



CORRELATION OF MAP UNITS

SEDIMENTS, METASEDIMENTARY ROCKS, AND METAVOLCANIC ROCKS

Qab Qes Qal Qf Qfp

INTRUSIVE ROCKS

gd

UNCONFORMITY

ju

UNCONFORMITY

mgq mgp mu

DESCRIPTION OF ROCK UNITS

SEDIMENTS, METASEDIMENTARY, AND METAVOLCANIC ROCKS

Qes EOLIAN SAND AND SILT—Red silt and fine sand and gray, medium to coarse sand in the dune field of Nafud al Urayk along the eastern boundary of the quadrangle; older, partly vegetated, stable dunes with subdued forms consist of gray, medium to coarse sand, whereas younger, unvegetated, active dunes consist of red silt and fine sand; dune complexes as high as 120 m near Jabal Khathariq, but thickness of unit is generally much less

Qab SARKISAN DEPOSITS—Tan to white, salt-impregnated silt in small plays basins adjacent to and within larger wadis; thickness unknown

Qal ALLUVIAL SAND, SILT, AND GRAVEL—Varicolored, poorly sorted, and unconsolidated materials underlying the broad channels of Wadi al Jarir and Wadi Sahag, and beneath numerous smaller unnamed channels; thickness unknown

Qf ALLUVIAL FAN DEPOSITS—Angular to subrounded, boulder- to pebble- and sand-sized detritus forming poorly sorted and unconsolidated debris aprons around the bases of isolated jabbals

Qfp WADI FLOODPLAIN DEPOSITS—Poorly sorted, weakly cemented(?), silt, sand, and gravel deposits capped by dark-colored desert pavement; generally forms small isolated patches within and adjacent to larger wadi channels but topographically higher than the presently active channel; thickness unknown

AL JURDAHAYIYAH GROUP

Rocks assigned to the Al Jurdahayiyah group are correlated on the basis of stratigraphic position and lithologic similarity with those of the reference area in the Al Jurdahayiyah quadrangle (sheet 25/42 D) immediately to the east (Cole, 1981). The Al Jurdahayiyah group consists dominantly of coarse volcaniclastic conglomerate and locally voluminous andesitic to rhyolitic extrusive and pyroclastic rocks that overlie the rocks of the Murdama group with pronounced angular unconformity. Units of the Al Jurdahayiyah group are exposed only along the northwestern boundary of the Wadi al Jarir quadrangle and in small outcrops at Jabal Aydah and Jabal Khathariq. Similar rocks in the Jabal Mawan (Aguttes and Chaumont, 1974) and Wadi al Jifn (Brossat and Delfour, 1972) quadrangles to the west and northwest are mapped as conglomeratic facies of the Murdama group.

AL JURDAHAYIYAH GROUP UNDIVIDED—Dark-green andesite agglomerate consisting of angular clasts of pyroxene-hornblende andesite in a matrix of similar composition; interlayered with thin beds of moderate-green, immature volcaniclastic graywacke and thin flow units of massive andesite; thickness unknown; primary mineralogy generally well preserved, but rocks locally altered to partial assemblages of chlorite, epidote, calcite, and actinolite. Al Jurdahayiyah group rocks at Jabal Aydah and Jabal Khathariq are oxidized and contact-metamorphosed to assemblages containing biotite and granular magnetite at the roof of a pluton of granodiorite (gd)

MURDAMA GROUP

Rocks assigned to the Murdama group underlie much of the western and southern parts of the Wadi al Jarir quadrangle. These rocks extend westward into the Jabal Mawan quadrangle where they were mapped as Murdama formation by Aguttes and Chaumont (1974, p. 15-21) and northward into the Wadi al Jifn quadrangle, where they were also mapped as Murdama formation by Brossat and Delfour (1972, p. 13-22).

