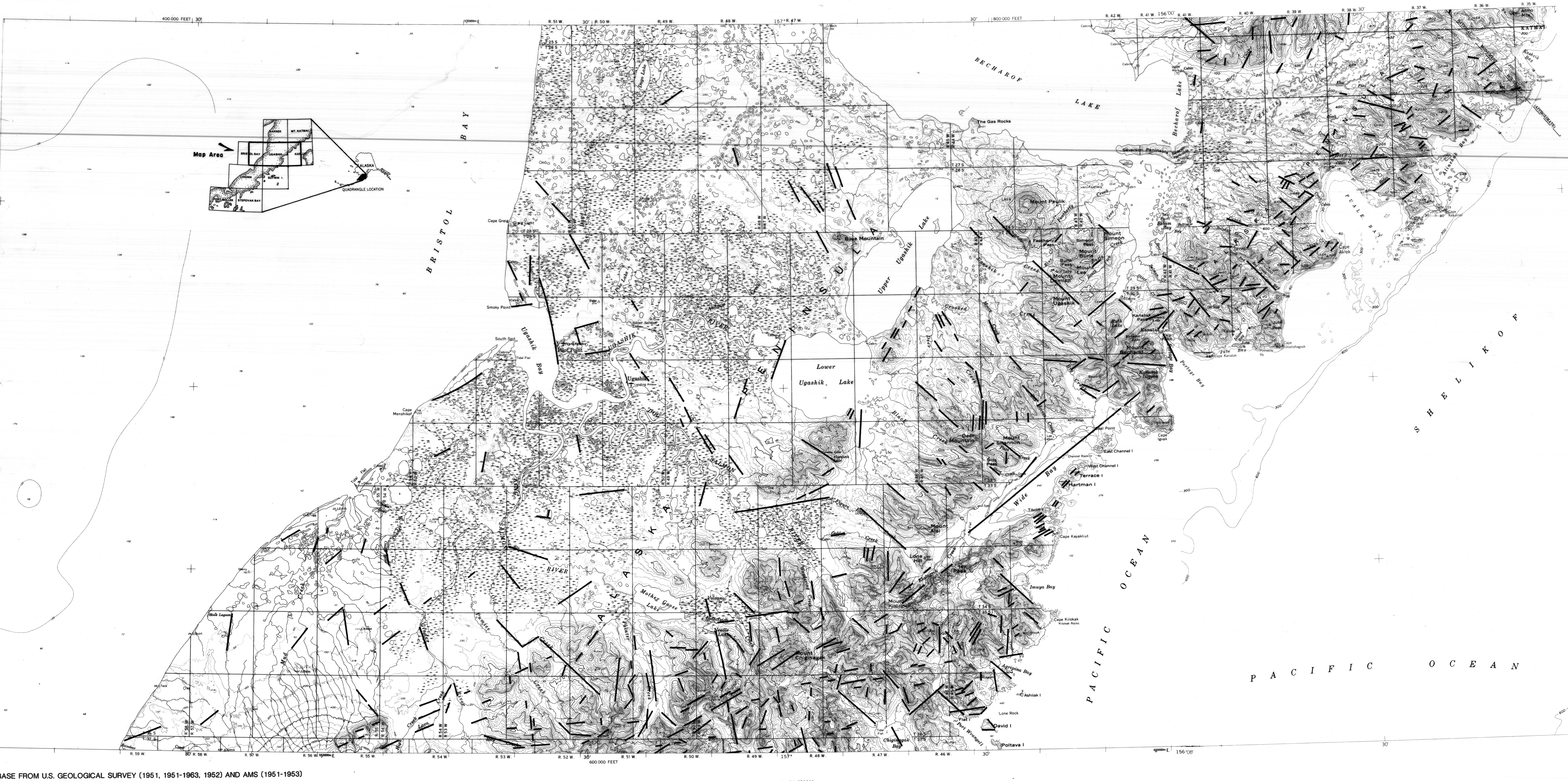
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY



BASE FROM U.S. GEOLOGICAL SURVEY (1951, 1951-1963, 1952) AND AMS (1951-1953)

SCALE 1:250000

CONTOUR INTERVAL 200 FEET
DATUM IS MEAN SEA LEVEL

EXPLANATION OF IMAGERY INTERPRETATION

—— Lineament

DISCUSSION

Landsat images of the Ugashik and Karluk quadrangles 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. These maps are a preliminary presentation of the observed Landsat data. Republication of these maps compiled with generalized geologic base maps (R.L. Detterman and others, unpub. data, 1981) is planned as part of a folio of maps on the Ugashik and Karluk quadrangles.

