MISCELLANEOUS INVESTIGATIONS SERIES
MARINE GEOLOGY ATLAS
BEAUFORT SEA
MAP I-1182-C (SHEET 2 OF 3)

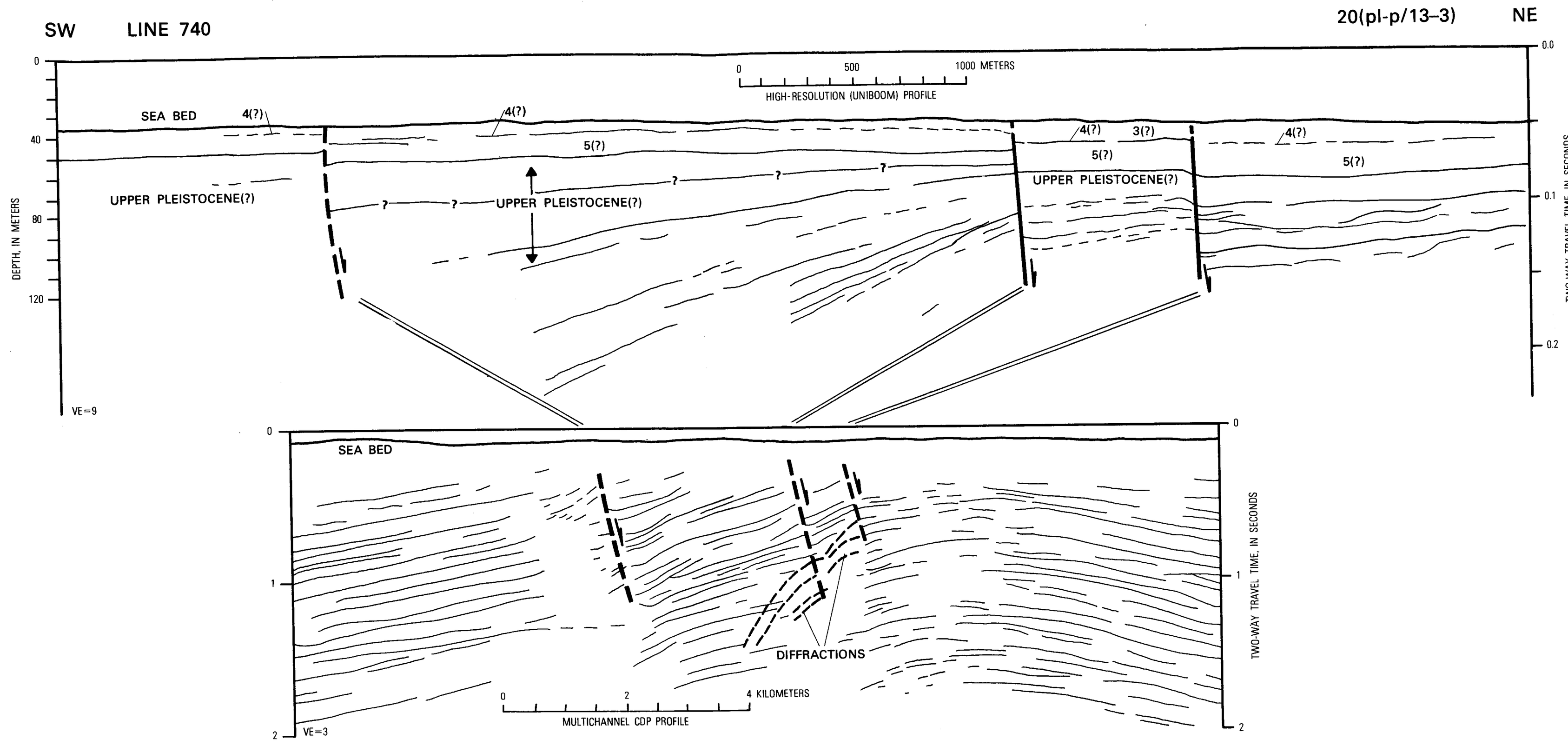

Figure 1.—Seaward-dipping normal faults in transition zone between Barrow and Barter Island sectors about 32 km north of mouth of Canning River. Faults are well developed in Neogene strata and offset beds as young as oxygen isotope stage 4 (provisional correlation).

