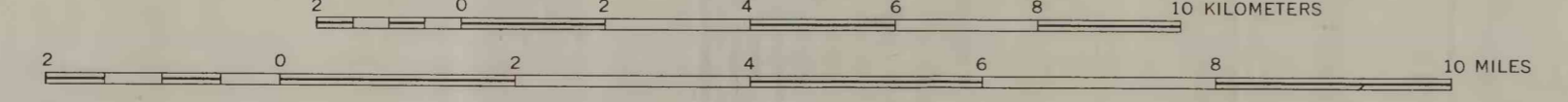


Aerial photography, 1955, and controlled mosaic, 1956, except southeast corner southeast of Wadi Ta'afin which is aerial photography and controlled mosaic, 1951. The two mosaics were controlled to different datums and are not reconcilable, but have been combined to give the best possible fit of detail. Parallels and meridians from 1956 mosaic, except east part of south parallel from 1951 mosaic.

DUTHUR AS SALAM 19/43C
SCALE 1:100 000



Geology mapped during 1965

EXPLANATION

PLUTONIC AND HYBABYSSAL INTRUSIVE ROCKS
NONLAYERED METAMORPHIC ROCKS

LAYERED SEDIMENTARY, PYROCLASTIC, AND METAMORPHIC ROCKS

UNCONFORMITY

Rhyolite dike
Brown, dark gray or pink rhyolite dikes (r)

Quartz porphyry
Pink, red, or gray quartz porphyry as masses, fractured and chloritized tectonic slices, or dikes; dikes locally have minette cores

Granite, felsite, and pegmatite dikes, quartz veins
White, pink, or red granite dikes (g), locally graphic granite, in swarms, generally associated with or grading into felsite dikes (f); granite and felsite dikes undivided (gf); felsite may be associated with or grade into pegmatite, not shown separately; felsite and pegmatite dikes undivided (fp); pegmatite and quartz dikes undivided (pq); dikes of granite, diorite, and felsite undivided (gdf); quartz veins (q)

Biotite-pyroxene granite, pyroxene granite, biotite granite, and syenite
Massive to locally flow-banded, pink to dark brown dikes of gabbro (gb), diorite (di), and andesite (an); undivided dark dikes (dd); locally includes lamprophyre dikes

Biotite granite
Massive to locally flow-banded, pink to red, perthitic biotite granite and biotite-pyroxene granite, generally in homogeneous subcrystalline textures

Gabbro, diorite, and andesite dikes
Fine to coarse-grained, dark gray, dark green to dark brown dikes of gabbro (gb), diorite (di), and andesite (an); undivided dark dikes (dd); locally includes lamprophyre dikes

Diorite, gabbro, and pyroxenite
Commonly fine to medium-grained, locally coarse-grained, light to dark gray diorite (di), massive to granitic and locally epidotized; diorite plutons rich in inclusions, septa, and roof penchants of older biotite-hornblende granodiorite gneiss and andesite, locally from igneous breccia; dark gray, greenish-gray, and brownish-black, massive to layered, fine to coarse-grained gabbro (gb) and composite intrusive plugs and masses of diorite and gabbro (dgb) or gabbro and pyroxenite (gdp)

Granite
Light gray to pink or red calc-alkalic biotite granite, general to medium-grained inequigranular to porphyritic, generally contains bluish quartz; may include some biotite granite of the post-blastic magma series

Biotite granite gneiss and biotite-hornblende granodiorite gneiss
Light gray to gray, fine to medium-grained, massive to strongly foliated biotite granite gneiss (gg) and biotite-hornblende granodiorite gneiss (gdg); both units, but particularly the biotite-hornblende granodiorite gneiss, contain inclusions and septa of meta-andesite, quartzite, biotite schist, and hornblende schist; locally igneous breccia formed where biotite-hornblende granodiorite gneiss intrudes meta-andesite

Serpentinite
Dark green to brownish green

Diorite and microdiorite
Dark microdiorite, diorite, and gabbro; mainly biotite diorite, biotite-hornblende diorite, and quartz diorite (md); locally metamorphosed to dark gray, nonlayered, biotite-rich, quartz-poor porphyroblastic gneiss; diorite rocks completely mixed with meta-andesite (ad)

Meta-andesite, metagraywacke, chlorite schist, hornblende schist, rhyolite, and marble
Nonmetamorphosed to weakly metamorphosed, interlayered andesite and graywacke (ag), meta-andesite (a); rhyolite and rhyolite porphyry interlayered with meta-andesite (rpa). Where the interlayered volcanic and sedimentary sequence of andesite and graywacke is more strongly metamorphosed the rocks are converted to chlorite schist (cs) and hornblende schist (hs); layers of marble (m) associated with the layered sedimentary and volcanic rocks

CONTACT - Dashed where approximately located or inferred; dotted where concealed

FAULT - Showing relative horizontal movement where known; dashed where approximately located or inferred; dotted where concealed; queried where probable

MINOR FOLD AXIS - Showing plunge

STRIKE AND DIP OF BEDS

STRIKE AND DIP OF FOLIATION

STRIKE AND DIP OF PRIMARY FLOW BANDING

STRIKE AND DIP OF CATACLASTIC FOLIATION

STRIKE AND PLUNGE OF PRIMARY FLOW LINEATION Marked by oriented inclusions

DIKE - Lithology not determined

ISOLATED OUTCROP OF MARBLE

LINEAMENT FROM AERIAL PHOTOGRAPHS - Not checked on ground; may be dikes, foliation, joints, bedding, or faults

POSSIBLE SHEETED CONTACT - Elliptical feature interpreted from aerial photographs to be possible sheeted contact over unbreached intrusions

SELECTED ELEMENTS IN RECONNAISSANCE SAMPLES
Showing sample numbers and results of spectrographic analyses of wadi sand

COPPER, ZINC, AND MOLYBDENUM

Location of sample with 20 ppm (parts per million) or less copper; also, less than 100 ppm zinc and 2 ppm or less molybdenum, unless otherwise indicated

Location of sample with 30 to 50 ppm copper; also, less than 100 ppm zinc and 2 ppm or less molybdenum unless otherwise indicated

ZINC

Threshold 100 ppm zinc; located by adjacent copper symbol

OTHER ELEMENTS
Ag, silver; Be, beryllium; Cr, chromium; Co, cobalt; Ga, gallium; La, lanthanum; Nb, niobium; Pb, lead; Sc, scandium; Sr, strontium; Ti, titanium; V, vanadium; Y, yttrium; Zr, zirconium; located by adjacent copper symbol. In ppm, parts per million.

Other anomalous elements and values
Anomalous Pb (value with asterisk) discussed in text on economic geology

Other threshold elements and values
Threshold element in detrital magnetite by chemical analysis: 100 Cu, 700 Zn, and 30-50 Mo; anomalous elements: 70 Mo.

Scheelite and/or powellite
Present in wadi sand (superimposed on symbol for copper)

MINERAL RESOURCES

METALLIC MINERAL DEPOSITS

Al Lugatah
Ancient gold mine

INDUSTRIAL MINERALS AND ROCKS

Quartz

Building and ornamental stone

Limestone and marble
Chemical analysis given in table 14 for sample number with asterisk

Amazon stone
Of little or no economic importance

QUATERNARY

PRECAMBRIAN AND CAMBRIAN (?)

RECONNAISSANCE GEOLOGY OF THE AL HASSIR QUADRANGLE, SHEET 19/43A,
KINGDOM OF SAUDI ARABIA

By
William C. Overstreet
1978