DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

MISCELLANEOUS FIELD STUDIES
MAP MF-1714
SHEET 2 OF 2

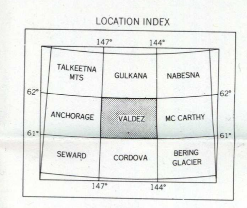
Base from U.S. Geological Survey, 1960

SCALE 1:250000

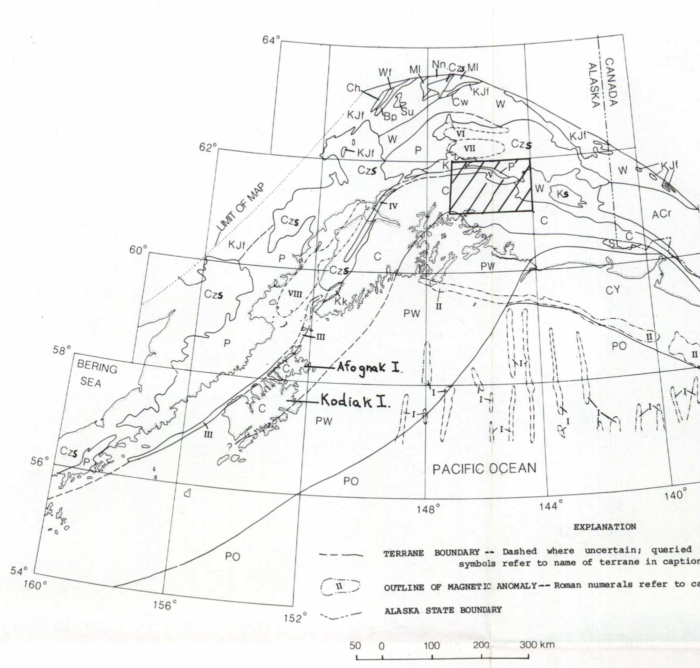
5 0 5 10 15 20 25 MILES

5 0 5 10 15 20 25 KILOMETERS

CONTOUR INTERVAL 200 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929



Geology generalized from Winkler and others (1981a)



EXPLANATION

TERRANE BOUNDARY -- Dashed where uncertain; queried where unknown; letter symbols refer to name of terrane in caption

OUTLINE OF MAGNETIC ANOMALY -- Roman numerals refer to caption and text

ALASKA STATE BOUNDARY

50 0 100 200 300 km

Figure 1. -- Index map showing location of Valdez quadrangle (lined) and some major magnetic features and tectonostratigraphic terranes of southern Alaska. Terranes slightly modified from Jones and others (1981). ACr, Alexander (Craig); Bp, Broad Pass; C, Chugach; CY, Chugach (Yakutat block); Ch, Chulitna; Cw, Clearwater; KJf, deformed upper Mesozoic flysch; Kk, Kachemak; Ml, Maclarens; Nn, Nenana; P, Peninsular; PO, Pacific Ocean floor; PW, Prince William; S, St. Elias; Su, Susitna; W, Wrangellia; Wf, West Fork. Postaccretionary rocks: Ks, Upper and middle Cretaceous sedimentary rocks; Czs, Cenozoic sedimentary and volcanic rocks. Note that plutonic rocks are not shown except for magnetic features III, IV, and V. Magnetic features: I, linear magnetic anomalies of Pacific Ocean floor; II, continental slope anomaly; III, Shelikof anomaly; IV, Knik Arm anomaly; V, North Chugach Mountains anomaly; VI, North Fork anomaly; VII, Copper River Basin anomaly; VIII, Cook Inlet anomaly.