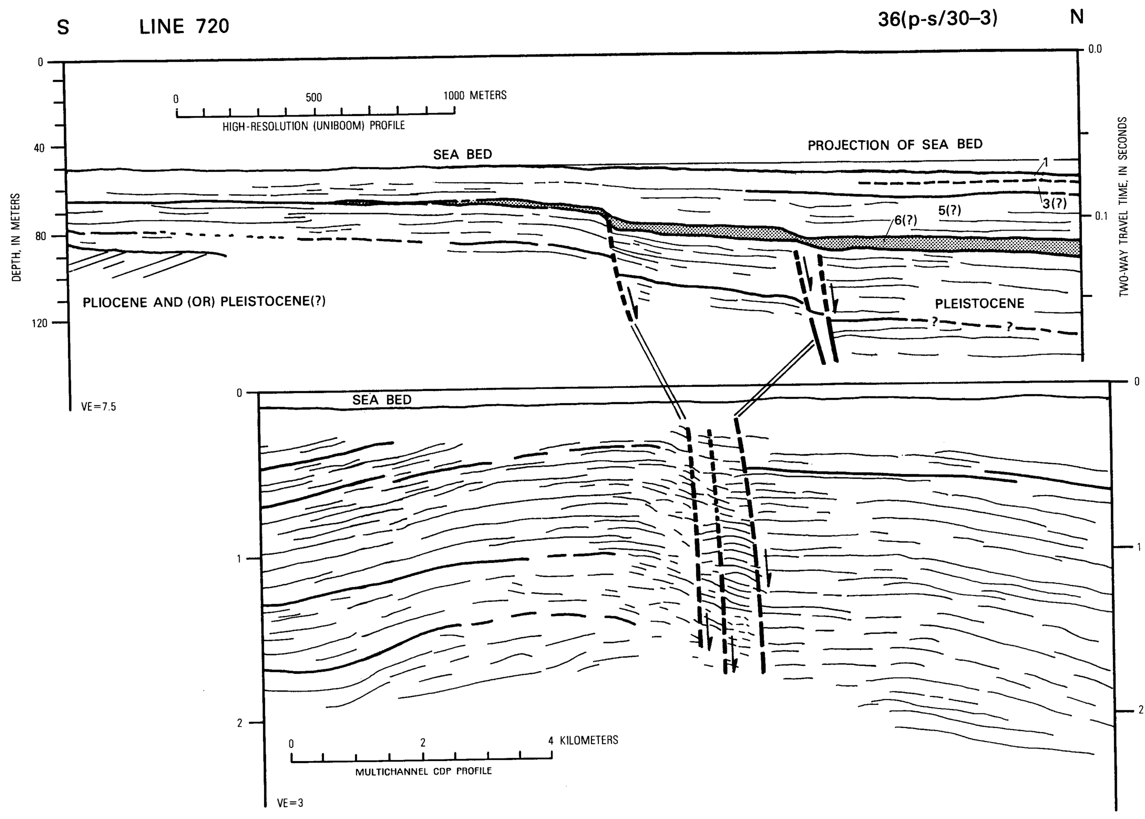

Figure 2.—Normal faults in seismogenic zone near Camden Bay about 30 km north-northwest of Barter Island. Faults are well developed and dip steeply in Neogene bedrock. Pleistocene beds are offset at least 30 m, and sea floor is downwarped about 3 m across fault zone.

