INTRODUCTION

This map report is one of a series of geologic and hydrologic maps covering all or parts of States within the Basin and Range province of the western United States. Other map reports contain information on ground-water hydrology, ground-water quality, surface distribution of selected rock types, tectonic conditions, areal geophysics, Pleistocene lakes and marshes, and mineral and energy resources. This work is a part of the U.S. Geological Survey's program for geologic and hydrologic evaluation of the Basin and Range province to identify potentially suitable regions for further study relative to isolation of high-level nuclear waste (Bedinger, Sargent, and Reed, 1984).

This map report on the granitic rocks of part of Arizona was prepared from published geologic maps and reports, utilizing the project guidelines defined in Sargent and Bedinger (1984). For this study, granitic rocks include mostly granite, quartz monzonite or adamellite, alaskite, and granodiorite; however, some intermediate and mafic rocks, such as diorite, quartz diorite, and gabbro, also are shown on the map where those rocks comprise plutons intruding granitic masses. All outcrops of granitic rocks within the Basin and Range province are shown, regardless of structural complexity. It is recognized, however, that some plutonic masses in Arizona may not extend to considerable depth because of extensive lateral displacement along low-angle faults subsequent to intrusion.

The Description of Map Units includes the geologic age, radiometric age, lithologic character, type of intrusive body, and sources of data for the granitic and related rocks in outlined and numbered areas in each county of the study area. The listed radiometric ages of the rock units are only those which are available from the literature, and do not necessarily represent the entire age range of the unit.
<table>
<thead>
<tr>
<th>County-area Map number</th>
<th>Geologic and radiometric age in millions of years (m.y.)</th>
<th>Lithology and comments</th>
<th>References for county area</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-1 Tg</td>
<td>Oligocene 29.6±2.1 to 34.2 m.y.</td>
<td>Granite(?) quartz monzonite, and granodiorite in stocks and small intrusive bodies.</td>
<td>Cooper, 1959, 1960; Drewes, 1980, 1981, 1982; Erickson, 1981</td>
</tr>
<tr>
<td>TKd</td>
<td>Early Paleocene and Late Cretaceous 57.2±1.7 to 64.3±1.9 m.y.</td>
<td>Small stocks of quartz diorite and quartz monzonite.</td>
<td></td>
</tr>
<tr>
<td>TKg</td>
<td>Tertiary or Cretaceous</td>
<td>Granite to granodiorite, locally porphyritic.</td>
<td></td>
</tr>
<tr>
<td>Yg</td>
<td>Middle and Early(?), Proterozoic 1,381±28 to 1,690±30(?) m.y.</td>
<td>Eight Proterozoic granitoid plutons, weakly to well foliated, occur in Dos Cabezas Mountains, but several have been metamorphosed to gneiss. Rocks are mainly medium- to coarse-grained, in part porphyritic, leucocratic quartz monzonite, but include one pluton of rapakivi quartz monzonite and a stock of dacite porphyry. In the Chiricahua Mountains the granitic rocks are very coarse grained and coarsely porphyritic granodiorite and some quartz monzonite. Granitic rocks are largely of Middle Proterozoic Y age, but locally a dacite porphyry may be about 1,690±30 m.y. old.</td>
<td>Cooper, 1960; Drewes, 1980</td>
</tr>
<tr>
<td>C-2 Tg</td>
<td>Oligocene 30 m.y.</td>
<td>Medium- to fine-grained granite to granodiorite, locally porphyritic.</td>
<td>Cooper, 1959; Drewes, 1980</td>
</tr>
<tr>
<td>C-3 Tg</td>
<td>Oligocene 30 and 33 m.y.</td>
<td>Granite to granodiorite.</td>
<td>Cooper, 1959; Drewes, 1980</td>
</tr>
<tr>
<td>Yg</td>
<td>Middle Proterozoic</td>
<td>Coarse-grained, commonly porphyritic granite.</td>
<td>Drewes, 1980; Hayes and Landis, 1964; Gilluly, 1956; Marvin and others, 1978</td>
</tr>
<tr>
<td>C-4 Jg</td>
<td>Jurassic 171±7, 182±7, 184±8 m.y.</td>
<td>Stock and associated dikes of porphyritic leucocratic alkali granite (Juniper Flat Granite). Intrudes Proterozoic schist and Paleozoic sedimentary rocks. Radiometric ages are on only main mass of Juniper Flat Granite, and some evidence suggests that part of granite may be of Precambrian age.</td>
<td>Hayes and Raup, 1968; Drewes, 1980; Marvin and others, 1978</td>
</tr>
<tr>
<td>C-5 Kg</td>
<td>Cretaceous</td>
<td>Fine-grained quartz monzonite in sill.</td>
<td>Hayes and Raup, 1968; Drewes, 1980; Marvin and others, 1978</td>
</tr>
<tr>
<td>Jg</td>
<td>Jurassic 167±8 m.y.</td>
<td>Huachua Quartz Monzonite is medium-grained biotite-hornblende quartz monzonite stock.</td>
<td>Hayes and Raup, 1968; Drewes, 1980; Marvin and others, 1978</td>
</tr>
</tbody>
</table>
**C-6 Kgd**

MIDDLE PROTEROZOIC  
Cretaceous  
74±4 m.y.  
Medium- to coarse-grained granodiorite, locally porphyritic, and on east side of Whetstone Mountains occurs as sill. Intrudes Paleozoic and Cretaceous sedimentary rocks.

