U.S. DEPARTMENT OF THE INTERIOR, GEOLOGICAL SURVEY, PREPARED FOR

MINISTRY OF PETROLEUM AND MINERAL RESOURCES
DEPUTY MINISTRY FOR MINERAL RESOURCES

KINGDOM OF SAUDI ARABIA

OPEN-FILE REPORT 83- 331
PLATE 1

Aerial photography 1956, controlled mosaic 1969
Aero Service Corp., Philadelphia, Penn., U.S.A.

This report has not been edited or reviewed for conformity with U.S. Geological Survey standards and nomenclature.

TRUE NORTH

SCALE 1 : 100 000

2 0 2 4 6 8 10 KILOMETERS

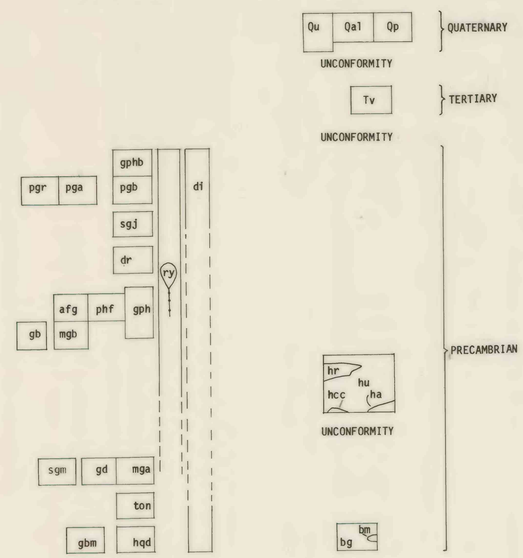
2 0 2 4 6 8 10 MILES

QUADRANGLE LOCATION

Geology mapped March-June 1982

EXPLANATION

CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

CENOZOIC SEDIMENTS AND VOLCANIC ROCKS

Qp PLAYA LAKE DEPOSITS--Mostly clay and fine silt deposits in small playa lakes

Qal ALLUVIUM--Deposits of unconsolidated silt, sand, and gravel in wadi channels

Qu UNDIFFERENTIATED QUATERNARY DEPOSITS--Deposits of colluvium, talus, and alluvium in channels too small to map

Tv BASALT--Dense, basaltic flows and interbedded lapilli tuff; contains blocks of vesicular to massive basalt

PRECAMBRIAN INTRUSIVE ROCKS

ry FELSIC DIKES--Red- to black-weathering, pink to gray, aphanitic to porphyritic dikes of rhyolite, rhyodacite, and dacite. Thickness generally from less than 1 m to tens of meters

di DIABASE--Dark-gray to black, low-weathering, very fine grained, intersertal-textured diabase

pgb, gphb BA'GHAM INTRUSIVE COMPLEX--Dark-gray- to red-weathering, white to purple, resistant, coarse-grained, xenomorphic-granular, arfvedsonite microcline granite (pgb) containing 5 to 10 percent mafic minerals; and brick-red, aphanitic to porphyritic granophyre (gphb). Characterized by hematite staining, hematite veins, replacement of mafic minerals by magnetite and menatite, and high radioactivity. Cut by dikes, along the southern and southwestern margin of complex

pga ARFVEDSONITE GRANITE--White- to light-gray-weathering, pink to light-purple, resistant, fine- to medium-grained, xenomorphic-granular arfvedsonite-bearing granite. Yellow biotite locally dominant mafic mineral. Low color index (1-2). Cut by few dikes

pgr RUMMAN GRANITE--Medium-gray-weathering, white to gray, resistant, hypidiomorphic- to xenomorphic-granular microcline granite with about 5 percent kataphorite, aegirine, and aenigmatite. Cut by dikes having predominantly easterly or northerly trends

sgj JUFAYFAH SYENOGRANITE--White- to tan-weathering, white, resistant, fine- to medium-grained, hypidiomorphic-granular, hornblende-biotite-bearing granite having color index of 1 to 2. Cut by swarm of east-northeast-trending dikes

dr DIORITE--Gray-weathering, white, fine-grained, hypidiomorphic-granular hornblende and biotite diorite. Crops out only as clusters of boulders

gph GRANOPHYRE--Brick-red, very fine grained, porphyritic granophyric granite having color index generally less than 2. Forms prominent red hills with steep sides and angular to broadly convex faces; sheeted jointing locally developed. Cut by very few dikes

phf HORNBLENDE-FELDSPAR PORPHYRY--White- to pink-weathering, fine-grained granitic porphyry containing distinctive phenocrysts of acicular amphibole and blocky plagiocase and potassium feldspar

afg ALKALI-FELDSPAR GRANITE--White- to red-weathering, fine- to medium-grained, xenomorphic-granular microcline granite containing less than 2 percent biotite. Includes minor plagioclase- and amphibole-bearing granite. Forms red-weathering hills that project above white, grus-covered plain. Cut by few dikes

gb GABBRO--Dark-gray- to black-weathering, medium- to coarse-grained, hypidiomorphic granular, two-pyroxene olivine gabbro having color index of 40 to 50. Forms high, resistant hills covered with subangular to subrounded boulders. Cumulate layering locally present

