GEOLOGIC MAP OF THE MAHD ADH DHAHAB DISTRICT, KINGDOM OF SAUDI ARABIA

By
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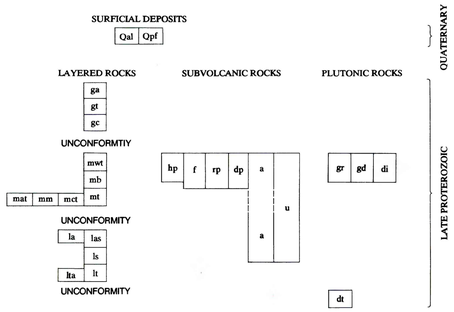
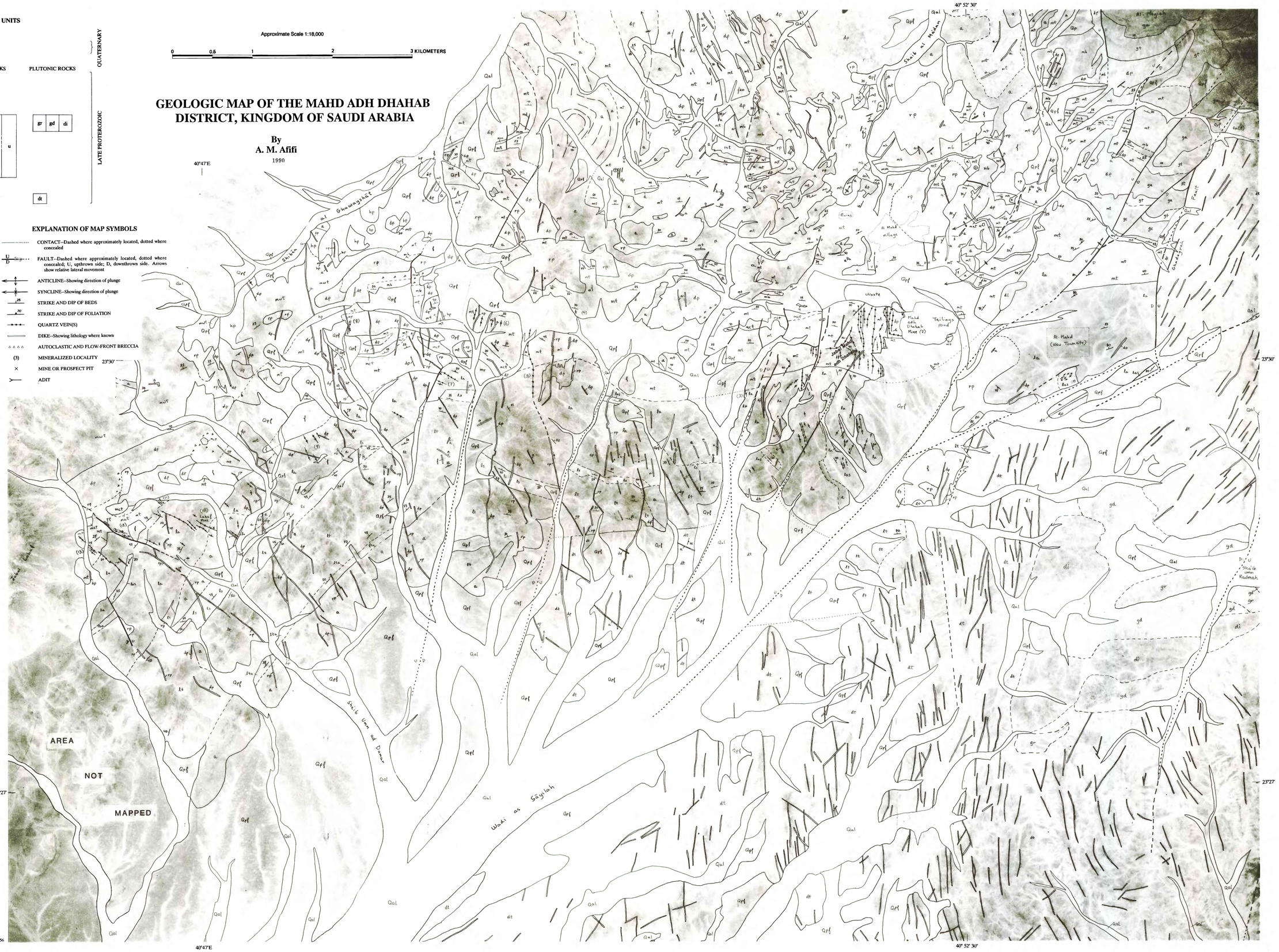
1990

CORRELATION OF MAP UNITS



Approximate Scale 1:18,000

0 0.5 1 2 3 KILOMETERS



DESCRIPTION OF MAP UNITS

QUATERNARY DEPOSITS

Qal ALLUVIUM (Holocene)--Sand in modern drainage channels

Qpf ALLUVIAL FAN AND PEDIMENT DEPOSITS (Holocene and Pleistocene)--Gravel and sand adjacent to highlands, veneered by wind-faceted lag gravel

LATE PROTEROZOIC LAYERED AND SUBVOLCANIC ROCKS

GHAMR GROUP (<770 Ma)

ga PORPHYRITIC DACITE--Green to brown lava flows with plagioclase and hornblende phenocrysts. Chlorite, epidote, and calcite in vesicles

gt VOLCANIC SANDSTONE--White, purple, and green interbedded sandstone, grit, and conglomerate. Composed of mixed lava, tuff, and feldspar fragments

gc BASAL CONGLOMERATE--Brown to green friable pebble and cobble conglomerate. Clasts derived from the Dhukhur batholith and Mahd Group

MAHD GROUP (8007-770 Ma)

TUWAL FORMATION--Consists primarily of layered felsic volcanic and volcaniclastic rocks with less abundant mafic lavas and minor dolostone and chert. Also included in the formation are subvolcanic rocks believed to be equivalents to the layered volcanic rocks. These consist of dacite porphyry, felsite, quartz-feldspar porphyry, feldspar porphyry, undivided basalt and diabase. Some of the basalt and diabase is probably equivalent in age to the Lahuf Formation.