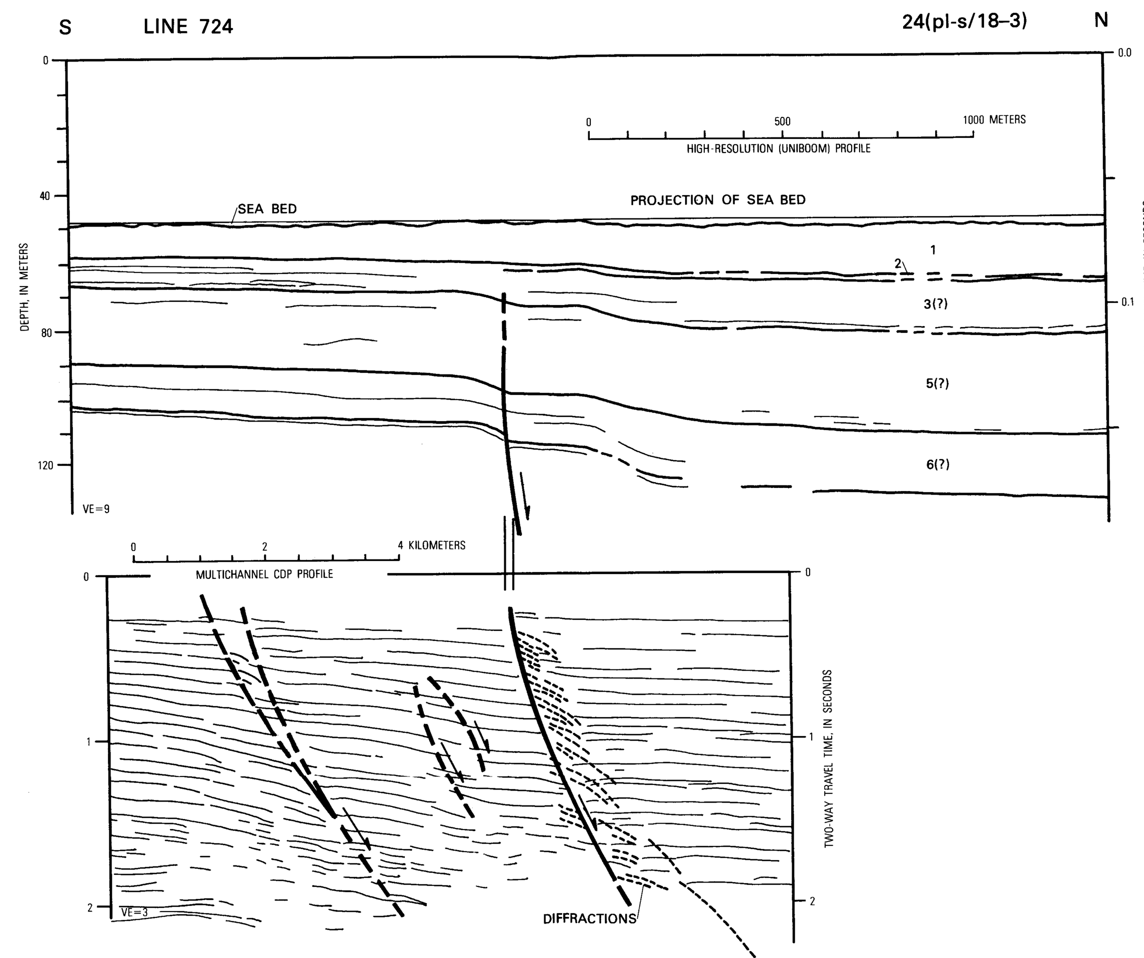

Figure 3.—Normal fault in transition zone about 43 km north-northwest of mouth of Canning River. Fault shows growth in Tertiary strata, offsets upper Pleistocene beds at least 18 m, and warps sea floor about 3 m.

