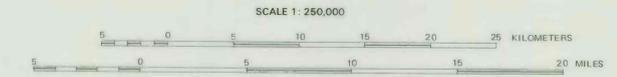




Original surveys supervised by B.R.G.M.
 1:250,000 assembly by the Riofex Geological Mission, 1980.
 For survey details see Airborne Magnetometer and Scintillation Counter
 Survey Reports of 1961-1962, 1965-1966, 1966-1967.

LEGEND

CONTOUR INTERVAL	20 GAMMAS
500 GAMMA CONTOUR	_____
100 GAMMA CONTOUR	_____
20 GAMMA CONTOUR	_____
MAGNETIC LOW	_____
RADIOMETRIC CONTOUR	_____
FIDUCIAL POINTS	• 3690
FLIGHT LINES	_____



Magnetic interpretation on a Universal Transverse Mercator projection. Geology is mosaicked to a UTM grid but geologic base adapted from lithologic maps prepared by the Riofex Geological Mission are on Lambert Conformal projection.

Geologic base adapted from Jackson and others (1963), Barnes and Johnson (1980), and Riofex Geological Mission (1980). Geologic Explanation adapted from Barnes and Johnson (1980) and Riofex Geological Mission (1980).

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

EXPLANATION

MAGNETIC INTERPRETATION

- Boundary between rock units of different magnetic properties or of differing magnetic patterns. Dashed where location is uncertain. Dotted where boundary is buried beneath nonmagnetic rocks. Code letters (described below), where present, indicate which side is the more magnetic rock unit.
- M Magnetic rock unit, lithology uncertain
- R Magnetic rock unit possessing reverse remanent magnetization
- G, G_R Magnetic rock unit probably granitic in composition. Subscript "R" where rock unit possesses reverse remanent magnetization
- B Magnetic rock unit probably mafic in composition
- Z, Z_R Zone of magnetic anomalies. Subscript "R" if more than half of the anomalies in the zone are magnetic lows that appear to be caused by rocks with reverse remanent magnetization
- 60 Approximate dip of magnetic boundary as estimated by comparison with a set of calculated models
- d' Linear magnetic anomaly probably caused by a dike

LAYERED ROCKS 1

Weakly to moderately metamorphosed and deformed, with volcanic and sedimentary character preserved (greenschist to lower amphibolite facies)

PREDOMINANTLY VOLCANIC ROCKS: unit includes flow rocks and volcaniclastic rocks with minor sedimentary members.

- Undifferentiated metavolcanic rocks of mafic to felsic composition
- Metavolcanic rocks of basaltic to andesitic composition; unit locally includes amphibolites and greenstones of extrusive and intrusive origin
- Metavolcanic rocks of predominantly dacitic to rhyolitic composition
- Cenozoic basalt (not differentiated from other Cover Rocks)
- Agglomerate (symbol used to indicate presence of very locally derived volcanic clasts; grades into conglomerate)

UNDIFFERENTIATED VOLCANIC AND SEDIMENTARY ROCKS

- Metamorphic rocks of mixed volcanic and sedimentary origin, including flow rock, agglomerate, tuffaceous rock, volcaniclastic sandstone (graywacke), conglomerate, shale, argillite, and so forth; commonly present as undifferentiated chlorite schist or greenschist (metamorphosed mafic volcanic rocks) or sericite-chlorite-feldspar-quartz schist (metamorphosed felsic volcanic rocks)
- Mixed metavolcanic and metasedimentary rocks with tuffs, tuffaceous sandstone, and tuffaceous siltstone; may be present as undifferentiated chlorite-sericite schist

PREDOMINANTLY SEDIMENTARY ROCKS: locally includes volcanic members

- Undifferentiated metasedimentary clastic rocks including volcaniclastic sandstone (graywacke), bedded tuff, shale, and argillite; locally unit includes flow rocks
- Medium- to coarse-grained metasedimentary rocks (sandstone, locally conglomeratic), generally noncalcareous; locally unit includes shale and argillite
- Polymict conglomerate: gradational from locally derived volcanic fragmental rock (agglomerate) to residual mixed-clast conglomerate
- Calclitic and dolomitic marble; interbedded with calcareous shales
- Cover Rocks (not differentiated from Cenozoic basalt)
- Meta-arenite and siltstone, locally conglomeratic; locally unit includes volcanic interbeds; in most places noncalcareous