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".

Certain Landsat circular features observed from this study appear analogous to circular features that may have a relation to areas with either known mineralization or mineralization potential in the Chignik and Sutwik Island quadrangles (Le Compte and Steele, 1981). Seven characteristically defined circular features, similar in appearance to others that show good spatial coincidence with several areas ("anomaly-areas") marked by "zoned clusters" of geochemically-anomalous drainage basins (Cox and others, 1981) in the Chignik and Sutwik Island quadrangles are observed from the imagery of the quadrangles (circular and arcuate features map, sheet 2, features 1-7). Cox and others (1981) note that all such anomaly-areas in the Chignik and Sutwik Island quadrangles are primarily associated with Tertiary intrusive rocks, and that each has significantly anomalous values of arsenic, bismuth, copper, gold, lead, molybdenum, silver, tin, tungsten, and zinc. They interpret these anomaly-areas as representing the temperature-controlled depositional sites (zones) of outward-diffusing elements (in hydrothermal solution) emanating from volatile-rich plutons.

The seven characteristic circular features noted from the imagery of the Ugashik and Karluk quadrangles are, similarly, all spatially related to areas either known or postulated to be underlain, at least in part, by Tertiary intrusive rocks (R.L. Detterman, oral commun., 1980). These features may, thus, denote localities with mineral potential akin to those regions (anomaly-areas) characterized by zoned clusters of geochemically-anomalous drainage basins noted in the Chignik and Sutwik Island quadrangles (Le Compte and Steele, 1981) and, as such, they may warrant further geologic and geochemical investigation.

Five anomalously colored areas, all located on the northern and eastern slopes of Mt. Becharof in the eastern part of the Ugashik quadrangle, are identified from the imagery (simulated natural color) of the quadrangles (circular and arcuate features map, sheet 2). The areas are typically marked by iron-oxide stained (gossan-like) surface colorations similar to those observed in other Alaskan areas (Albert, 1975; Albert and Steele, 1976a, b; Steele and Le Compte, 1978; Le Compte, 1981), many of which have proved to be sites of hydrothermally altered rock materials, i.e., mainly altered volcanic and plutonic rocks.

REFERENCES CITED

Albert, N.R.D., 1975, Interpretation of Earth Resources Technology Satellite imagery of the Nabesna quadrangle, Alaska: U.S. Geological Survey Miscellaneous Field Studies Map MF-655J, 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-773N, 3 sheets, scale 1:250,000.

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Raines, G.L., 1978, Porphyry copper exploration model for northern Sonora, Mexico: U.S. Geological Survey Journal of Research, v. 6, no. 1, p. 51-58.

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-870C, 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

Scenes used for computer enhancement and (or) photo-optical enhancement are 1428-20565, taken September 24, 1973, and 2534-20511, taken July 9, 1976. 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 (1978). 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 (#1)	Yes	4 Green 5 Red Syn Blue	Orthographic	E-792-67CT	Composite (2534-20511, 2534-20504)	1:1,000,000	1:250,000
Simulated natural color (#2)	Yes	4 Green 5 Red Syn Blue	Orthographic	E-809-77CT	1428-20565	1:1,015,000	1:250,000
False-color (POE)	No	4 Blue 5 Green 7 Red	Space Cylindrical	E-1216-99CT	2534-20511	1:1,000,000	1:250,000
False-color (POE)	No	4 Blue 5 Green 7 Red	Space Cylindrical	E-1217-99CT	1428-20565	1:1,015,000	1:250,000

POE = photo-optically enhanced

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

LINEAMENT MAP

PRELIMINARY MAPS SHOWING INTERPRETATION OF LANDSAT IMAGERY OF THE UGASHIK AND KARLUK QUADRANGLES, ALASKA

by

James R. Le Compte

1981