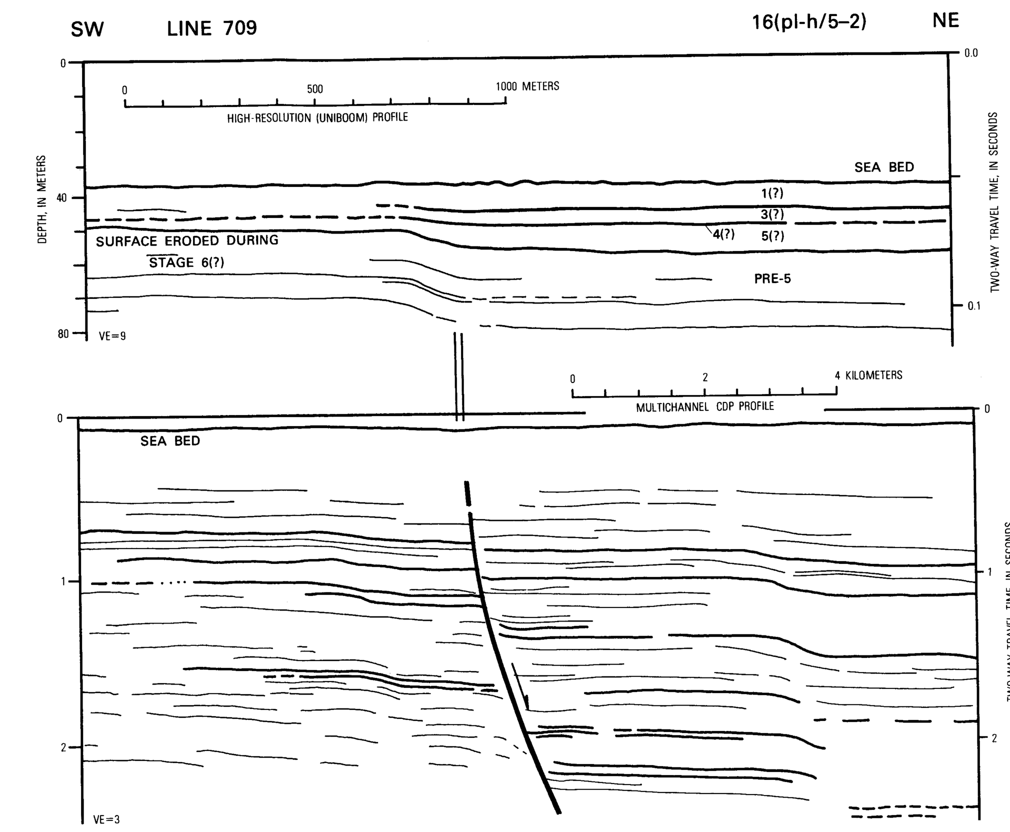

Figure 4.—Monocline in upper Quaternary beds in Barrow sector about 38 km north-northwest of mouth of Canning River overlies a growth fault developed in Tertiary strata. Upper Pleistocene beds offset at least 5 m, and basal Holocene(?) beds at least 2 m.

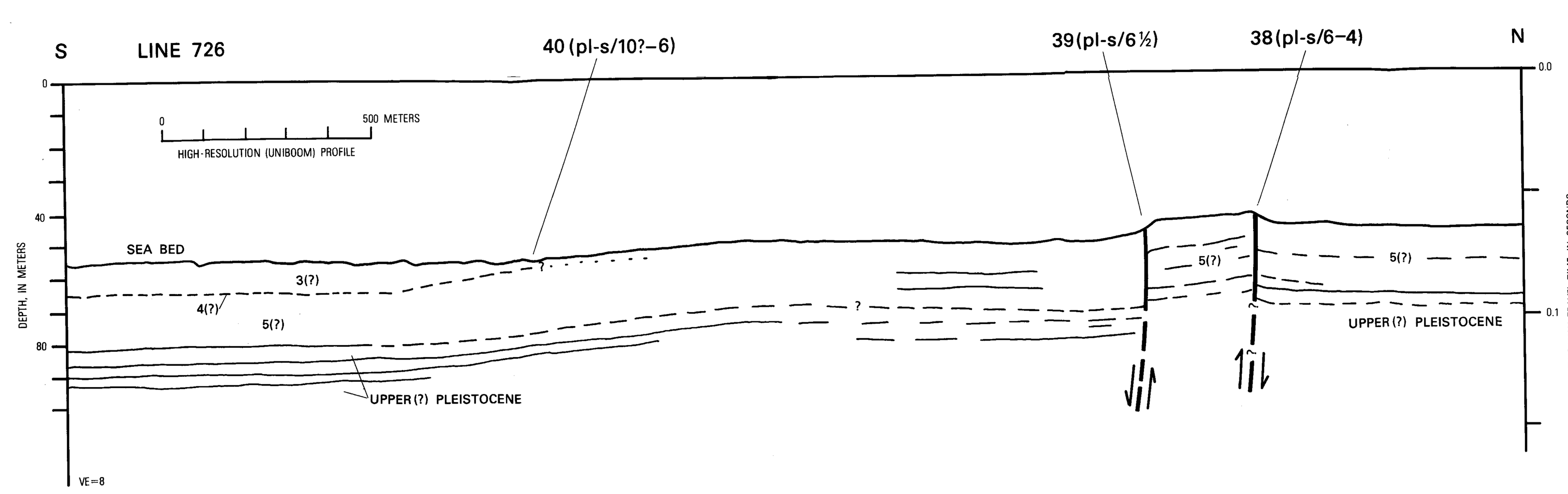

Figure 5.—"Pop-up" horst in seismogenic zone about 30 km north of Barter Island. Horst is bounded by poorly defined, surficial, very high-angle reverse(?) and normal fault pair on flank of a broad fold. Both normal fault (39) and the nearby monocline (40) displace sea floor as much as 6 m. These structures are not evident on coincident multichannel seismic reflection profile.