mgb POST-HADN MONZOGRANITE--White, low-weathering, friable, medium- to coarse-grained, locally porphyritic, hypidiomorphic-granular granite containing 2 to 5 percent biotite that is locally recrystallized into fine-grained, chlorite-rich clots; hornblende present in 30 to 40 percent of rock. Unit becomes more potassium feldspar-rich toward margins of plutons; forms broad, flat, grus-covered plains and low, scattered, cavernous-weathering inselbergs. Locally cut by numerous dikes

mga PRE-HADN MONZOGRANITE--White, low-weathering, friable, medium- to coarse-grained, locally porphyritic, hypidiomorphic-granular granite containing less than 5 percent biotite that is commonly recrystallized into fine-grained, chlorite-rich clots. Unit grades into granodiorite with increasing plagioclase content; forms broad, flat, grus-covered plains and low, scattered, cavernous-weathering inselbergs. Cut by numerous dikes

sgm MAGNETITE SYENOGRANITE--White- to red-weathering, coarse-grained, xenomorphic-granular, microcline-rich granite. Color index less than 2, and magnetite principal dark mineral. Hematite staining and hematite-filled fractures pervasive. Unresistant, forms low-lying terrain. Cut by numerous dikes

gd BIOTITE-HORNBLENDE GRANODIORITE--White- to gray-weathering, medium- to coarse-grained, hypidiomorphic-granular, biotite-hornblende granodiorite having color index of 5 to 15. Contains distinctly euhedral laths of plagioclase. Mafic minerals partially replaced by chlorite and magnetite. Forms low, gray, bouldery hills with gray-green regolith

ton TONALITE--White-weathering, coarse-grained, hypidiomorphic-granular hornblende-biotite tonalite having color index of 10 to 20. Hornblende and biotite generally altered to actinolite and chlorite. Weathers to boulder-free, low hills and pediments

hqd HORNBLENDE QUARTZ DIORITE--Dark-gray-weathering, white, medium-grained, hypidiomorphic granular hornblende quartz diorite having color index of 15 to 30. Unit includes zones of diorite. Biotite locally present. Amphibole and biotite altered to chlorite; calcite veins locally abundant. Weathers to low-lying hills covered with small, rounded to subangular, dark-gray boulders and gray-green regolith

gbm METAGABBRO--Dark-gray-weathering, medium- to coarse-grained, hypidiomorphic-granular, two-pyroxene olivine metagabbro having color index of 40 to 65. Cumulate layering locally present. Alteration extensive; clinopyroxene replaced by actinolite; olivine and orthopyroxene replaced by serpentine, talc, and magnetite; plagioclase intensely saussuritized. Underlies low hills or pediments with scattered boulders; blue-green sheen

PRECAMBRIAN VOLCANIC AND SEDIMENTARY ROCKS

hr, hu, hcc, ha HADN FORMATION--Undivided, red-weathering, massive to thick-bedded flow rock, volcanic breccia, welded tuff, and tuff of rhyolite, rhyodacite, and dacite (hu); brick-red weathering, thick-bedded, welded rhyolite tuff (hr); immature, poorly sorted, arkosic sandstone and breccia (ha) containing fragments of Hadn volcanic rock and pre-Hadn granitic rock; concretionary chert (hcc) composed of closely packed, rounded siliceous concretions 5 to 10 cm in diameter

bg, bm BANANA GREENSTONE--Greenstone (bg) composed of dark gray-green, black, and light-gray flow rock, flow breccia, and volcanic wacke ranging in composition from basalt to andesite, and dioritic and diabasic subvolcanic intrusive rock and minor interbedded marble (bm). Metamorphic grade ranges from greenschist to epidote-amphibolite facies. Outcrops of greenstone have blue-green sheen from abundant chlorite, epidote, and actinolite. Veins of quartz and epidote ubiquitous

SYMBOLS

CONTACT--Dashed where inferred

FAULT--Dashed where inferred

STRIKE AND DIP OF BEDS--Inclined, showing inclination

STRIKE AND DIP OF CUMULATE IGNEOUS LAYERING--Inclined, showing inclination

STRIKE AND DIP OF FOLIATION

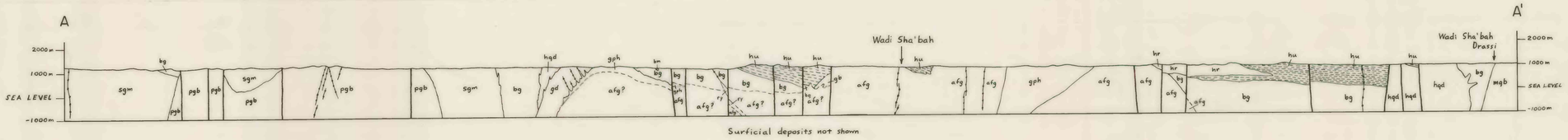
Inclined, showing inclination

Vertical

STRIKE AND DIP OF JOINTS

Inclined, showing inclination

Vertical



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RECONNAISSANCE GEOLOGIC MAP OF THE GHAZZALAH QUADRANGLE, SHEET 26/41 A, KINGDOM OF SAUDI ARABIA

by
James E. Quick

1983