The Murdama group in the Wadi al Jarir quadrangle consists predominantly of graywacke, phyllite, and quartzose marble with minor amounts of conglomerate, argillite, and white marble. The rocks are moderately folded and dips are mostly less than 50°. Schistosity is weak to absent except in phyllite, in which it commonly is pronounced. The rocks are variably metamorphosed, mostly to assemblages of greenschist facies characterized by epidote and chlorite, but this assemblage is accompanied by biotite in some places and, in the phyllite unit, by muscovite, amphibole, and staurolite(?).

The thickness of the Murdama group may be as much as 20 km. No repetition of section by isoclinal folds or faults was recognized, but if such structures are present then the section could be appreciably thinner. In the Wadi al Jifn quadrangle to the northeast, a thickness of about 9 km was reported by Brossat and Delfour (1972, p. 14-17) and Delfour (1977, p. 12), but the lower part of their section appears to be absent in the Wadi al Jarir quadrangle.

The Murdama group in the Wadi al Jarir quadrangle is divided into four informal lithologic units. In inferred stratigraphic order, the phyllite unit (mph) is conformably overlain by quartzose marble (mqm), which is conformably overlain by pure, white marble (mm), which is conformably overlain by graywacke and argillite (mgq) units. Contacts between these three units and other map units are faulted or covered by Quaternary deposits. The fourth major unit, graywacke and argillite (mgq), comprises most of the Murdama group rocks in the quadrangle, but its stratigraphic position relative to the other three units is unknown. Small beds and lenses of conglomerate (mcg) and impure marble (lithologically similar to quartzose marble, mqi) are mapped separately within the phyllite unit and the graywacke and argillite unit.

INTRUSIVE ROCKS

gd GRANODIORITE—Light-gray, medium-grained, hypidionorphic-granular to porphyritic; contains zoned phenocrysts of oligoclase-andesine in a matrix of oligoclase, quartz, potassium feldspar, hornblende, and biotite (color index typically 15-20); contains accessory opaque minerals (trace to 3 percent), sphene (trace to 2 percent), apatite, and zircon, and minor secondary chlorite, epidote, and sericite. Granodiorite characteristically contains discoid inclusions, 5 to 20 cm in diameter, of fine-grained biotite-hornblende-rich dioritic rock. Two outcrop areas are shown on the map at the bases of Jabal Aydah and Jabal Khathariq where granodiorite intrudes rocks of the Al Jurdahayiyah group. At Jabal Aydah, a thin selvage of red, leucocratic granophyre (as much as 10 m thick) is present at the contact.

Dikes are very abundant within granodiorite-monzogranite (gdmg) and also intrude the phyllite unit (mph) and to a lesser extent the inclusions of Murdama group univided (mu) within the plutonic bodies. Compositions of dikes range from andesite to rhyolite (or granite), and some dikes are composite. All are altered to assemblages containing calcite, chlorite, epidote, actinolite, and sericite. Dikes are as much as 10 km long and range in width from 1 to 50 m. Most trend north-northeast or west-northeast, but a few trend east or east-northeast.

The west-northeast-trending dike swarm in the west-central part of the quadrangle may be along fractures related to the late Precambrian Najd faulting episode (Moore, 1979), and the abundant north-northeast-trending dikes may likewise fill fractures complementary to the main Najd system (Moore, 1979, p. 9-10); however, all dikes may be older than Najd deformation because they appear to be related to emplacement of the complex granodiorite-monzogranite pluton.

On the geologic map, dikes are divided into 4 groups: felsic, intermediate, mafic, and composition unspecified. Composite dikes designated by c on map.