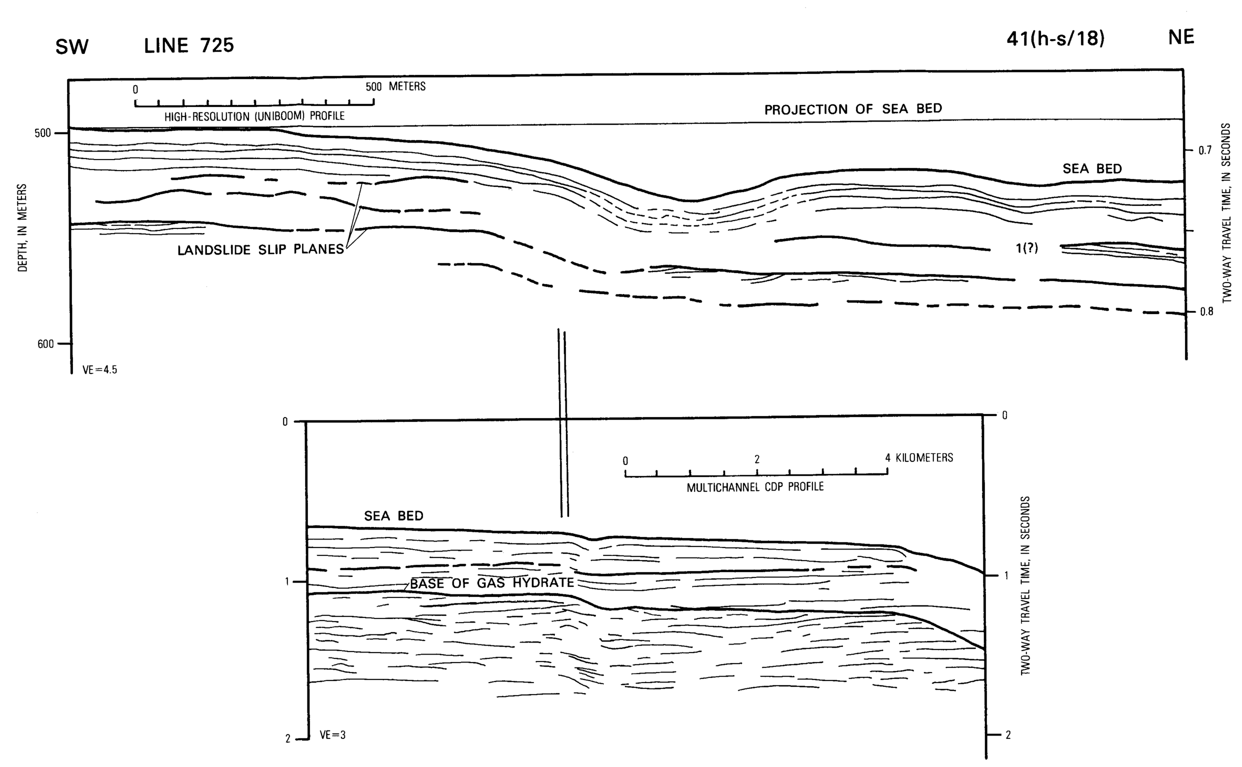

Figure 6.—Monocline developed in Neogene beds near edge of continental shelf in Barrow sector about 95 km north-northwest of mouth of Canning River. Monocline warps Holocene sedimentary deposits, landslide slip planes, and sea bed about 18 m.

