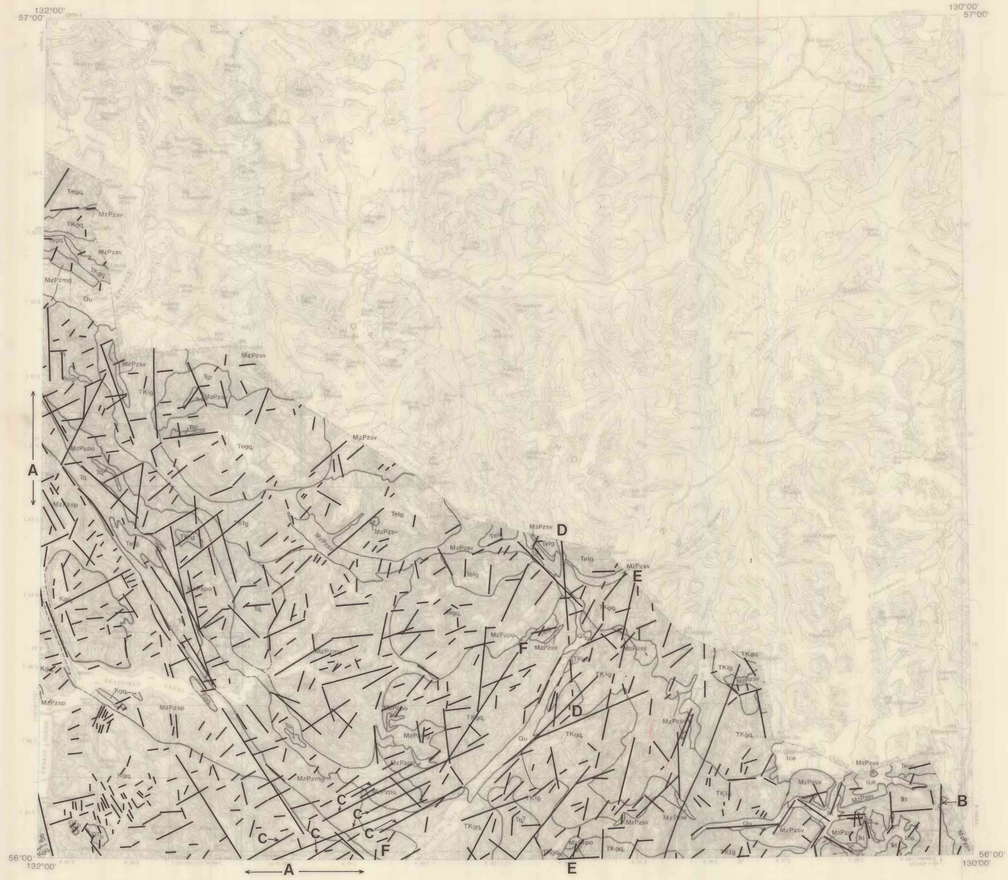
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

OPEN-FILE REPORT
81-728-L
SHEET 1 OF 2
FOLIO OF THE BRADFIELD CANAL QUADRANGLE, ALASKA
LE COMPTE--INTERPRETATION OF LANDSAT IMAGERY



BASE FROM USGS TOPO SERIES:
BRADFIELD CANAL, 1955, ALASKA-CANADA

EXPLANATION

—— LINEAMENT. WIDTH OF LINEAMENT ZONE (FEATURE A-A) SHOWN BY ARROWS

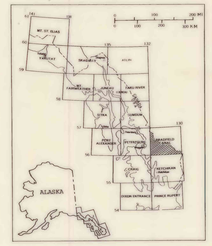
LINEAMENT MAP

Geology by H. C. Berg, D. A. Brew, A. L. Clark, W. H. Condon, J. E. Decker, M. F. Diggles, G. C. Dunne, R. L. Elliott, J. D. Gallinatti, M. H. Hendrick, S. M. Karl, R. D. Koch, M. L. Miller-Hoare, R. P. Morrell, J. G. Smith, and R. A. Sonnevil, 1968-1979.