**C-7 Kgd**

MIDDLE PROTEROZOIC  
Cretaceous  
72 m.y.  
Quartz-poor granodiorite, but ranges from porphyritic granodiorite to quartz monzonite.

**C-8 Tg**

Miocene and Oligocene  
22±3, 24.1±2, and 27±2 m.y.  
Mostly coarse-grained granite with microcline crystals, but has porphyritic border facies and an aplitic facies (Stronghold Granite)—youngest major intrusion in area.

**Jg**

Jurassic  
181, 183±5, and 185±4 m.y.  
Mainly coarse-grained quartz monzonite with crystals of plagioclase, microcline, and hornblende, but in places has an alaskite facies (Gleeson Quartz Monzonite).

**Rg**

Triassic  
Includes Copper Belle Monzonite Porphyry and Turquoise Granite. Copper Belle is characterized by conspicuous phenocrysts of plagioclase feldspar. Turquoise Granite is badly weathered. Questionably correlated with rocks elsewhere in southeastern Arizona which are dated at 184, 190, and 210 m.y.

**Yg**

MIDDLE PROTEROZOIC  
Southern- and northern-most outcrops are gneissic granite; those in north-central part are quartz monzonite, which is equivalent of the Cochise Peak Quartz Monzonite, which Gilluly (1956) dated as Triassic or Jurassic; Drewes (1980) assigned a questionable Precambrian age to the Cochise Peak. The northern-most outcrops of gneissic granite were designated Tertiary or Cretaceous by Gilluly (1956) and Precambrian by Drewes (1980).

**C-9 Tg**

Early Eocene and late Paleocene  
51±3 and 53±3 m.y.  
Generally porphyritic Texas Canyon Quartz Monzonite containing phenocrysts of potassium feldspar.

**Yg**

MIDDLE PROTEROZOIC  
1,420±10 m.y.  
Medium- to coarse-grained porphyritic hornblende-biotite granite (Tungsten King Granite).
C-10 Xgd Early Proterozoic 1,660±30 and 1,655±20 m.y.
Johnny Lyon Granodiorite is mainly medium- to coarse grained, somewhat porphyritic hornblende-biotite granodiorite containing plagioclase crystals. Formerly considered as Precambrian Y, but now dated as Proterozoic X.
Cooper and Silver, 1964; Drewes, 1974, 1980; Marvin others, 1978

C-11 Yg Middle Proterozoic Medium- to coarse-grained granite containing abundant potassium feldspar.
Cooper and Silver, 1964; Creasey and others, 1961; Drewes, 1980

GILA COUNTY (G)

G-1 Xg, pEG Early Proterozoic 1,710 m.y. and Precambrian Medium- to coarse-grained granite, locally includes large quartz phenocrysts. Largest mass is red-colored Payson Granite of Proterozoic X age. Ages of adjacent Precambrian masses unknown.
Condie, 1981; Gastil, 1958; Putman and Burham, 1963; Wilson, 1939; Wilson and others, 1969

G-2 Yg, pEG Middle Proterozoic and Precambrian Coarse-grained, porphyritic, biotite quartz monzonite, correlated with the Ruin Granite (Proterozoic Y) to the south. Undated granite in western part of area resembles the Payson Granite (Proterozoic X) to the northwest, consequently two ages of intrusive bodies may occur in this area. Age of Precambrian granite in eastern part not known.
Bergquist and others, 1961; Wilson and others, 1969

G-3 TKg Tertiary and Cretaceous Granitic rocks, undescribed; may be correlative with Tertiary quartz diorite and quartz monzonite porphyry exposed southeast of Montana Mountain.
Bromfield and Shride, 1956; Condie, 1981; Peterson, D. W., 1960, 1969; Peterson, N. P., 1954; Ransome, 1904; Wilson, and others, 1969

Yg, pEG Middle Proterozoic 1,390 m.y. and Precambrian Ruin Granite is coarse-grained, porphyritic quartz monzonite or granite containing large feldspar phenocrysts. Intrudes Precambrian metamorphics. Includes the Miami-Globe mining district. Age of most plutonic masses northeast of Globe unknown.