LAYERED ROCKS OF THE TUWAL FORMATION

mwt GHUWAYSHAT MEMBER--Subaerial felsic pyroclastic rocks, chiefly welded and unwelded ash-flow tuff. Crystal fragments of sodic plagioclase + potassium feldspar ± quartz. Lapilli of trachytic felsite and chloritized pumice. Conglomerate at base

mb MAFIC VOLCANIC ROCKS--Basaltic lava and lapillistone, extensively replaced by chlorite + albite ± carbonates ± epidote ± hematite

mt MINE MEMBER--Mainly water-lain felsic fragmental rocks consisting of very thick beds of lapilli tuff and tuff-breccia (turbidity and debris-flow deposits) interlayered with thinly bedded to laminated tuffaceous sandstone and siltstone (current-sorted tuff). Crystal fragments of sodic plagioclase, + potassium feldspar ± quartz, and lithic fragments of felsic lava, chloritized pumice, and rip-up clasts. Secondary chlorite + albite ± sericite ± epidote ± hematite ± carbonates ± sphene. Thickness 1,500 + m.

mat Mixed-clast lapilli tuff--Contains mafic and felsic lava clasts and phenocryst fragments of potassium feldspar, plagioclase, quartz, and augite

mm Dolostone--Massive or thinly bedded. Contains minor chert, chlorite, hematite, or pyrite

mct Chert--Massive or laminated. Pyritic, chloritic, or hematitic. Includes highly silicified felsic tuff

SUBVOLCANIC ROCKS OF THE TUWAL FORMATION

FELSIC LAVA DOMES AND SUBVOLCANIC INTRUSIONS--

hp Porphyritic dacite--Acicular phenocrysts of amphibole? (replaced by chlorite) + sodic plagioclase ± potassium feldspar in aphanitic groundmass. Secondary chlorite + albite + epidote ± sericite

f Felsite--Aphanitic, with feldspar microphenocrysts

rp Quartz-feldspar porphyry--Rhyolite, with medium- to fine-grained phenocrysts of quartz + sodic plagioclase ± potassium feldspar in aphanitic groundmass. Secondary quartz + albite ± chlorite ± sericite ± epidote

dp Feldspar porphyry--Rhyolite to dacite, with medium- to fine-grained phenocrysts of sodic plagioclase ± potassium feldspar in aphanitic groundmass. Secondary quartz + albite ± chlorite ± epidote ± sericite

a MAFIC SUBVOLCANIC INTRUSIONS--Dark-gray to dark-green basalt and diabase. Contains primary labradorite + augite + magnetite, and secondary chlorite ± albite ± epidote ± hematite ± carbonates ± sericite ± prehnite ± pumpellyite

u UNDIFFERENTIATED FELSIC AND MAFIC DIKES--Includes undifferentiated dikes of a, dp, rp and f.

LAHUF FORMATION

UPPER MEMBER--

la Mafic volcanic rocks--Dark-gray to dark-green subaerial mafic lava, agglomerate, and lapillistone. Replaced by secondary chlorite + albite ± epidote ± carbonates. Cut by numerous basalt dikes

las Felsic tuff layers--Tuffaceous sandstone and siltstone (similar to ls) and lapilli tuff in the central part of the area, welded tuff west of the Lahuf mine

ls MIDDLE MEMBER--Tan to light-green, thinly bedded to laminated felsic tuff, with occasional beds of lapilli tuff

LOWER MEMBER--

lt Lapilli tuff--Very thick beds of green-purple felsic to intermediate crystal-lithic-(vitric) lapilli tuff. Lithic fragments of vitrophyre, chert, and chloritized pumice. Phenocryst fragments of sodic plagioclase + potassium feldspar (± quartz near base). Secondary chlorite + albite ± epidote ± hematite ± carbonates. Arkosic conglomerate locally present at base, with fragments of dt. Thickness approximately 600 m.

lta Mafic lapillistone--Dark green, chloritized

LATE PROTEROZOIC PLUTONIC ROCKS

MAHD PLUTONIC ROCKS (about 770 Ma)

gr Granite--Pink granite, granophyre, and aplite

gd Granodiorite and quartz monzonite--Gray to pink; biotite(?) and hornblende extensively chloritized

di Diorite and quartz diorite--Dark-gray to greenish-gray, with hornblende ± augite

dt DHUKHUR BATHOLITH (816 Ma)--Light gray, weakly to moderately foliated, medium-grained tonalite, trondhjemite, and granodiorite. Biotite(?) extensively replaced by chlorite. Cut by undifferentiated dikes of a, dp, rp, and f

EXPLANATION OF MAP SYMBOLS

- CONTACT--Dashed where approximately located, dotted where concealed
- FAULT--Dashed where approximately located, dotted where concealed; U, upthrown side; D, downthrown side. Arrows show relative lateral movement
- ANTICLINE--Showing direction of plunge
- SYNCLINE--Showing direction of plunge
- STRIKE AND DIP OF BEDS
- STRIKE AND DIP OF FOLIATION
- QUARTZ VEIN(S)
- DIKE--Showing lithology where known
- AUTOCLASTIC AND FLOW-FRONT BRECCIA
- (3) MINERALIZED LOCALITY
- × MINE OR PROSPECT PIT
- ADIT

Base from enlarged aerial photographs flown in 1956

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