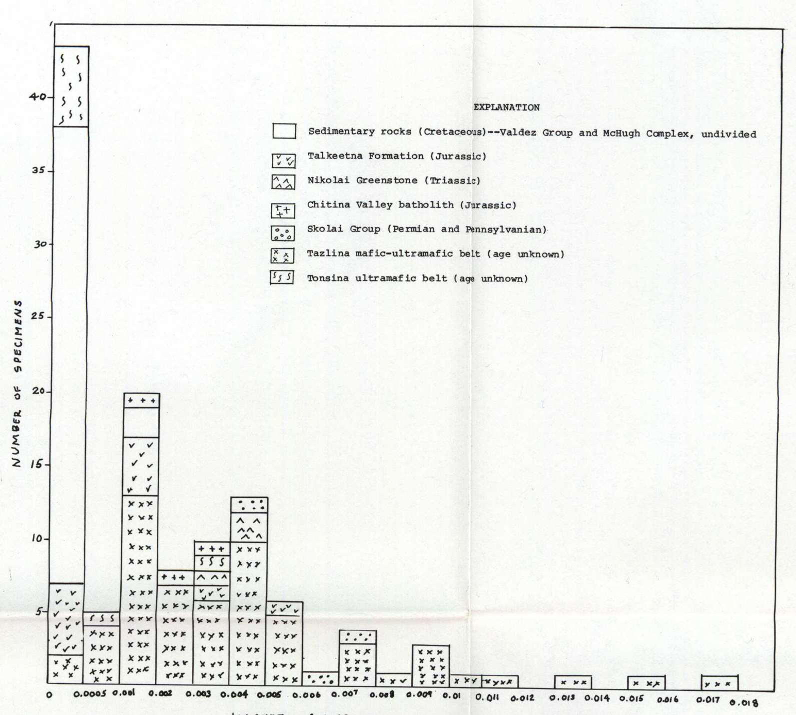


Figure 2. -- Histograms of magnetic susceptibility measurements from the Valdez and Anchorage quadrangles and vicinity, Alaska.

EXPLANATION

- APPROXIMATE DOMAIN BOUNDARY
- APPROXIMATE OUTLINE OF GROUPS OF PREDOMINANTLY POSITIVE ANOMALIES
- APPROXIMATE BOUNDARY OF LARGER NEGATIVE ANOMALIES
- APPROXIMATE ZONE OF STEEPENED MAGNETIC GRADIENT
- BOUNDARY BETWEEN TWO AEROMAGNETIC SURVEYS

ANOMALY CLASSIFICATION -- Subjective

- S Shallow magnetic object--Less than 2 km below aircraft
- M Magnetic object at moderate depth--2-5 km below aircraft
- D Deep magnetic object--Greater than 5 km below aircraft
- I Strongly magnetic--K=0.001-0.005 cgs unit
- II Moderately magnetic--K=0.0005-0.001 cgs unit
- III Weakly magnetic--K<0.0005 cgs unit

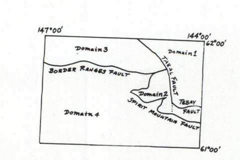
SOURCES OF MAGNETIC LOWS--Queried where uncertain

- T Topographic effect
- L Undefined low
- P Polarization anomaly
- R Reversed remanent magnetization
- A Alteration

Khcm+Khc GEOLOGIC SYMBOLS OR SYMBOL COMBINATIONS--Probable geologic-unit sources of anomalies; queried where uncertain

CORRELATION OF MAP UNITS

Bedrock units of the Valdez quadrangle are divided into four fault-bounded domains that differ markedly in stratigraphy, structural style, or ages (paleontologic or radiometric) of their component rocks. Three of the domains coincide conceptually with tectonostratigraphic terranes that have been defined previously: domain 1 = Wrangellia (Jones and others, 1977); domain 3 = Peninsular terrane (Jones and Silberling, 1979); and domain 4 = Chugach (redefined by Plafker and others, 1977) and Prince William terranes (Jones and Silberling, 1979). Domain 2 is of uncertain affinity; perhaps it represents a selvage of upper-plate rocks that were subjected to more intense deformation than neighboring rocks during accretion of subduction complexes comprising the lower plate of the Border Ranges fault.



ALL DOMAINS

- Qs — QUATERNARY
- Th — Eocene — TERTIARY

DOMAIN 1

SEDIMENTARY AND VOLCANIC ROCKS / PLUTONIC ROCKS

- QTw — Holocene to Miocene — QUATERNARY AND TERTIARY
- Tg — Eocene(?) — TERTIARY(?)
- Kb — Lower Cretaceous — CRETACEOUS
- Jc — Upper Jurassic — JURASSIC
- JTRc — JURASSIC AND TRIASSIC
- TRn — Upper and (or) Middle Triassic — TRIASSIC
- PPs — Lower Permian and Pennsylvanian — PERMIAN AND PENNSYLVANIAN

DOMAIN 2

VOLCANIC ROCKS / PLUTONIC ROCKS

- QTw — Holocene to Miocene — QUATERNARY AND TERTIARY
- Tt — Eocene — TERTIARY

METAMORPHIC ROCKS

- Khc, Khcm — Lower Cretaceous — CRETACEOUS
- Kmr — Lower Cretaceous(?) — CRETACEOUS(?)
- Jgl, Jum — JURASSIC OR OLDER

