U. S. DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH
THE MINISTRY OF PETROLEUM AND MINERAL RESOURCES
DEPUTY MINISTRY FOR MINERAL RESOURCES
KINGDOM OF SAUDI ARABIA

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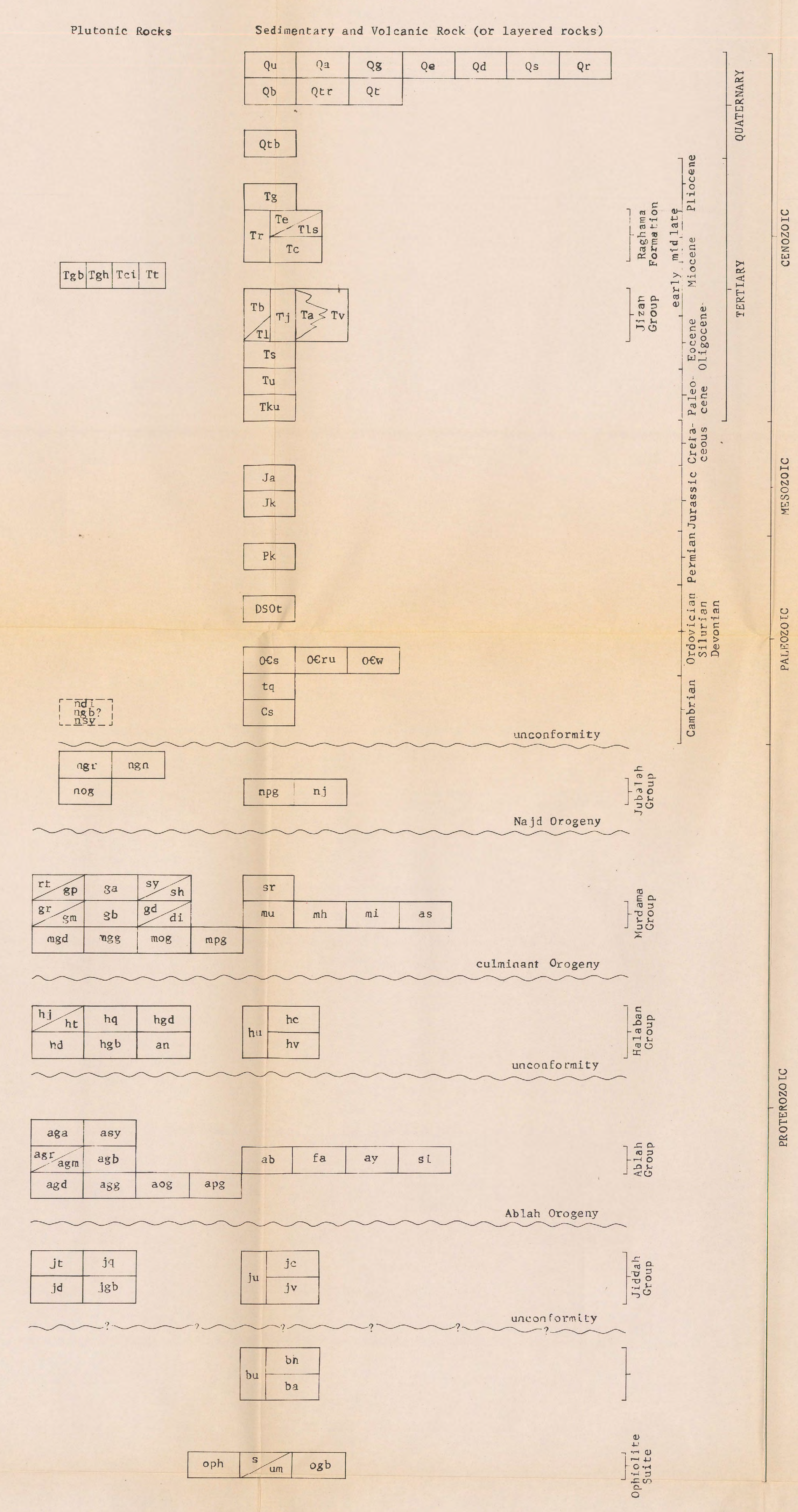
EXPLANATION

Correlation of Units



Qu Alluvium, undivided

Qa Alluvium in wadis

Qg Gravel, commonly on pediments and low terraces

Qe Eolian sand and silt, undivided

Qd Dune sand, conspicuous dune forms present

Qs Sabkhah deposits, mostly saline silt

Qr Coral reef, along Red Sea mostly in terraces 2 to 3m high; some higher in northern Red Sea area; mostly of latest Quaternary; most modern fringing reefs not shown

Qb Flood basalt

Qtr Trachytic flows and cones on harras

Qt Terrace alluvium on high terraces and dissected pediments

QTb Flood basalt, mostly in large harras

Tg Sand and gravel in alluvial fill deposits; in places toward the sea, grade into finegrained marine deposits including limestone