Unit Descriptions - Generalized Geologic Map

Unit Descriptions

Qu	UNCONSOLIDATED DEPOSITS, UNDIVIDED (Quaternary)
Q_{Tg}	BASALT (Quaternary and Tertiary?)
Tgr	ALKALI-FELDSPAR GRANITE WITH ASSOCIATED QUARTZ-PORPHYRITIC RHYOLITE DIKES AND FLOWS(?) (Miocene?)
Tgb	BIOTITE-PYROXENE GABBRO, LOCALLY CONTAINS HORNBLENDE AND/OR OLIVINE (Miocene)
Tetg	LEUCOCRATIC QUARTZ MONZONITE AND GRANODIORITE (Eocene)
Tegd	GRANODIORITE AND QUARTZ DIORITE (Eocene)
Tg	QUARTZ DIORITE (Eocene or Paleocene)
TKtg	LEUCOCRATIC QUARTZ MONZONITE AND GRANODIORITE (Tertiary and/or Cretaceous)
TKgd,	GRANODIORITE AND QUARTZ DIORITE (Tertiary and/or Cretaceous)
Kgdq	BIOTITE-HORNBLENDE QUARTZ DIORITE, PLAGIOCLASE-PORPHYRITIC BIOTITE GRANODIORITE/QUARTZ DIORITE, BOTH LOCALLY CONTAIN GARNET AND/OR EPIDOTE (Cretaceous)
Tkt	TEXAS CREEK GRANODIORITE (Triassic)
MzPzmg	MIGMATITE AND ORTHOGNEISS, WITH LESSER PARAGNEISS (Mesozoic and/or Paleozoic)
MzPzpo	PARAGNEISS AND ORTHOGNEISS, WITH LESSER AMPHIBOLITE AND MARBLE (Mesozoic and/or Paleozoic)
MzPzsp	SCHIST AND PARAGNEISS, WITH LESSER AMPHIBOLITE AND MARBLE (Mesozoic and/or Paleozoic)
MzPzsv	METASEDIMENTARY AND LESSER METAVOLCANIC ROCKS, WITH LOCAL MARBLE (Mesozoic and/or Paleozoic)



INDEX MAP SHOWING LOCATION OF THE BRADFIELD CANAL QUADRANGLE

DISCUSSION

Landsat images of the Bradfield Canal quadrangle were analyzed for lineaments, and circular and arcuate features as a possible aid in the mineral resource assessment of the area.

This study is a modified version of more-detailed interpretative investigations conducted in other areas in Alaska (Albert, 1975; Albert and Steele, 1976a, b; Albert and others, 1978; Steele and Albert, 1978): the report is abridged and the methodology involved is similar to that used by Raines (1978). Details concerning the different types of imagery used are given in Table of Imagery Used in Analyses.

Although many lineaments and circular features in the Bradfield Canal quadrangle are observed from the imagery, no apparent spatial relation between these features and known mineralization (Elliott and Koch, 1981) is apparent.

Noteworthy geologic correlations can be made, however, with many of the Landsat features observed in the quadrangle:

(1) A well-defined, generally northwest-trending set (zone) of lineaments (lineament zone A-A, sheet 1) that marks the location of the Coast Range megalineament (Brew and Ford, 1977) within the southwest part of the quadrangle. A disjunction (separation) in the trace of the lineament zone immediately to the north and south of Burroughs Bay (in the southernmost part of the Bradfield Canal and in the northeasternmost part of the Ketchikan quadrangles) may indicate an apparent, left-lateral offset (of approximately 8 kilometers) of the megalineament along the length of Burroughs Bay.

(2) Lineament feature B (lineament map, sheet 1) is part of a series of generally northtrending lineaments (located in the southeast corner of the Bradfield Canal quadrangle and in the northeast corner of the Ketchikan quadrangle) that may be indicative of a previously unrecognized, high-angle fault at this locality (Raymond L. Elliott, oral commun., 1981).

