are known at the same depth in younger strata to the north (see also note 15).
14. Evidence of growth faulting in the lower Van Hauen Formation (PVH, mbr. 1) interval is found below CDP 835, profile P1921, and below CDP 410, profile P2674. (See also note 12.)
15. Evidence of growth faulting in the Belcher Channel Formation (PBC), Raanes and Great Bear Cape Formations (PRG) intervals is apparent beneath CDP 510, profile P2674. Intrusive sills act as prominent reflectors in this area within and beneath the lower Van Hauen Formation (PVH, mbr. 1). The sills have intruded the upper parts of the Van Hauen Formation (mbrs. 3 to 5) farther north on the line of section. The elevated reflectivity of these sills has prevented penetration of deeper primary signal.
16. The faults found below CDP 585 to 655, profile 2674, have not been recognized at the surface. Likewise they appear to terminate downsection in the Van Hauen Formation (PVH).

Depth conversion

KK, KTES: 2.1 km s^{-1}
KH: 2.2 km s^{-1} (south)–2.6 km s^{-1} (north)
KCM: 1.9 km s^{-1} (south)–2.7 km s^{-1} (north)
KCI: 2.3 km s^{-1} (south)–3.4 km s^{-1} (north)
KI: 2.6 km s^{-1} (south)–3.4 km s^{-1} (north)
JK: 2.8 km s^{-1} (south)–3.6 km s^{-1} (north)
JJS: 2.8 km s^{-1} (south)–3.3 km s^{-1} (north)
TS: 3.6 km s^{-1} (south)–4.4 km s^{-1} (north)
TB: 2.4 km s^{-1} (south)–3.8 km s^{-1} (north)
TBF: 4.0–4.6 km s^{-1}
PVH (upper): 4.4–4.6 km s^{-1}
PVH (lower): 3.2–3.8 km s^{-1}
PTF: 3.4 km s^{-1}
PD: 4.1 km s^{-1} (south)–4.8 km s^{-1} (north)
PSS, PA: 3.2 km s^{-1}
PBC, PRG: 4.8–5.0 km s^{-1}
CPC: 3.7 km s^{-1} (south)–5.6 km s^{-1} (north)
DHB: 3.6 km s^{-1}
DCB, DW: 4.0 km s^{-1}
DBF: 5.8 km s^{-1}
OSC: 5.3 km s^{-1}
OTM, OBF2: 6.4 km s^{-1}
OBF1: 5.3 km s^{-1}
sC1–OER: 5.7 km s^{-1}
below sC1: 6.2 km s^{-1}

Method of cross-section construction and restoration

Bed length measurement and balancing of the contacts above OBF1, OBF2, OTM, and OSDCP between pin lines 1 and 2.

Bed length measurement and balancing of the contacts above sC1, sC2, sC3, sCO, and OEH between pin lines 1 and 2.

Area measurement and restoration of OBF1. This method assumes that horizontal shortening of OBF1 is the same as that expressed by bed lengths of contacts above OBF1–OSDCP.

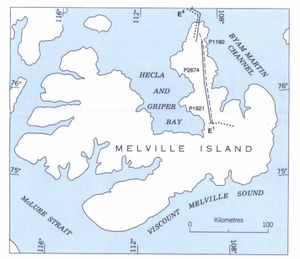
Results

Section length (pin 1 to pin 2 only): 27.0 km
Postorogenic extension: 3.1 km
Pre-extension section length: 23.9 km

Bed length of OTM (this section): 24.8 km
Shortening of OTM (this section): 24.8 - 23.9 = 0.9 km (3.6%)
Estimated shortening in foreland*: 18.0 km
Total shortening of OTM from foreland: 18.0 + 0.9 = 18.9 km (8.0%)

Bed length of OER (this section): 31.4 km
Shortening of OER (this section): 31.4 - 23.9 = 7.5 km (23.9%)
Estimated shortening in foreland*: negligible
Total shortening of OER from foreland: 7.5 km

*Foreland shortening is carried over to this section from pin line 8 on Section D.



Location of structure sections and seismic profiles

Line of structure section (with offset) ..... E1——E4
Seismic reflection profile (displayed) .....
Seismic reflection profile (consulted only) .....

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 E
(MAP 1844A)

ST. ARNAUD HILLS TO VESEY HAMILTON ISLAND, MELVILLE ISLAND

DISTRICT OF FRANKLIN
NORTHWEST TERRITORIES
Scale 1:250 000

Kilometres
5 0 5 10

Canada