Tr Raghama Formation, continental and marine detrital deposits; includes marl and some evaporites on coastal plain of Red Sea

Tls Limestone of Raghama Formation, in part reefal; some may be slightly older and equivalant to the middle Miocene Globergerina Marl

Te Evaporite Series

Tc Bathan Formation, boulder conglomerate associated with uplift of the Red Sea Escarpment

Tgb Gabbro, small plutons, commonly concentrically layered; includes some dioritic and quartz-dioritic rocks

Tgh Granophyre, small plutons associated with gabbro

Ti Small, intrusive stocks and plugs of rhyolitic to trachytic compositions as at Ad Darb; probably part of Tihamat Asir Complex but some may be late Jizan Group age

Tt Basaltic to gabbroic dikes and sills of Tihamat Asir Complex age; commonly intruded into Jizan Group rocks, abundant but not shown in Jizan Group rocks south of Ad Darb

Tb Flood basalt mostly in large harras; some small outliers as at Harrat Hadan are hypabyssal basaltic and trachytic feeder pipes

Tl Lake bed and fluvial sediments beneath and adjacent to flood basalt; includes lag boulder accumulations of Shumaysi Formation age beneath flood basalts

Ta Baid Formation, silicified tuffaceous siltstones in lake beds; fossiliferous, includes some volcanic rocks (Tv)

Tj Jizan Group, undivided, continental-rift volcanic and sedimentary rocks

Tv Volcanic rocks of Jizan Group, intermediate to silicic composition

Ts Shumaysi Formation

Tu Usfan Formation

TKu Sedimentary rocks, undivided; older than Jizan Group

Ja Amran Formation

Jk Khums Formation

Pk Khuff Formation

DSOt Tabuk Formation

O€s Saq Sandstone

O€ru Ram-Umm Sahm Sandstone

O€w Wajid Sandstone

€q Quweira Sandstone

€s Siq Sandstone

nj Jubalah Group

ngr Granite; nonsheared small plutons in Najd fault zones

ngn Granite gneiss, syntectonically intruded granite in Najd fault zones

nog Orthogneiss, older intrusive rocks emplaced as gneiss domes in Najd fault zones

npg Paragneiss, older volcanic and sedimentary rocks tectonized in Najd fault zones

sr Shammar Group

mu Murdama Group, undivided

mh Hadiyah Formation, mostly even-bedded, fine-grained siltstone and shale; in northwestern region

mi Hibshi Formation, interbedded conglomerate, arkose, and wacke; in northeastern region

as Abt Schist

rt Rhyolite, trachyte, microgranite, and granophyre, commonly peralkalic, in hypabyssal intrusions

gp Alkalic granite, commonly peralkalic or peraluminous, commonly in circular plutons or ring structures, flow banded to massive, minor biotite and pyroxene

ga Alkalic granite

sy Syenite, commonly in circular plutons

sh Shonkinite, commonly in circular plutons

gr Granite, commonly red, biotite syenogranite in circular plutons; posttectonic; may include monzogranite

gm Granite, pink or gray; biotite or biotite-hornblende monzogranite, commonly in large irregularly shaped plutons; includes adamillite; posttectonic

gb Gabbro, commonly concentrically layered in small circular plutons, in places bimodally associated with granite; posttectonic

di Diorite, small plutons of hornblende diorite, quartz monzodiorite, and quartz monzonite composition; not abundant

mgd Granodiorite, gray; biotite-hornblende granodiorite and low potassium monzogranite, gneissose, commonly in batholiths, in places associated with gneiss domes; late syntectonic intrusion

mgg Migmatite, gray, biotite-hornblende granodiorite-monzogranite gneiss, associated with gneiss domes and grandiorite batholiths; late syntectonic emplacement

mog Orthogneiss, commonly gray, hornblende-biotite tonalite-trondhjemite emplaced as large gneiss domes through reactivation of Halaban plutonic crust; syntectonic emplacement

mpg Paragneiss, metavolcanic and metasedimentary rocks of Halaban Group, reactivated in association with gneiss domes; amphibolite facies; syntectonic emplacement

hu Halaban Group, undivided

hc Upper Halaban, predominantly clastic sequence of sedimentary and volcaniclastic rocks, includes volcanic flow rocks of largely andesitic to dacitic, calc-alkalic composition, and small marble members; mostly metamorphosed to greenschist facies

hv Lower Halaban, predominantly volcanic sequence of lava and pyroclastic rocks of basaltic to andesitic, calc-alkalic composition; mostly metamorphosed to greenschist facies

hj Trondhjemite

ht Tonalite

hq Quartz diorite; many feldspars are sericitized, slightly calcareous, chloritisized biotite; syntectonic

