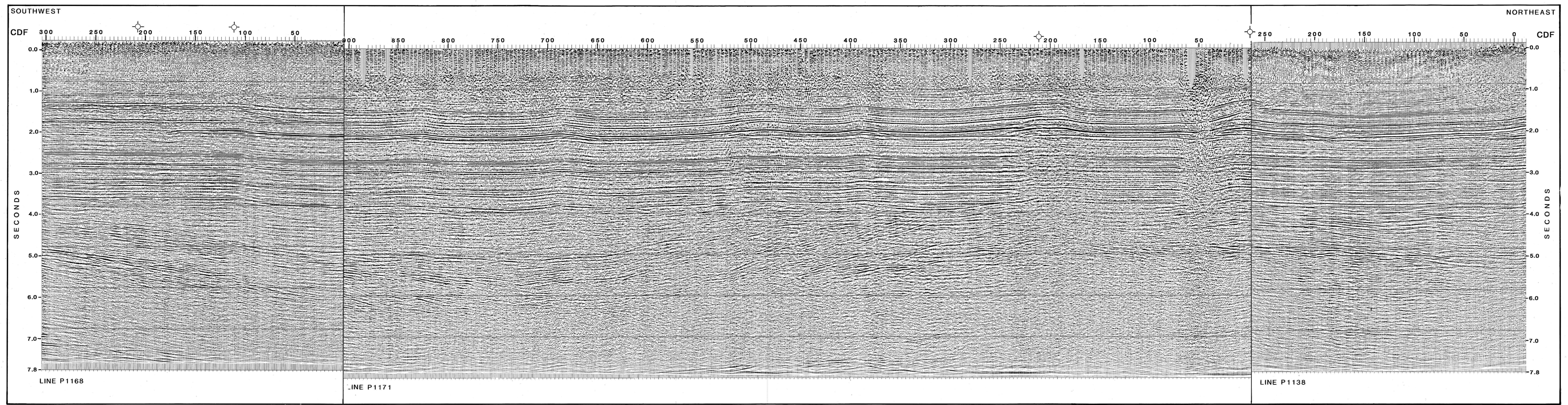
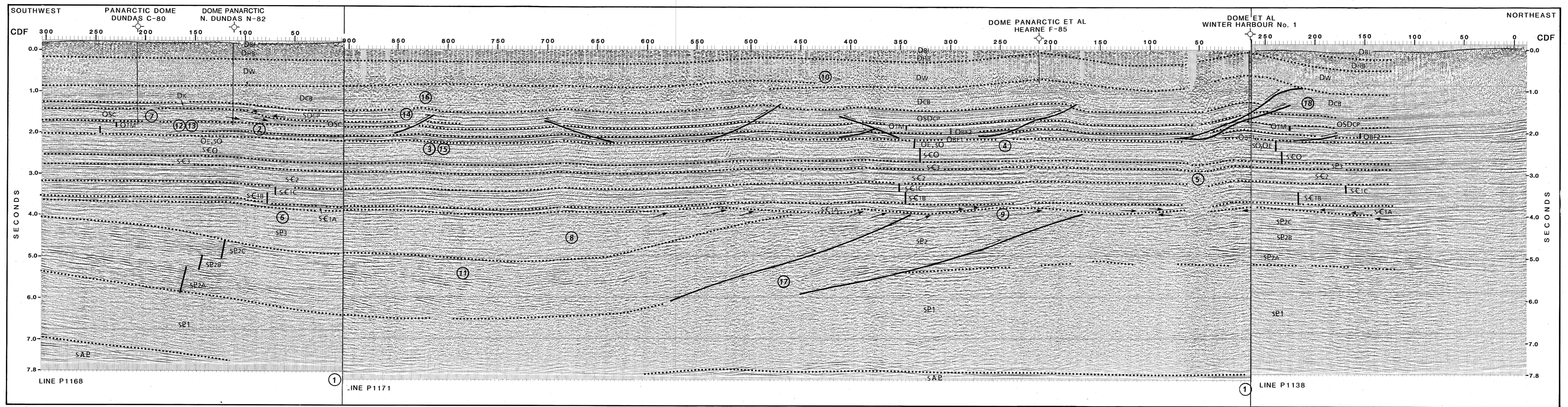