FELSIC ROCKS IN DIKES—Fine-grained; comprise syenogranite, monzogranite, alkali-feldspar granite, quartz syenite, apatite, and rhyolite; composed of quartz, potassium feldspar, plagioclase (commonly albite), a little biotite or hornblende, and accessory black opaque minerals, sphene, apatite, and minor zircon and rutile; granophyric and micrographic textures common

INTERMEDIATE ROCKS IN DIKES—Aphanitic to fine-grained; granodiorite and rhyodacite; composed of plagioclase, potassium feldspar, quartz, biotite, hornblende, microcline clinopyroxene, and accessory black opaque minerals, apatite, sphene, and sparse zircon and rutile; granophyric and micrographic textures in some rocks

MAFIC ROCKS IN DIKES—Aphanitic; andesite and latite(?). Composed of a felted network of plagioclase laths, hornblende or biotite, and clinopyroxene (pigeonite) in some rocks; quartz is sparse or lacking; accessory minerals are black opaque minerals, sphene, apatite, and local pyrite; secondary alteration minerals common

ROCKS OF UNSPECIFIED COMPOSITION IN DIKES

GRAYWACKE AND ARGILLITE—Medium to dark-gray to yellow-green to olive, fine- to coarse-grained graywacke, interlayered with argillite and minor calcareous siltstone; graywacke, best exposed in the northwestern part of the quadrangle, is composed of unsorted conic rock fragments, quartz (15 to 25 percent), feldspar, and some hornblende in a dark matrix of prograde metamorphic biotite (10 to 20 percent), chlorite, epidote, and sericite. Argillite interlayered with graywacke is dark gray, very fine grained, and composed of 10 to 30 percent quartz, 10 to 30 percent feldspar, 10 to 30 percent metamorphic biotite, as much as 30 percent actinolite, and a few percent opaque minerals. Green graywacke, best exposed in the southeastern part of the quadrangle, is medium to coarse grained and consists of fragments of volcanic rock and felsite, 20 to 30 percent quartz, and 5 to 15 percent feldspar in a matrix of very fine grained prograde metamorphic epidote (5 to 20 percent), chlorite (5 to 10 percent), and minor sericite and biotite. Argillite interlayered with green graywacke is grayish-green to pale-olive, very fine grained, and composed of quartz, feldspar, sericite, and epidote. Thickness in the southeastern part of the quadrangle may be as much as 14 km (see structure section A-A'); locally folded on outcrop scale near contacts with mgq; overlain unconformably by Al Jurdahayiyah group (ju) and intruded by granodiorite-monzogranite (gdmg).

mgq Lenses of conglomerate as much as 3.7 km long and 200 m thick, composed of sand- to cobble-sized clasts of granite, granitic gneiss, volcanic rocks, microcrystalline felsite, and impure marble in a fine-grained, dark matrix of quartz, feldspar, biotite, chlorite, epidote, actinolite, and sericite; granitic clasts form flattened ovoids, cylinders, or spindles that typically are 25 cm long and 5 cm in diameter

mgp Lenses of conglomerate as much as 4.5 km long and 250 m thick, composed of sand- to cobble-sized clasts of grayish-yellow-green, microcrystalline felsite in a dark-yellow-green, slightly calcareous matrix of quartz (10-20 percent), felsite fragments, plagioclase, microcline, and minor black opaque minerals; felsite is very fine grained, and is composed of quartz, feldspar, epidote, and chlorite

mm WHITE MARBLE—Very light gray to medium-light-gray, fine-grained marble, weathers white; average grain size less than 0.1 mm; nearly pure carbonate, contains less than 5 percent of combined quartz, black opaque minerals, and muscovite. Contact bedding and/or flow banding along eastern border; thickness averages about 30 m; conformably overlies quartzose marble (mqm); contacts with granodiorite-monzogranite (gdmg) and tonalite (to) are faults

mqm QUARTZOSE MARBLE—Dark-gray, locally pale-olivish-brown, sandy to silty, fine-grained marble; consists of 60 percent or more calcite in grains averaging 0.1 mm across; quartz, feldspar, biotite, chlorite, epidote, and epidote are present in variable amounts. In southern part of outcrop area, is complexly interlayered with argillite; thickness uncertain but may be as much as 2 km (see structure section A-A'); contacts with overlying white marble (mm) and underlying phyllite (mph) are conformable; contacts with other bedrock units are faults

