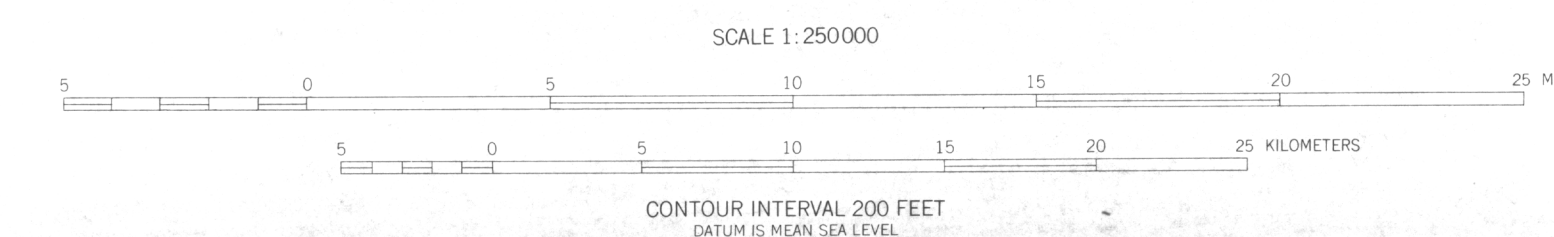


BASE FROM U.S. GEOLOGICAL SURVEY, 1956



EXPLANATION OF IMAGERY INTERPRETATION  
**A** Lineament. Letters refer to features cited in "Discussion"

LINEAMENT MAP

PRELIMINARY MAPS SHOWING INTERPRETATION OF LANDSAT IMAGERY OF THE HEALY QUADRANGLE, ALASKA

by  
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1981

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

DISCUSSION

Landsat images of the Healy quadrangle were analyzed for lineaments, circular and arcuate features, and iron-oxide colored areas as a possible aid in the mineral resource assessment of the area. Reproduction of these maps compiled with generalized geologic base maps (Bela Csetley, Jr., and others, unpub. data, 1981) is planned as part of a folio of maps on the Healy quadrangle.

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

Although many lineaments and circular and arcuate features are observed from the imagery of the quadrangle, no marked relation between these features and known mineralization (Cobb, 1972) is apparent.

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

- (1) A well-defined, generally east-trending lineament (lineament map, sheet 1, feature DF) marks the trace of the McKinley strand of the Denali Fault across the central part of the quadrangle. Numerous subordinate lineaments that subparallel this main lineament probably correspond to separate fault traces comprising the Denali Fault zone (Wyatt Gilbert and others, unpub. data, 1981) in this region. Additionally, several lineaments (lineament map, sheet 1, features A, B, and C) which diverge from lineament DF within the McKinley National Park in the west-central part of the quadrangle, give the appearance of being splays (1) of the McKinley strand of the Denali Fault.
- (2) A generally northwest-trending lineament "zone" (i.e., zone of lineaments) (lineament map, sheet 1, feature D-D'), that is comprised of a number of moderately well-defined segments which extend approximately 350 in overall length, transects the southern part of the quadrangle. This lineament zone shows good spatial coincidence with the margins of numerous gravity highs and lows in the Healy, Gulkana, and Nabesna quadrangles (Barnes, 1977). Correlations with other lineaments of similar lengths and attitudes (geophysical) (Latham and Albert, 1974) suggest lineament zone D-D' as possibly related to a previously unrecognized (?) fundamental crustal feature underlying this region.
- (3) A number of moderately well-defined circular features (circular and arcuate features map, sheet 2), which range in diameter from approximately 5 to 25 km, show good spatial coincidence with widespread areas underlain either by known (Bela Csetley, Jr., and others, unpub. data, 1981) or inferred (Andrew Grison, unpub. data, 1981) plutonic and (or) volcanic rocks.

Many anomalously-colored areas are noted from the imagery of the quadrangle (circular and arcuate features map, sheet 2). One of these areas (locality X) is marked by a known, mineralized "altered porphyry intrusives" (Donald Stevens, oral comm., 1980) in the shallow subsurface. The areas are typically marked by iron-oxide stained (gossan-like) surface colorations similar to those observed for other Alaskan localities (Albert, 1976; Albert and Steele, 1976a, b; Steele and Albert, 1976; Le Compte, 1981), many of which have proved to be sites of hydrothermally-altered rocks, i.e., mainly volcanic and plutonic rocks.

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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-7370, 3 sheets, scale 1:250,000.

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Latham, E.H., and Albert, N.R.D., 1974, Significance of space image linears in Alaska, in Proceedings, First International Conference on the New Basement Tectonics, Salt Lake City: Utah Geological Association, Salt Lake City, Utah, p. 11-26.

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Steele, W.C., and Albert, N.R.D., 1976, Interpretation of Landsat imagery of the Talkeetna quadrangle, Alaska: U.S. Geological Survey Miscellaneous Field Studies Map MF-670C, 2 sheets, scale 1:250,000.

Steele, W.C., and Le Compte, J.R., 1978, Map showing interpretation of Landsat imagery of the Talkeetna Mountains quadrangle, Alaska: U.S. Geological Survey Open-File Report 78-558D, 2 sheets, scale 1:250,000.

