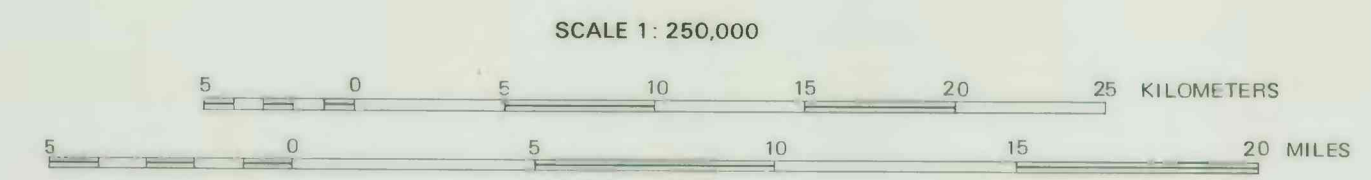


Original surveys supervised by B.R.C.M.  
1:250,000 assembly by the Riofronx Geological Mission, 1980.  
For survey details see Airborne Magnetometer and Scintillation Counter  
Survey Reports of 1961-1962, 1965-1966, 1966-1967.

**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 Riofronx Geological Mission are on Lambert Conformal projection.

Geologic base adapted from Jackson and others (1963) and Riofronx Geological Mission (1980).  
Geologic Explanation adapted from Riofronx Geological Mission (1980).

**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.
- Magnetic rock unit, lithology uncertain
- Magnetic rock unit possessing reverse remanent magnetization
- Magnetic rock unit probably granitic in composition. Subscript "R" where rock unit possesses reverse remanent magnetization
- Magnetic rock unit probably mafic in composition
- 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
- Approximate dip of magnetic boundary as estimated by comparison with a set of calculated models
- 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 and volcanoclastic rocks with minor sedimentary members

- Undifferentiated metavolcanic rocks of mafic to felsic composition
- Metavolcanic rocks of basaltic to andesitic composition; locally unit includes amphibolite and greenstone of extrusive and intrusive origin
- Metavolcanic rocks of predominantly dacitic to rhyolitic composition
- Genozoic 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, volcanoclastic sandstone (graywacke), conglomerate, shale, argillite, and so forth; commonly present as undifferentiated chlorite schist or greenstone (metamorphosed mafic volcanic rocks) or sericite-chlorite-feldspar-quartz schist (metamorphosed felsic volcanic rocks)

**Compositional modifiers:**

- mafic component significant
- felsic component significant

Undifferentiated metavolcanic and metasedimentary rocks with abundant andesitic tuff, some flow rock, and abundant volcanoclastic sandstone

**PREDOMINANTLY SEDIMENTARY ROCKS:** locally unit includes volcanic members

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

**LAYERED ROCKS 2**

Strongly metamorphosed and deformed with original volcanic and sedimentary character blurred

- Undifferentiated metamorphic rocks of sedimentary and volcanic origin; mainly schists, locally gneissic; unit includes amphibolite (metamorphosed volcanic rocks) and sericite-biotite-feldspar-quartz schist, muscovite-microcline-quartz schist, and quartz schist (metamorphosed felsic volcanic rocks and sedimentary rocks)
- Quartz-feldspathic schist
- Talc-actinolite schist (associated with retrogressive metamorphism of serpentinite along the Nabihah 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; unit locally includes granodiorite
- Granodiorite, locally with quartz monzonite; undifferentiated granitoid rocks; in part gradational with 'Syntectonic granitic rocks'
- Trochilite with minor granodiorite and quartz monzonite
- 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 /1/4 associated commodity  
principal commodity surface expression (goossan)

- copper
- gold
- iron oxide
- iron sulfide
- nickel
- other (as indicated)

**GEOCHRONOLOGICAL DATA**

- K-Ar method
- Rb-Sr method
- Ar-Ar method
- Zircon method
- age reported
- location
- rock sampled
- data source

**SOURCES OF LITHOLOGIC DATA**

- Jackson, R.O., and others, 1963
- Riofronx Geological Mission, 1979
- Barnes, D., and Johnson, P.R., 1980
- Riofronx Geological Mission, 1980
- Kashkary, A. A. R., 1974
- Kellogg, K. S., USGS, unpublished geologic maps, 1981
- Latalenet, 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 WADI BISHAH QUADRANGLE, SHEET 20F**

by  
**Andrew Griscom**  
1982

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