hgd Granodiorite; many feldspars are sericitized, some chloritization of green hornblende; syntectonic to late tectonic

hd Diorite, dark to light gray; commonly mildly metamorphosed; syntectonic or late tectonic; often gneissic, locally epidotized acessory hornblende

hgb Gabbro, metamorphosed to greenschist facies

an Anorthosite, in large pluton or tectonic block in Halaban-age crust in southeastern shield; rock may be much older than Halaban age

ab Ablah Group, metasedimentary and volcanic rocks containing thick marble beds and andesitic to rhyolitic volcanic rocks; red oxidized sedimentary and tuffaceous beds are common. Often schistose

fa Fatimah Group, clastic-volcanic sequence similar to Ablah Group

ay Al Ays Group, clastic-volcanic sequence similar to Ablah Group

si Silasia Formation, slate, shale, schist, and lenses of marble; arkose and conglomerate in lower part; jaspilite interbedded with hematite and limestone beds in upper part

aga Alkalic granite

asy Syenite, orange and reddish gray, fine grained, porphyritic; some quartz monzonite

agr Granite, commonly red biotite syenogranite in small plutons

agm Granite, pink or gray biotite or biotite-hornblende monzogranite

agb Gabbro; lower parts of layered, folded, and graded cumulates in northern part of the shield; partly metamorphosed to amphibolite facies

agd Granodiorite, gray, biotite-hornblende rock, gneissose, commonly in batholiths associated with gneiss domes; late syntectonic intrusion

agg Migmatite, gray biotite-hornblende granodiorite gneiss associated with gneiss domes and granodiorite batholiths of Ablah age; late syntectonic emplacement

aog Orthogneiss, commonly gray, hornblendebiotite tonalite-trondhjemite emplaced as large gneiss domes through reactivation of plutonic crust of Jiddah age; syntectonic emplacement

apg Paragneiss, metasedimentary and metavolcanic rocks of Jiddah group, reactivated in association with gneiss domes; amphibolite facies; syntectonic emplacement

ju Jiddah Group, undivided

jc Upper Jiddah Group, predominantly clastic sequence of sedimentary, volcaniclastic rocks; includes volcanic flow rocks largely of andesitic and dacitic, calc-alkalic composition; mostly metamorphosed to greenschist facies

jv Lower Jiddah Group, predominantly volcanic sequence of lava and pyroclastic rocks of basaltic to andesitic calc-alkalic composition; mostly metamorphosed to greenschist facies

jt Tonalite and trondhjemite; light gray, medium- to coarse-grained quartz and oligoclase; some amphibolite facies

jq Quartz diorite, leucocratic, cleaved, often gneissic; minor granodiorite; syngenetic

jd Diorite, hornblende, gray; massive, less commonly layered; syngenetic

jgb Gabbro, olivine or tholeiitic, commonly metamorphosed to amphibolite facies or retrometamorphosed to greenschist facies; locally tectonized; massive and banded

bu Baish-Bahah Groups, undivided. Sediments and volcanic sequences largely tholeiitic

bh Bahah Group, paraschists, chlorite-sericite quartz feldspar retrograded mostly to greenschist facies except near intrusives

ba Baish Group, metabasalt and meta-andesite with interbedded mafic pyroclastic rocks metamorphosed to greenschist and amphibolite facies; minor graphitic and quartzitic schist, slate, and chert; tectonized. Northernmost outcrops include marble and almandine amphibolite. Pillow structures in some flows

oph Ophiolite suite, commonly as parts of dismembered and incomplete ophiolites, possibly of differing ages in different regions of the shield; fragments of sematic ocean floor rocks generally in a melange, and irregularly metamorphosed to greenschist or amphibolite grade. Ultramafic and mafic igneous rocks, anorthosite, plagiogranite, and chert may be present

s Serpentinite, commonly in fault zones, largely after ultramafic rocks of ophiolite suite, includes listwanite, (secondary dolomite, magnesite, talc, and oxidized and hydrated sulfides). May include anthophyllite or tremolite.

um Ultramafic rocks, largely associated with ophiolitic suite of several different ages in different parts of the shield; includes peridotite, pyroxenite, dunite, and harzburgite; frequently serpentinized and metamorphosed to amphibolite or greenschist facies

ogb Metagabbro, associated in large fault zones with rocks of the ophiolite suite

an Anorthosite, essentially andesine and labradorite; with kinky deformed feldspar twin laminae, minor zoisite, or clinozoisite, calcite biotite chlorite, hornblende. Large tectonic block in Halaban crust of Southeastern shield.

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature. Any use of trade names is for descriptive purposes only and does not imply endorsement by the USGS.

GEOLOGIC MAP OF THE SAUDIA ARABIAN SHIELD, SOUTH SHEET

Compiled by Glen F. Brown, Dwight L. Schmidt, and A. Curtis Huffman, Jr.

Credit
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