TABLE OF IMAGERY USED IN ANALYSES

Images used for computer-enhancement and photo-optical enhancement are 2945-20143 and 2945-20150, both taken August 24, 1977. Computer-compatible tapes were processed by Pat S. Chavez, Jr., and Ellen Sanchez, U.S. Geological Survey, Flagstaff, Arizona; descriptions of this type of enhancement (simulated natural color) are given in Albert and Steele (1976a, b) and Condit and Chavez (1976). Imagery is available from EROS Data Center, Sioux Falls, SD 57198 (specify PAD number when ordering). Example of imagery is shown in Figure 2.

IMAGE TYPE	COMPUTER-ENHANCED	BANDS AND COLORS USED	PROJECTION	PAD NUMBER	SCENE ID NUMBER	TRANSPARENCY SCALE	PRINT SCALE
U.S.D.A. Alaska mosaic	No	7 Black and white	Alber's equal area	this item not available from EROS Data Center		N/A	1:1,000,000
Simulated natural color	Yes	4 Green 5 Red 5 Blue	Orthographic	E-794-67CT	Composite (2945-20143, 2945-20150)	1:1,070,000	1:250,000
False-color (POE) - north	No	4 Blue 5 Green 7 Red	Space Cylindrical	E-1220-99CT	2945-20143	1:1,007,500	1:250,000
False-color (POE) - south	No	4 Blue 5 Green 7 Red	Space Cylindrical	E-1221-99CT	2945-20150	1:1,005,000	1:250,000

POE = photo-optically enhanced

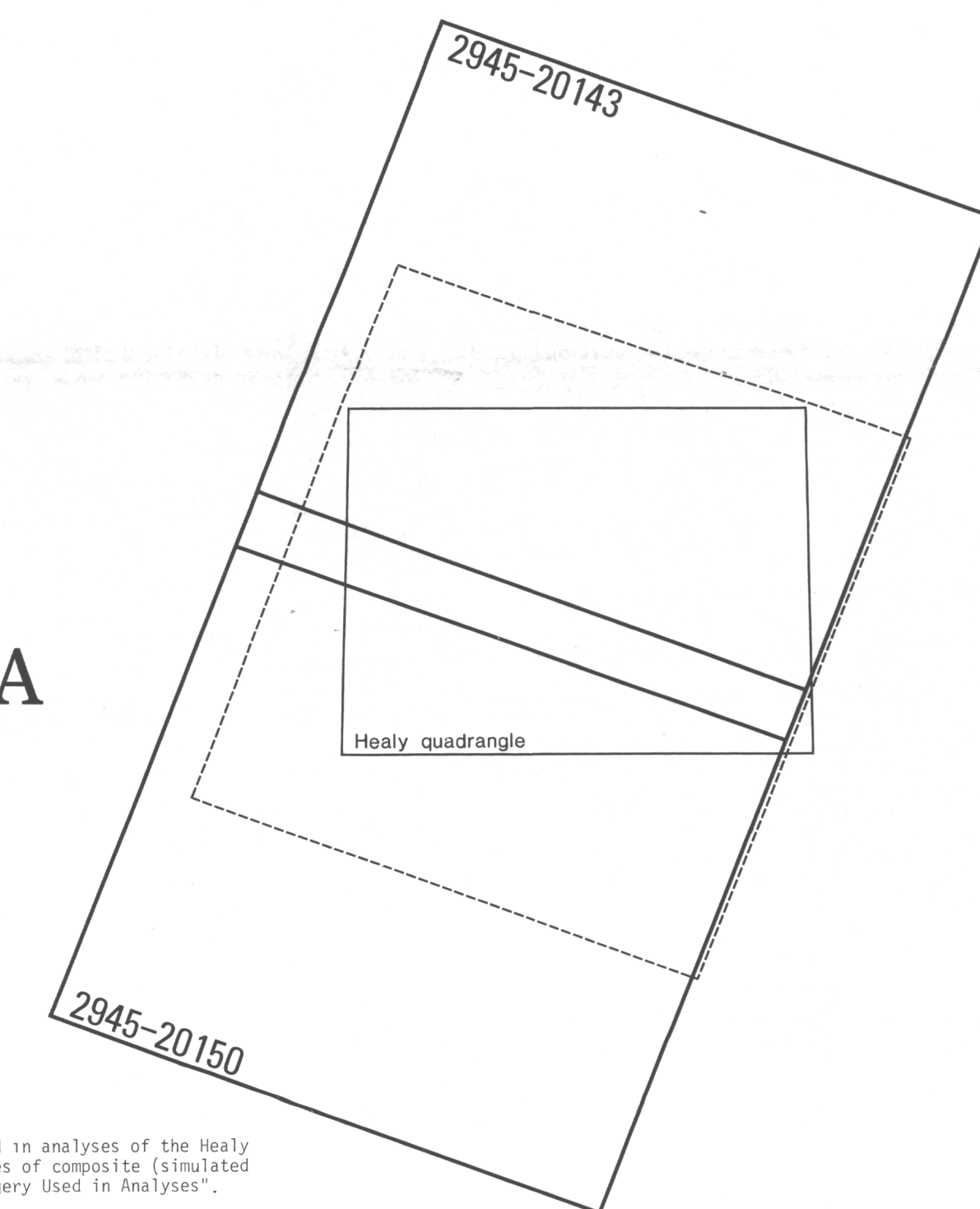


Figure 1. Map showing location of Landsat imagery used in analyses of the Healy quadrangle. Dashed lines indicate boundaries of composite (simulated natural color) image noted in Table of Imagery Used in Analyses.