DOMAIN 3

SEDIMENTARY AND VOLCANIC ROCKS / PLUTONIC ROCKS

- QTw — Holocene to Miocene — QUATERNARY AND TERTIARY
- Km — Upper and Lower Cretaceous — CRETACEOUS
- Ji, Jmp, Ju — Upper and Middle Jurassic — JURASSIC
- Jt — Lower Jurassic — JURASSIC

DOMAIN 4

SEDIMENTARY AND VOLCANIC ROCKS

- Tov, Tos — Eocene(?) and Paleocene — TERTIARY
- TKm — TERTIARY OR CRETACEOUS
- Kw, Kvs — Upper Cretaceous — CRETACEOUS
- Kmc — Lower Cretaceous — CRETACEOUS

PLUTONIC ROCKS

- mum — CRETACEOUS AND JURASSIC(?)

METAMORPHIC ROCKS

- Jgb, Ja — JURASSIC OR OLDER

DESCRIPTION OF MAP UNITS

ALL DOMAINS

- Qs SURFICIAL DEPOSITS (HOLOCENE)--Glacial and alluvial deposits
- Th HYPABYSSAL PLUTONS (EOCENE)--Granitoid bodies

DOMAIN 1

SEDIMENTARY AND VOLCANIC ROCKS

- QTw WRANGELL LAVA (HOLOCENE TO MIOCENE)
- Kb BERG CREEK TERRANE (LOWER CRETACEOUS)
- JTRc MARINE CLASTIC AND CARBONATE ROCKS, UNDIVIDED (JURASSIC AND TRIASSIC)--Consist of the Kotsina Conglomerate (Middle or Upper Jurassic); unnamed marine sedimentary rocks (Jurassic); lower member (Upper Triassic) of the McCarthy Formation; and the Chitistone (Upper Triassic) and Nizina (Upper Triassic) Limestones
- TRn NIKOLAI GREENSTONE (UPPER AND (OR) MIDDLE TRIASSIC)
- PPs SKOLAI GROUP (LOWER PERMIAN AND PENNSYLVANIAN)--As mapped, includes the metamorphosed Skolai Group and Permian gabbro intruding the Skolai

PLUTONIC ROCKS

- Tg GRANITIC ROCKS (EOCENE?)--Granite and granodiorite
- Jc CHITINA VALLEY BATHOLITH (UPPER JURASSIC)

DOMAIN 2

VOLCANIC ROCKS

- QTw WRANGELL LAVA (HOLOCENE TO MIOCENE)

PLUTONIC ROCKS

- Tt ALTERED TONALITE (EOCENE)
- Jgl GABBRO AND LEUCOGABBRO (JURASSIC OR OLDER)
- Jum ULTRAMAFIC ROCKS (JURASSIC OR OLDER)

METAMORPHIC ROCKS

- Khc HALEY CREEK TERRANE, UNDIVIDED (LOWER CRETACEOUS)--Locally divided into:
- Khcm Metaplutonic rocks
- Kmr METAMORPHIC ROCKS, UNDIVIDED (LOWER CRETACEOUS?)--As mapped, consist of the Liberty Creek, Bernard Creek, and Fox Creek terranes

DOMAIN 3

SEDIMENTARY AND VOLCANIC ROCKS

- QTw WRANGELL LAVA (HOLOCENE TO MIOCENE)
- Km MATANUSKA FORMATION (UPPER AND LOWER CRETACEOUS)
- Jt TALKEETNA FORMATION (LOWER JURASSIC)

PLUTONIC ROCKS

- Ji INTRUSIVE ROCKS (UPPER AND MIDDLE JURASSIC)--Granodiorite and granite
- Jmp MAFIC-ULTRAMAFIC PLUTONIC BELT (UPPER AND MIDDLE JURASSIC)
- Ju ULTRAMAFIC ROCKS (UPPER AND MIDDLE JURASSIC)

DOMAIN 4

SEDIMENTARY AND VOLCANIC ROCKS

ORCA GROUP (EOCENE? AND PALEOCENE)--Divided into:

- Tov VOLCANIC ROCKS
- Tos SEDIMENTARY ROCKS
- TKm MELANGE (TERTIARY OR CRETACEOUS)

VALDEZ GROUP (UPPER CRETACEOUS)--Divided into:

- Kvv VOLCANIC ROCKS
- Kvs SEDIMENTARY ROCKS
- Kmc McHUGH COMPLEX (LOWER CRETACEOUS)

PLUTONIC ROCKS

- mum MAFIC AND ULTRAMAFIC ROCKS (CRETACEOUS AND JURASSIC?)