SEISMIC REFLECTION DATA

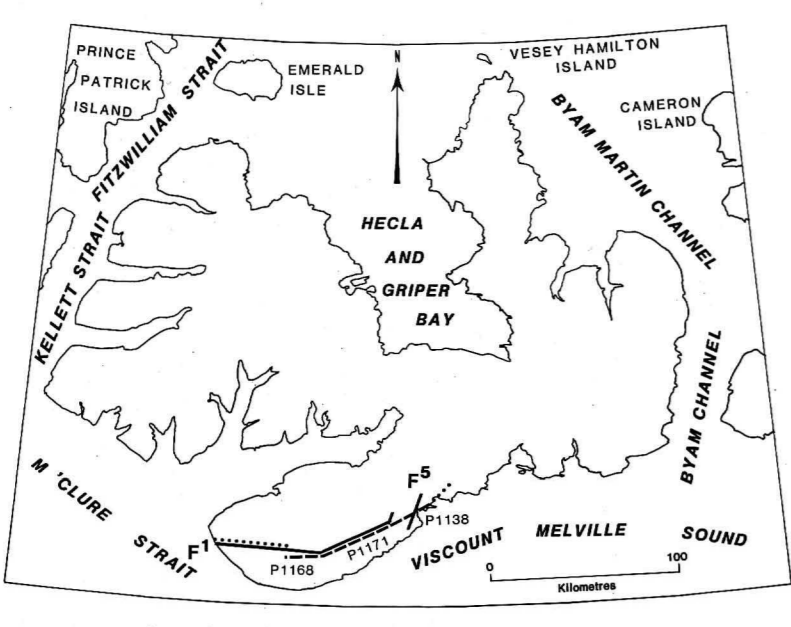
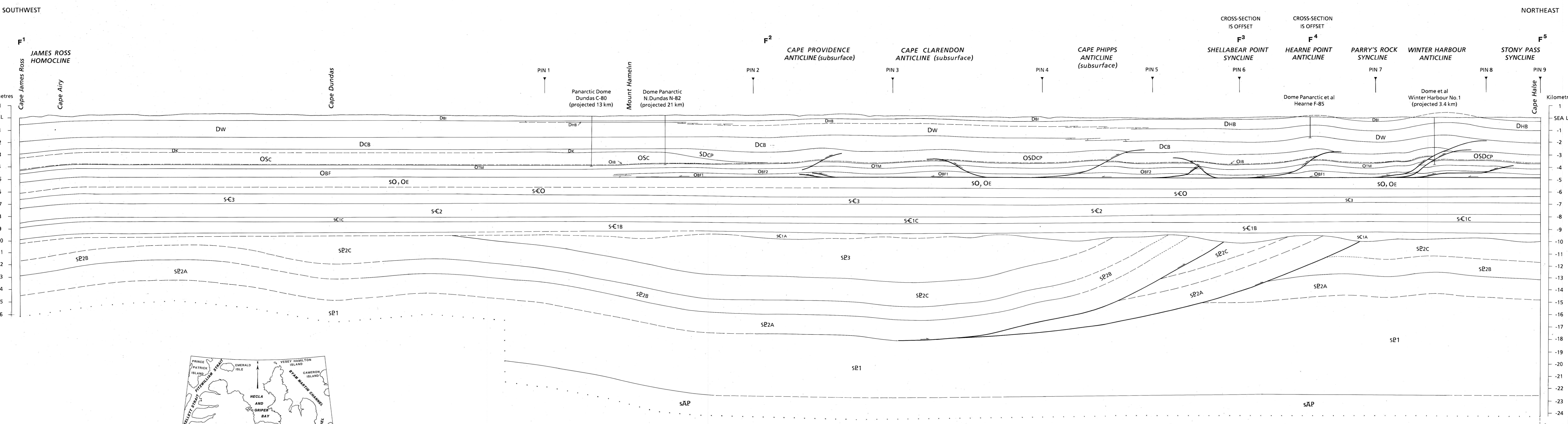


INTERPRETED SEISMIC DATA



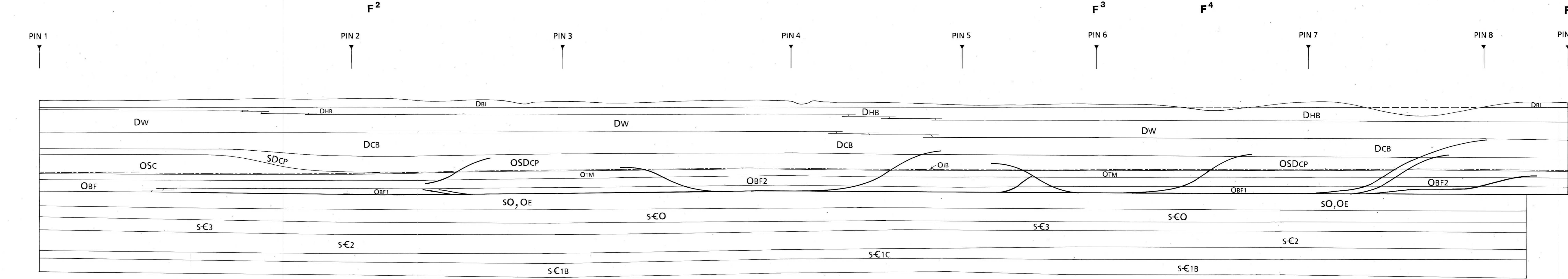
Number on structure sections refers to accompanying marginal notes