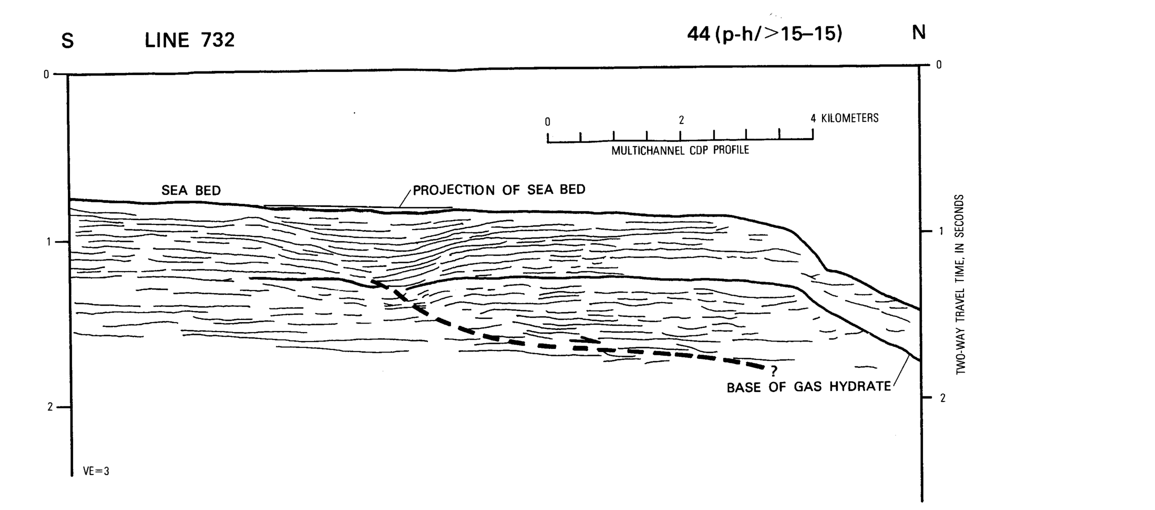

Figure 7.—Small syncline (sag) overlying headwall scarp of a low-angle, listric normal fault near shelf edge about 100 km north of Demarcation Bay. Syn- and post-slip sedimentation in pull-apart zone behind hanging wall, which is similar to a thick slump block, created the feature. Insufficient penetration by our high-resolution source precludes direct dating of movement. Regional evidence, however, suggests that deeper beds in sag above fault, which are offset as much as 70 m, may be Pleistocene, and shallower beds, which are offset about 15 m, may be Holocene. Beds below sag are Tertiary.