METAMORPHIC ROCKS

- Jgb GREENSCHIST- AND TRANSITIONAL BLUESCHIST-FACIES ROCKS (JURASSIC OR OLDER)
- Ja AMPHIBOLITE-FACIES ROCKS (JURASSIC OR OLDER)

- CONTACT--Dotted where concealed; queried where approximately located
- FAULT--Dotted where concealed; queried where approximately located
- THRUST FAULT--Showing dip. Dotted where concealed; queried where approximately located. Sawteeth on upper plate
- g GLACIER

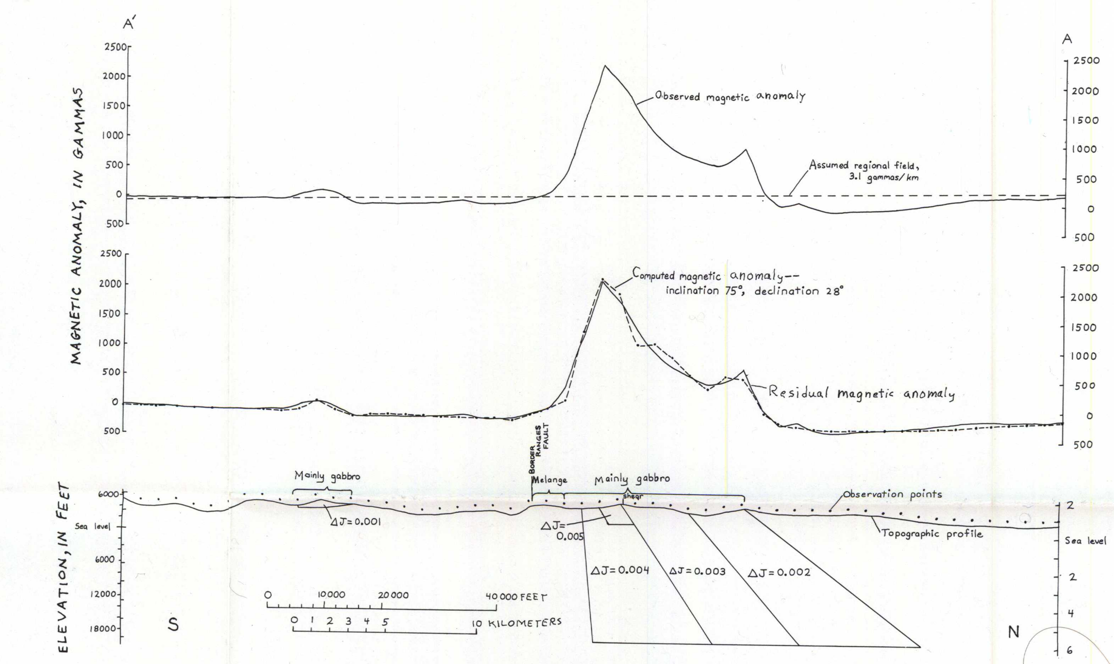


Figure 3. -- Aeromagnetic profiles and model A-A' west of Tazlina Lake. On this and subsequent profiles, ΔJ = assumed magnetization contrast. Lines of profile for figures 3-7 shown on sheet 2.