DEFORMED STATE CROSS-SECTION



SECTION F  
 CAPE JAMES ROSS ON M'CLURE STRAIT TO  
 STONY PASS SYNCLINE NEAR CAPE HALSE,  
 MELVILLE ISLAND  
 Scale 1:125,000

RESTORED STATE CROSS-SECTION



NOTES TO ACCOMPANY SECTION F  
 (Seismic lines P1168, P1171, half of P1138)

- |   |  |  |   |   |
|---|--|--|---|---|
| <p><b>Acquisition and Processing</b></p> <ol style="list-style-type: none"> <li>All seismic lines along the section intersect at each of the physical splice points. Line P1171 was reprocessed separately. In that processing the data above the 0 ms (sea level) datum has been omitted. There are polarity reversals at the splices of P1171 with the adjacent lines. The interpretation of line P1138 continues on section G.</li> <li>A mismatch of reflectors occurs at and below the top of the Thumb Mountain Formation (Dw) near CDF 99, line P1168. This mismatch is attributed to residual velocity pull-up to the west created by a facies change from shales of the Cape Phipps Formation (SDc) to carbonates of unit OSC immediately above the Thumb Mountain at this location. West of CDF 99, the pull-up creates apparent structural relief of nearly 100 m.</li> <li>Up to 50 ms of residual velocity pull-up occurs under the anticline at CDF 825, line P1171. This pull-up of the reflectors at and below the top of the Hearne River (Otr) and the reflection pull-up occurring under all anticlines on these seismic sections is attributed to thrust stacking of high velocity carbonates and evaporites higher in the section.</li> <li>Diffractions within anticlines on line P1171 (for example below CDF 210) were not entirely eliminated by time migration. There may be two reasons for this. Migration is ineffective when the seismic line is not orthogonal to structure. On P1171, the line of section is 50° removed from orthogonality. Residual diffractions will also remain on the migrated section when selected migration velocities are too slow.</li> <li>Reduced data quality between CDF 44 and 68 on P1171 is attributed to a 33% reduction in stacking fold.</li> </ol> | <p><b>Stratigraphic Features</b></p> <ol style="list-style-type: none"> <li>One of the clearest examples of Proterozoic seismic stratigraphy occurs below 3700 ms west of CDF 60 on P1168.</li> <li>The chaotic internal reflection pattern of unit OSC, (at 1500 to 1800 ms west of CDF 75, on P1168), corresponds to an interval of shallow marine dolostones in the Dundas C-80 and N. Dundas N-82 wells. The irregular upper surface of unit OSC is interpreted to be a substantial erosion surface (disconformity) overlain by a transgressive unit that correlates with black mudrocks of the Kition Formation (Dc) in the two Dundas wells. Unit OSC is in part overlain by and in part interfingered with mudrocks and basal carbonates of the Cape Phipps Formation (SDc and OSDc) which thicken rapidly east of the N. Dundas N-82 well.</li> <li>One of the thickest developments of unit SR1 occurs beneath CDF 700, line P1171. With an estimated interval velocity of 5.7 km/s<sup>1</sup> this may represent 3300 m of section.</li> <li>The base of unit SC1A is irregular and in many areas is not associated with a basal reflection. Between CDF 350 and 360 on P1171 there is an obvious basal reflector. Three or four overlapping reflectors occur immediately above the base of the unit in this area.</li> <li>The contact between the Cape de Bray (Dca) and Weatherall (Dw) formations is a markedly diachronous surface drawn above regionally extensive clinoform reflectors. This contact steps up section between CDF 430 and 528 on P1171.</li> <li>There are apparently two contrasting reflection attitudes in unit SR1. Near CDF 810, line P1171, there is a subhorizontal regional reflection attitude and a second superimposed east dipping set. The dipping reflection set could be attributed to either internal structural complexity of the unit or (more likely), a set of intrusive sills. Other examples occur in unit SR1 near CDF 696, on P1171, and between CDF 100 and 200 on P1168.</li> <li>Lateral termination of reflectors above and below unit OBr1 near CDF 178, line P1168, is attributed to a westward disappearance of evaporites in OBr1, thus eliminating the impedance contrasts with overlying (Otr) and underlying (Dc) carbonate units.