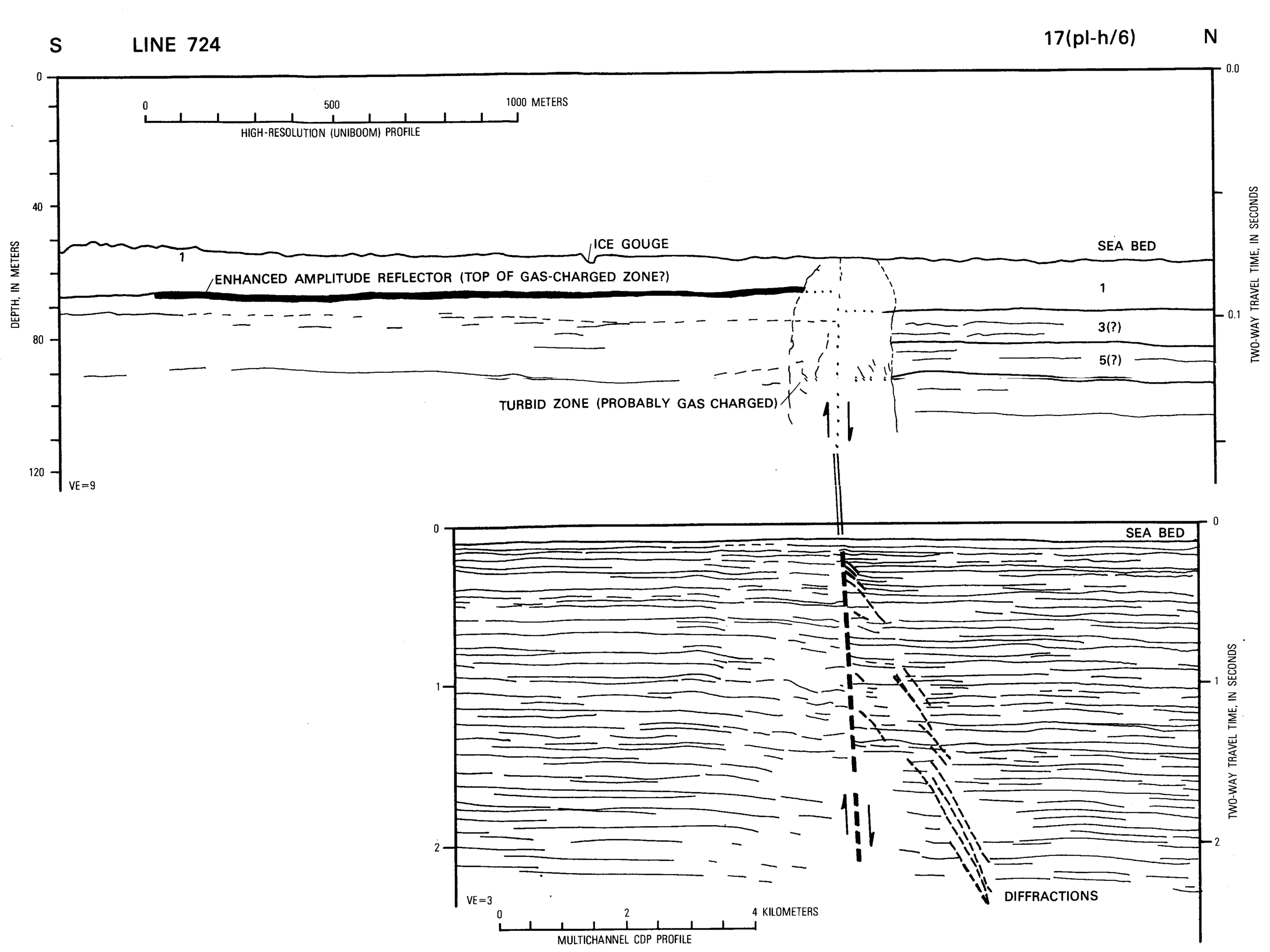

Figure 8.—Small normal fault in Neogene beds in Barrow sector about 55 km north-northeast of mouth of Canning River. Position of fault in Quaternary section is obscured by an acoustically "turbid" zone. Note that basal Holocene reflector is strongly enhanced in amplitude on upthrown side of fault for a distance of 2 km. "Turbid" zone and amplitude enhancement of basal Holocene reflector are probably due to presence of free gas seeping from fault zone. Fault displaces upper Pleistocene deposits and basal Holocene beds about 6 m, but sea floor is not offset.

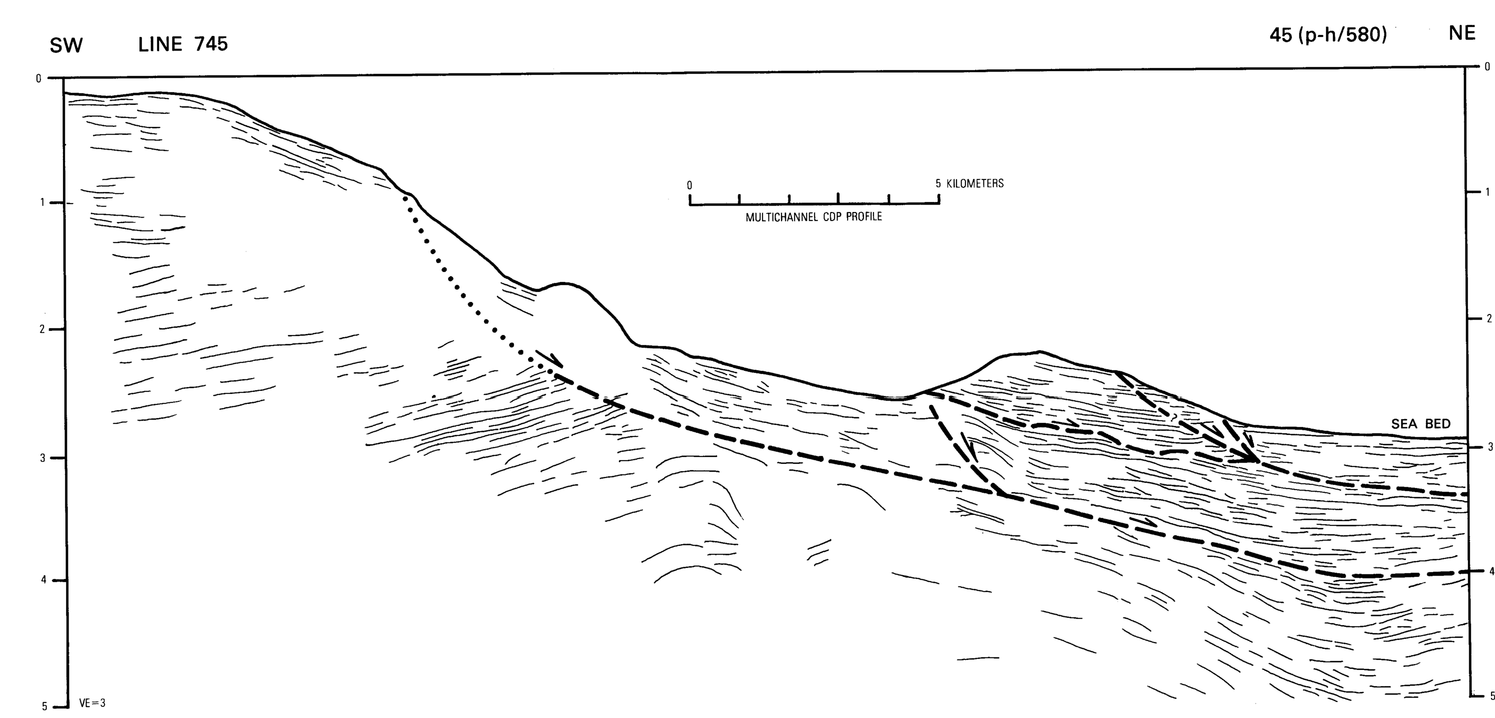

Figure 9.—Complex of slump masses as thick as 950 m, and slope-facies sedimentary units overlying a listric normal fault that reaches sea bed at head of continental slope. Uppermost large slump mass dropped about 580 m and moved seaward about 3.5 km. Downslope, beyond end of profile, listric faults presumably die out in a network of small faults or in a buckled zone. Because of their depth, it is less likely that they break a present or a former position of sea bed.