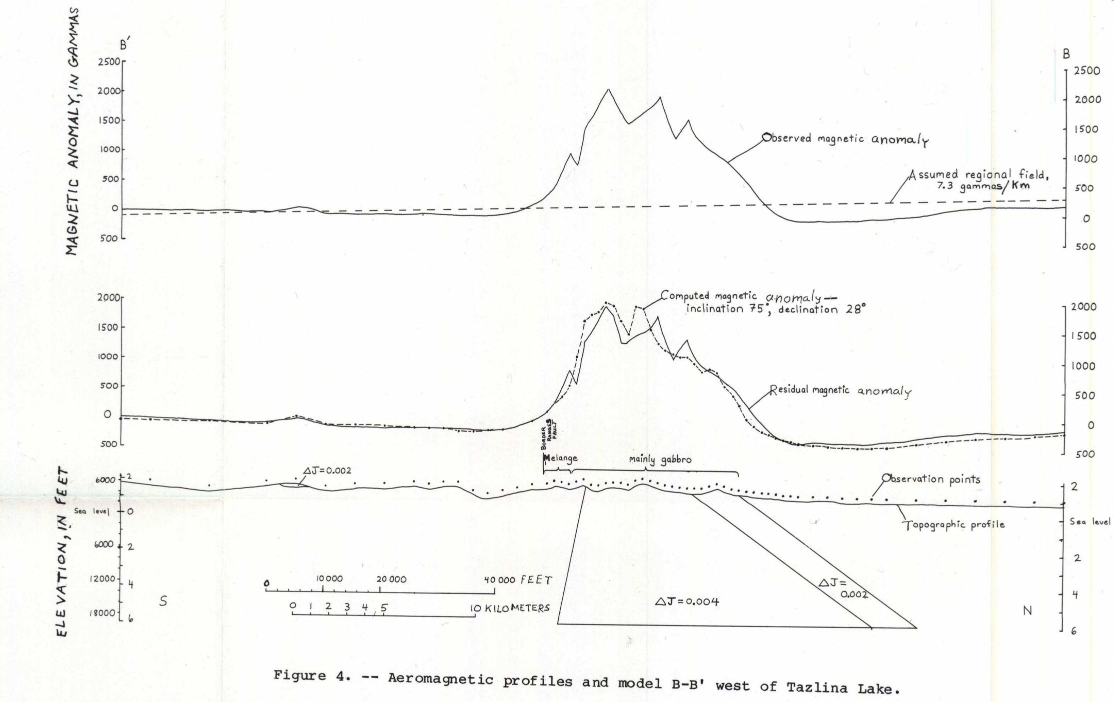


Figure 4. -- Aeromagnetic profiles and model B-B' west of Tazlina Lake.

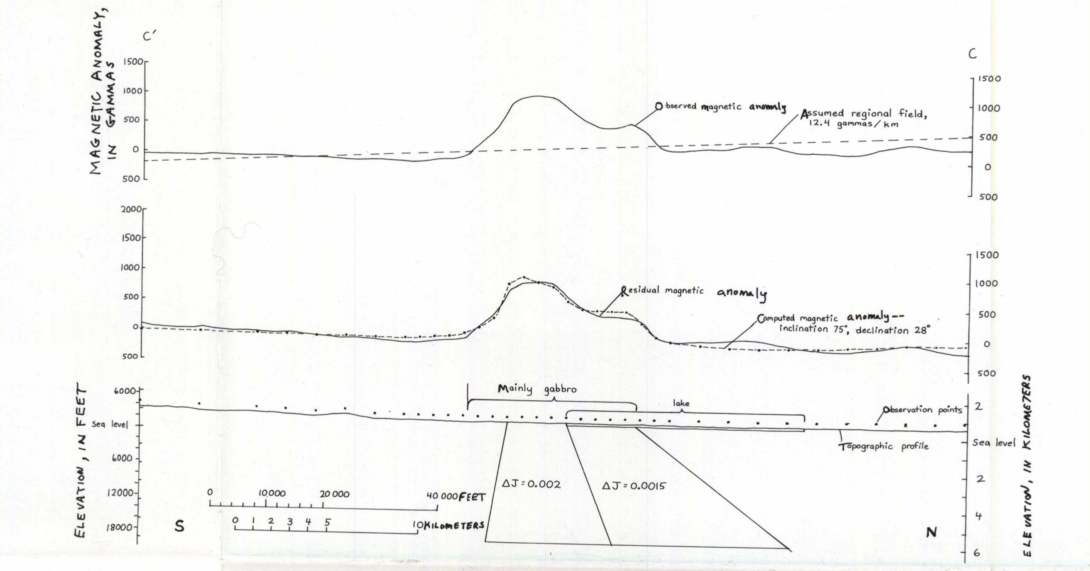


Figure 5. -- Aeromagnetic profiles and model C-C', Tazlina Lake.