mph PHYLLITE—Gray, fine- to very fine grained phyllite and schist; contains lenses of argillite, volcaniclastic rocks, and a few andesitic flow rocks. Phyllite consists largely of quartz, plagioclase, minor potassium feldspar, and prograde biotite (6 to 15 percent), hornblende (as much as 10 percent), and minor muscovite and sericite; gently folded in southern part of outcrop area; base not exposed and thickness is unknown but may be more than 6 km (see structure section A-A'); overlain conformably by quartzose marble (mqm) and intruded by granodiorite-monzogranite (gdmg); other bedrock contacts are faults

mu Lenses of quartzose marble

mcg Lenses of conglomerate same as mcg of graywacke and argillite unit (mgq) described above

to MURDAMA GROUP UNDIVIDED—Dark-gray hornfels in isolated blocks within plutons of tonalite (to) and granodiorite-monzogranite (gdmg); contact-metamorphosed and argillite similar to mgq unit with some interlayered andesitic(?) flow rocks consisting of felicit oligoclase-andesine phenocrysts in a plagioclase groundmass of feldspar laths with epidote, chlorite, actinolite, and opaque minerals

SYMBOLS

CONTACT

FAULT

TREND LINES - Average trend of layering in Murdama group rocks

SYNCLINE - Showing trace of trough plane and direction of plunge

ANTICLINE - Showing trace of crestal plane

STRIKE AND DIP OF BEDS

Inclined

Inclined, showing dip

Vertical

STRIKE AND DIP OF FOLIATION

Inclined mineral schistosity, showing dip

Vertical mineral schistosity

ANCIENT MINE SITE

Some information on this map was supplied by the U.S. Geological Survey Mission, 1980-1981. Additional information for the geology of this quadrangle is contained in an unedited report available for inspection at the U.S. Geological Survey Mission, Jiddah, under the title:

Young, Edward J., 1981, Reconnaissance geology of the Wadi al Jarir quadrangle, sheet 25/42 C, Kingdom of Saudi Arabia: Saudi Arabian Deputy Ministry for Mineral Resources Data File USGS-DR-02-2, 41 p.

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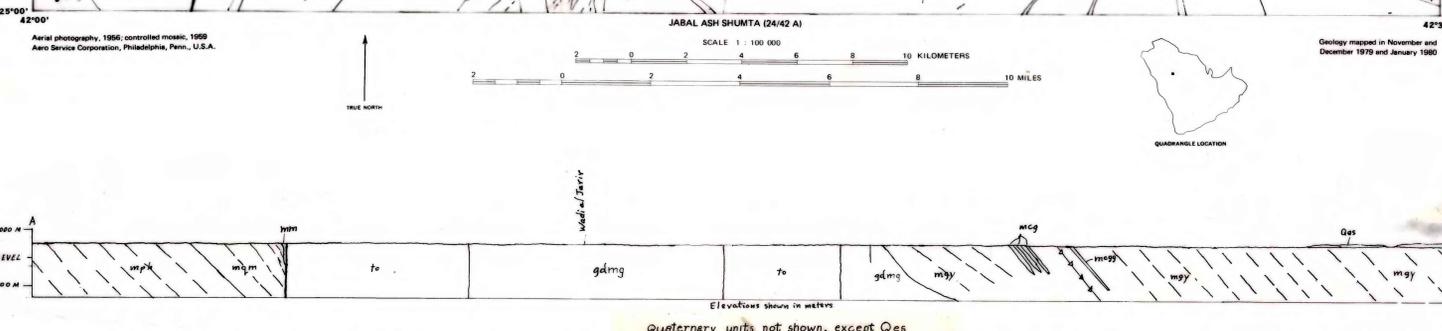
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ROCKS OF UNSPECIFIED COMPOSITION IN DIKES

RECONNAISSANCE GEOLOGIC MAP OF THE WADI AL JARIR QUADRANGLE, SHEET 25/42 C, KINGDOM OF SAUDI ARABIA
by Edward J. Young 1982