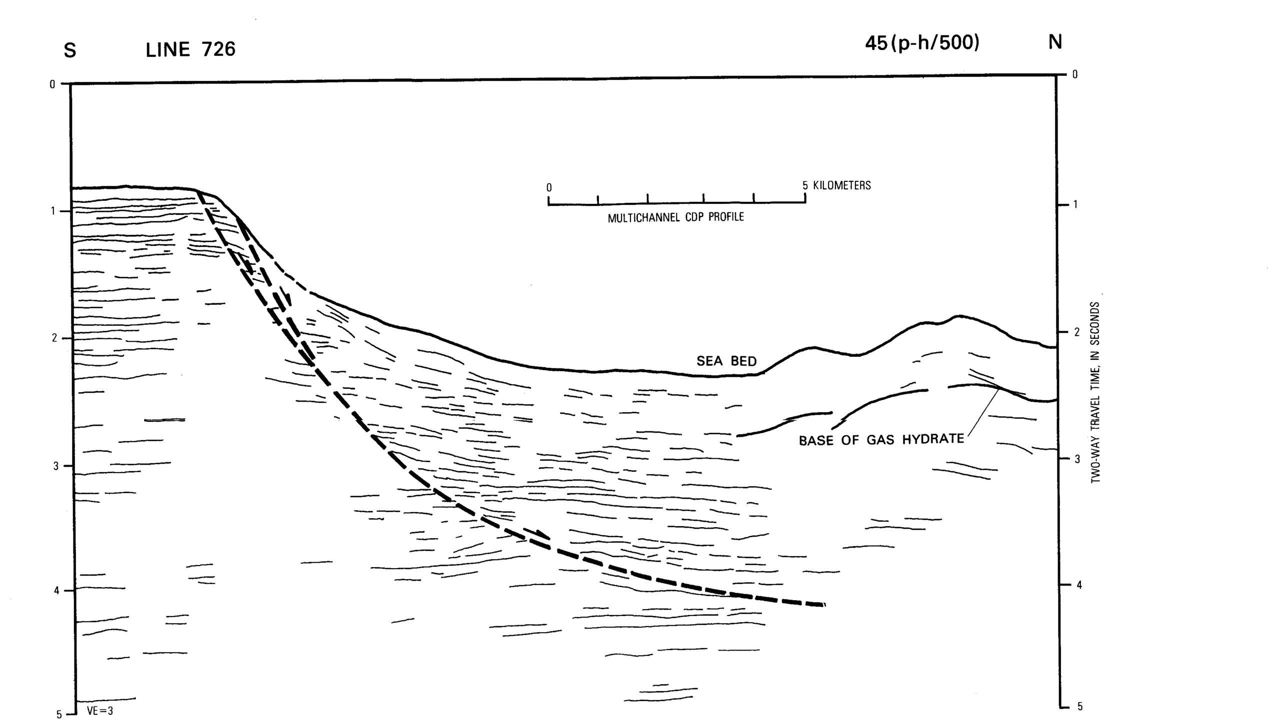

Figure 10.—Large slump mass with a bathymetrically smooth, structurally coherent facies about 1,500 m thick and a hummocky, internally deformed facies about 1,900 m thick. Slump rests on a listric normal fault that reaches surface at head of continental slope. Head of coherent terrain dropped roughly 500 m and moved about 1 km seaward. Geometry of fault beneath deformed facies is ambiguous on our seismic records, but fault appears to remain well below sea bed.

Note on abbreviations:
CDP—Common-depth-point method of processing multichannel seismic reflection profiles
VE—Vertical exaggeration

Note: See sheet 1 for location of structural features and sheet 3 for tabulation of stratigraphic offsets and displacement history. Numbers identifying stratigraphic units in cross sections are tentatively assigned oxygen-isotope stages (see sheet 3)

CROSS SECTIONS OF TYPICAL LATE QUATERNARY FAULTS AND MONOCLINES DRAWN FROM SEISMIC REFLECTION PROFILES

MAP, CROSS SECTIONS, AND CHART SHOWING LATE QUATERNARY FAULTS, FOLDS, AND EARTHQUAKE EPICENTERS ON THE ALASKAN BEAUFORT SHELF

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