</li> </ol> | <p><b>Structural Features</b></p> <ol style="list-style-type: none"> <li>A tectonic thickening is interpreted to exist in the OBr1 interval between CDF 88 and 178, P1168. The unit is apparently terminated to the west (note 12), and is thinner where it continues to the east.</li> <li>Reflectors in the Cape Phipps (OSDc) and at the top of the Thumb Mountain (Otr) are displaced by a minor north-vergent thrust in the vicinity of CDF 330, P1171. This fracture system does not appear to offset the upper OSDc reflectors. Neither does it appear to fracture the reflectors down section near the base of the upper Bay Fjord (Otr).</li> <li>Minor internal reflections in the lower Bay Fjord (Otr) salt welt of the Cape Clarendon Anticline (CDF 825, P1171), are imbricated into what appears to be a southerly-vergent thrust stack beneath a local upper detachment near the upper contact of unit OBr1.</li> <li>The Cape de Bray (Dca) interval is roughly 90 ms thinner over the apex of the Cape Clarendon Anticline (CDF 825, P1171).</li> <li>Possible thrusts in unit SR2 are placed where steeper dipping reflections overlie shallower dipping reflectors. These faults and the moderate dips of SR2 reflectors clearly do not extend into SC1A or overlying units. The weak subhorizontal reflection segments below SC1A could be reverberations.</li> <li>The Cape de Bray (Dca) interval is at least 200 ms thicker where northerly-vergent thrusts in the Cape Phipps (OSDc) merge upsection into Dca. These thrusts do not penetrate the continuous reflector at the top of the Cape de Bray. It is possible that some thrusts in the Dca interval may have ramped upsection on clinoform surfaces and then have occupied a horizontal detachment on or near the topset beds above Dca.</li> </ol> | <p><b>Depth Conversion</b></p> <p>Dw: 3.6 km/s<sup>1</sup> —<br/>             Dw: 4.0 km/s<sup>1</sup> —<br/>             DCB: 3.7 km/s<sup>1</sup> —<br/>             OSDc, SDc: 4.4 km/s<sup>1</sup> (south) - 5.0 km/s<sup>1</sup> (north)<br/>             DC: 4.5 km/s<sup>1</sup> —<br/>             OSC: 5.7 km/s<sup>1</sup> —<br/>             OTr, OBr: 6.4 km/s<sup>1</sup> —<br/>             OBr1: 5.3 km/s<sup>1</sup> —<br/>             SR-Oe: 5.7 km/s<sup>1</sup> —<br/>             below SR1: 6.2 km/s<sup>1</sup> —</p> <p><b>Method of Cross-section Construction and Restoration</b></p> <p>Bed length measurement and balancing of the contacts above OBr1, OTr, and OSDc between pairs of adjacent pin lines. Deformation is assumed to be negligible southwest of pin line 1.</p> <p>Bed length measurement of the contacts above Oe and Dw.</p> <p>Area measurement and restoration of OBr1, Dca, Dw, Dca, and Dca between pairs of adjacent pin lines. This method assumes that horizontal shortening of units OBr1 and Dca-Dca is the same as that expressed by bed lengths of contacts above OBr1-OSDc.</p> | <p><b>Results</b></p> <p>Section length (measured from pin 1 to pin 9 only): 81.1 km</p> <p>Bed length of OTr (this section): 82.4 km<br/>             Shortening of OTr (this section): 81.4 - 81.1 = 2.3 km (2.8%)<br/>             Estimated shortening in foreland*: nil<br/>             Total shortening of OTr from foreland: 2.3 km (2.8%)</p> <p>Bed length of Oe (this section): 81.1 km<br/>             Shortening of Oe (this section): nil<br/>             Estimated shortening in foreland*: nil<br/>             Total shortening of Oe from foreland: nil</p> <p>Deformed state bed length of Dw: 82.2 km<br/>             Apparent shortening of Dw (this section): 82.2 - 81.1 = 1.1 km (1.3%)<br/>             Estimated apparent shortening in foreland*: nil<br/>             Total apparent shortening of Dw from foreland: 1.1 km (1.3%)</p> <p>Range of assumed tectonic thickening of Dw-Dca (approximate): 1 - 6%</p> <p>* The foreland limit of visible compressive deformation is observed a short distance northeast of pin line 1 on this section. A gentle flexure of the Cambrian to Devonian succession is, however, also evident at the west end of the cross-section (James Ross Homocline).</p> |
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