(3) Lineament features C (lineament map, sheet 1) which are located in the vicinity of the south-central margin of the quadrangle mark the traces of generally northeast-trending (linear) valleys formed by differential erosion along the Tertiary lamprophyre dikes and joint sets present in this region (Smith, 1973; Richard D. Koch, oral commun., 1981).

(4) Lineament features D-D, E-E, and F-F (lineament map, sheet 1) which are located in the south-central part of the quadrangle are prominently developed features herein recognized as (probably) representing either large-scale joints or previously unrecognized fault traces in this area.

REFERENCES CITED

Albert, N.R.D., 1975, Interpretation of Earth Resources Technology Satellite Imagery of the Yakutania quadrangle, Alaska: U.S. Geological Survey Miscellaneous Field Studies Map MF-650-C, 2 sheets, scale 1:250,000.

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Albert, N.R.D., and Steele, W.C., 1976a, Interpretation of Landsat imagery of the McCarthy quadrangle, Alaska: U.S. Geological Survey Miscellaneous Field Studies Map MF-773-H, 3 sheets, scale 1:250,000.

———— 1976b, Interpretation of Landsat imagery of the Tanacross quadrangle, Alaska: U.S. Geological Survey Miscellaneous Field Studies Map MF-767-C, 3 sheets, scale 1:250,000.

Brew, D.A., and Ford, A.B., 1977, Coast Range megalineament and Clarence Strait lineament on west edge of Coast Range batholithic complex, southeastern Alaska: in Blean, K.M., ed., The United States Geological Survey in Alaska: Accomplishments During 1976: U.S. Geological Survey Circular 751-B, p. B79.

Condit, C.D., and Chavez, P.S., Jr., 1978, Basic concepts of computerized digital image processing for geologists: U.S. Geological Survey Bulletin 1462.

Elliott, R.L., and Koch, R.D., 1981, Map and table describing mines, prospects, and selected metalliferous mineral occurrences in the Bradfield Canal quadrangle, Alaska: U.S. Geological Survey Open-File Report 81-728-B, scale 1:250,000.

Raines, G.L., 1978, Porphyry copper exploration model for northern Sonora, Mexico: U.S. Geological Survey Journal of Research, v. 6, no. 1, p. 51-60.

Smith, J.G., 1973, A Tertiary lamprophyre dike province in southeastern Alaska: Canadian Journal of Earth Sciences, v. 10, no. 3, p. 408-420.

Steele, W.C., and Albert, N.R.D., 1978, Interpretation of Landsat imagery of the Talkeetna quadrangle, Alaska: U.S. Geological Survey Miscellaneous Field Studies Map MF-870-C, 2 sheets, scale 1:250,000.

TABLE OF IMAGERY USED IN ANALYSES

Scenes used for computer- and photo-optical enhancement are 1771-19111, taken September 2, 1976, and 5866-17556, taken September 1, 1977. Computer-compatible tapes were processed by Pat S. Chavez, Jr. and Ellen Sanchez, U.S. Geological Survey, Flagstaff, Arizona; for a description of this type of enhancement (simulated natural color), see Albert and Steele (1976a, b) and Condit and Chavez (1978). All imagery is available from EROS Data Center, Sioux Falls, SD 57198 (specify PAO number when ordering). Example of imagery is shown in Figure 2.

IMAGE TYPE	COMPUTER-ENHANCED	BANDS AND COLORS USED	PROJECTION	PAO NUMBER	SCENE ID NUMBER	TRANSPARENCY SCALE	PRINT SCALE
Simulated natural color	Yes	4 Green 5 Red Syn Blue	Orthographic	E-1276-72CT	1771-19111	1:1,000,000	1:250,000
False-color (PDE) - BC	No	4 Blue 5 Green 7 Red	Space Cylindrical	E-1275-72CT	5866-17554	1:997,500	1:250,000

PDE = photo-optically enhanced

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature

MAPS SHOWING INTERPRETATION OF LANDSAT IMAGERY OF THE BRADFIELD CANAL QUADRANGLE, SOUTHEASTERN ALASKA

by

James R. Le Compte

1981