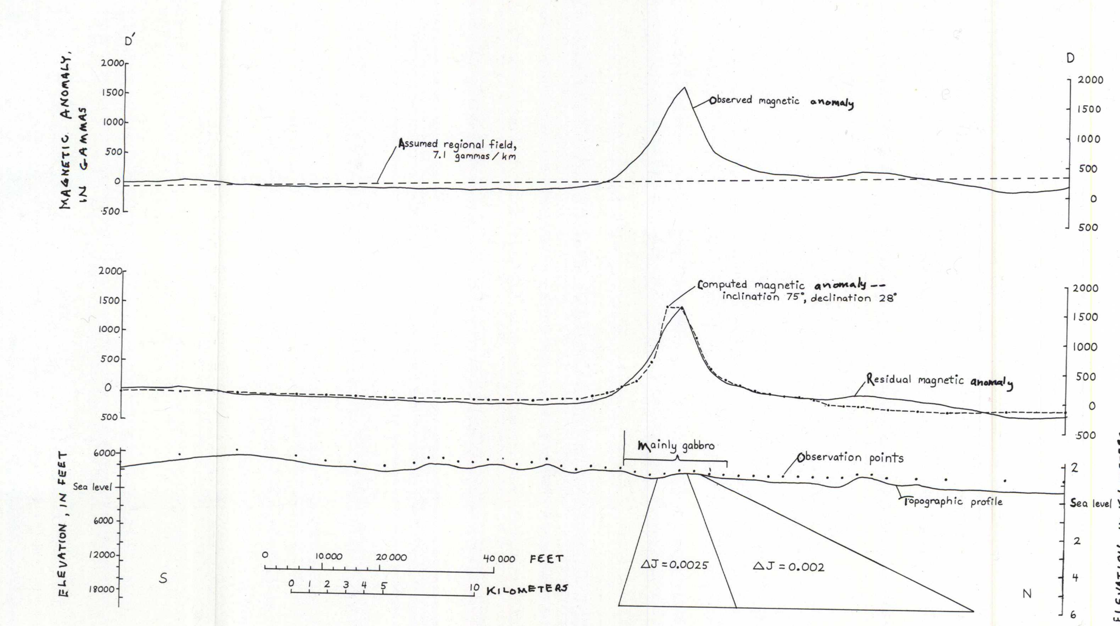


Figure 6. -- Aeromagnetic profiles and model D-D' east of Tazlina Lake.

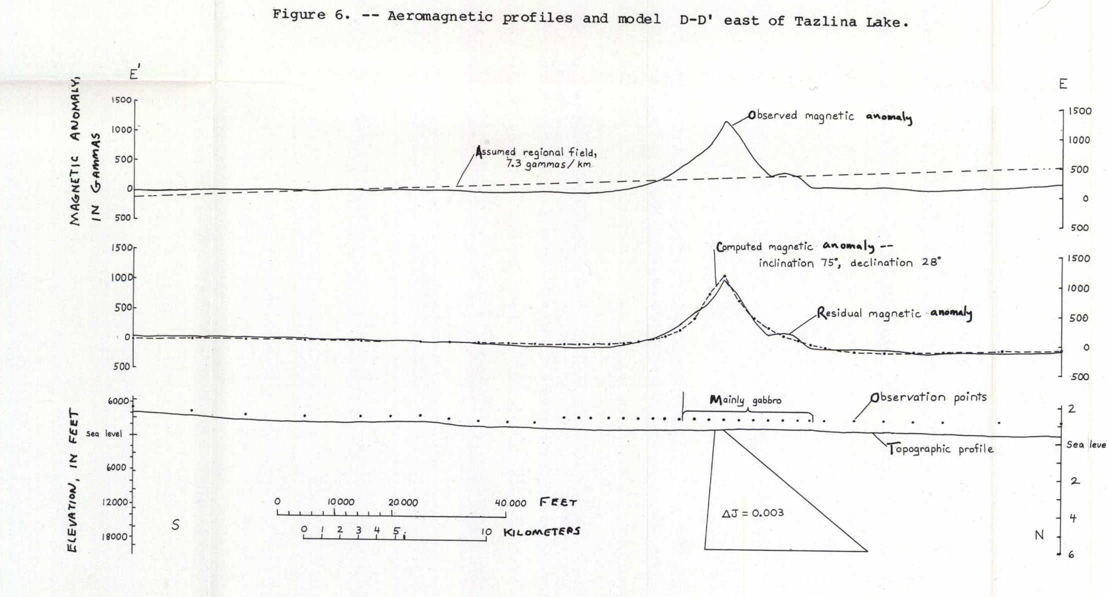


Figure 7. -- Aeromagnetic profiles and model E-E' east of Tazlina Lake.

GEOLOGIC INTERPRETATION

MAPS SHOWING AEROMAGNETIC SURVEY AND GEOLOGIC INTERPRETATION OF THE VALDEZ QUADRANGLE, ALASKA

By

J.E. Case, Laurel E. Burns, and G.R. Winkler

1986