LAYERED ROCKS 2

Strongly metamorphosed and deformed; original volcanic and sedimentary character blurred

- Undifferentiated metamorphic rocks of sedimentary and volcanic origin; mainly schist, locally gneissic; unit includes amphibolite (metamorphosed volcanic rocks) and sericite-biotite-feldspar-quartz schist, muscovite-microlite-quartz schist and quartz schist (metamorphosed felsic volcanic rocks and sedimentary rocks)
- Quartzo-feldspathic schist
- Talc-actinolite schist (associated with retrogressive metamorphism of serpentinite along the Nabitah Fault Zone)
- Amphibolite, hornblende schist, locally quartz-biotite-feldspar-hornblende schist, locally hornblende gneiss; of diverse sedimentary and volcanic origin
- Amphibolite unit as above; of inferred sedimentary origin
- Amphibolite unit as above; of inferred plutonic origin
- Hornblende gneiss, biotite-hornblende gneiss, locally hornblende schist, biotite-hornblende schist; of diverse origin

INTRUSIVE ROCKS

- Alkali-feldspar granite (peralkaline riebeckite-arfvedsonite-biotite granite)
- 'Granite', calc-alkalic granite, quartz monzonite; locally unit includes granodiorite
- Granodiorite, locally with quartz monzonite, undifferentiated granitoid rocks; in part gradational with 'Syntectonic granitic rocks'
- Heterogeneous granitic rocks; undifferentiated granitoid rocks, mainly granodiorite to quartz monzonite in composition; commonly foliated
- Diorite and quartz diorite; unit includes tonalite and minor gabbro
- Undifferentiated gabbro and diorite
- Gabbro, including massive, layered, and metamorphosed varieties; locally unit includes norite, tonalite, and anorthosite
- Ultramafic, serpentinite complex
- Quartz porphyry and granophyre
- Syntectonic granitic rocks, orthogneiss, granite-gneiss; mainly quartz monzonite to granodiorite in composition
- Strongly metamorphosed diorite-gabbro and tonalite with schistose and gneissic texture
- Fine-grained diorite sills and dikes intruding volcanic rocks of andesitic composition

MINERALIZATION

J SELM name of occurrence

MDS number

principal commodity

associated commodity

surface expression (gossan)

○ copper

□ gold

GEOCHRONOLOGICAL DATA

□ K-Ar method

○ Rb-Sr method

age reported

location

rock sampled

method

data source

Data sources:

- Fleck, R. J., Greenwood, W. R., Hadley, D. G., Anderson, R. E., and Schmidt, D. L., 1980, Rubidium-strontium geochronology and plate-tectonic evolution of the southern part of the Arabian Shield: U.S. Geological Survey Professional Paper 1131, 38 p.
- Brown, G. F., Hedge, C. E., and Marvin, Richard, 1978, Tabulation of Rb-Sr and K-Ar ages given by rocks of the Arabian Shield: U.S. Geological Survey Saudi Arabian Project Report 240: sec. 2, p. 10-20.
- Kroner, A., Koobol, M. J., Ramsay, C. R., and Jackson, N. J., 1979, Pan-African ages of some gneissic rocks in the Saudi Arabian Shield: Journal of the Geological Society of London, v. 136, p. 445-461.
- Hadley, D. G., 1976, Geology of the P'ir Juhayq quadrangle, sheet 21/43 D, Kingdom of Saudi Arabia: Saudi Arabian Directorate General of Mineral Resources Geologic Map GM-26, 30 p., scale 1:100,000.

SOURCES OF LITHOLOGIC DATA

- Jackson, R.O., and others, 1963
- Riofex Geological Mission, 1979
- Barnes, D., and Johnson, P.R., 1980
- Riofex Geological Mission, 1980
- Kashkary, A. A. R., 1974
- Kellogg, K. S., USGS, unpublished geologic maps, 1981
- Letalenet, J., 1979

OTHER SYMBOLS

- Principal town
- Other towns, villages, wells
- Alluvium-bedrock boundary
- Geologic boundary
- Uncertain geologic boundary
- Fault
- Fault inferred under alluvium

MAGNETIC INTERPRETATION OF THE AR RAWDAH QUADRANGLE, SHEET 21F

by
Andrew Griscom
 1982