G-4 Tg Tertiary Two small bodies of quartz monzonite porphyry having aphanitic border facies. Intrudes Precambrian schist and sedimentary rocks.

TKg Early Tertiary or Late Cretaceous In Pinal Mountains unit includes porphyritic biotite quartz monzonite containing large phenocrysts of orthoclase, biotite granodiorite, and locally granite. North of Superior, the intrusive is quartz diorite.
YXg, Middle and Early Proterozoic and Precambrian and Madera Diorite (Proterozoic X) undifferentiated. In Mescal Mountains along latitude 33°15', the Ruin contains small intrusive bodies of Madera Diorite, but apparently the amount of Madera Diorite increases northward, and the Ruin is not present northwest of Signal Peak in the Pinal Mountains, although much of those mountains is poorly mapped. Madera is quartz diorite, locally, has a mafic facies with much hornblende, described as granodiorite. Ruin Granite is coarse grained and ranges in composition from quartz monzonite to granodiorite. Ruin Granite and Madera Diorite are cut by numerous Precambrian diabase and diorite dikes. Granite at east end of Mescal Mountains and around Coolidge Dam probably largely an extension of Ruin Granite, but exact age unknown.

---

<table>
<thead>
<tr>
<th>GRAHAM COUNTY (GR)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GR-1</strong> TKg</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>GR-2</strong> Td</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>GR-2</strong> Tg</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>GR-2</strong> Yg</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>GR-3</strong> TKg</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>GR-4</strong> p6g</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
GREENLEE COUNTY (GN)

GN-1 Tg Early Tertiary
51 to 63 m.y.
Stocks, laccoliths, and dikes of diorite porphyry to quartz-monzonite porphyry to granite porphyry, partly related to Morenci porphyry copper deposit. Bennett, 1975; Lindgren, 1905; McDowell, 1971; Wilson and others, 1969

p6g Precambrian
Coarse-grained granite containing large grains of orthoclase and microperthite.

LAPAZ COUNTY (L)

L-1 TKg Tertiary and Cretaceous
Granitic rocks. Wilson and others, 1969

L-2 Kg Late Cretaceous
Intrusive rocks, probably ranging from diorite to granite, as in nearby plutons. Reynolds, 1980

L-3 Kg Late Cretaceous
Tank Pass biotite granite intruded by biotite granodiorite of Granite Wash Pass. Granite Wash Pass granodiorite is 65 to 70 m.y. old. Some uranium-lead evidence gives 85 m.y. date for Tank Pass granite. Rehrig and Reynolds, 1980; Reynolds, 1980; Shafiqullah and others, 1980

L-4 Tg Early Tertiary(?)
Muscovite granite. Probably of early Tertiary or Late Cretaceous age, because it intrudes Late Cretaceous granite in adjacent Harcuvar Mountains, post-dates most Late Cretaceous structural fabric, and yields an Eocene Rb-Sr muscovite age. Rehrig and Reynolds, 1980; Reynolds, 1980; 1982; Reynolds and others, 1980; Richard, 1982

p6g Precambrian
Plutonic rocks in the Harquahala Mountains consists mostly of biotitic granodiorite, porphyritic granite, equigranular muscovite-garnet granite, and many small tabular bodies of alaskite and pegmatite. Quartz monzonite, the dominant plutonic rock, in Little Harquahala Mountains, commonly is porphyritic with phenocrysts of potassium feldspar. Harquahala Mountains are part of a metamorphic core complex, and some of the plutonic rocks at the west end, particularly the porphyritic granite, are involved in subhorizontal thrust sheets. Reynolds, 1980; Shafiqullah and others, 1980

L-5 Td Paleocene
52.8±1.1 m.y.
Medium-grained, biotite diorite; intrudes metasedimentary sequence. Miller, 1970

L-6 Mzg Middle Mesozoic
Granitic rocks. Reynolds, 1980

L-7 CzMzg Cenozoic or Mesozoic
Quartz-monzonite porphyry and quartz porphyry are composed of an aphanitic groundmass and phenocrysts of quartz and plagioclase; of possible dacitic composition.
<table>
<thead>
<tr>
<th>Code</th>
<th>Period</th>
<th>Stage</th>
<th>Description</th>
<th>Source(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>L-8</td>
<td>Kg</td>
<td>Late</td>
<td>Cretaceous</td>
<td>Biotite quartz monzonite.</td>
</tr>
<tr>
<td>L-9</td>
<td>Mzg</td>
<td>Late</td>
<td>Mesozoic</td>
<td>Equigranular to slightly porphyritic diorite to granite in small stocks, plugs, and dikes.</td>
</tr>
<tr>
<td>Yg</td>
<td>Middle</td>
<td>Proterozoic</td>
<td>1,400 to 1,500 m.y.</td>
<td>Mostly rapakavi granite in lower plate of thrust fault.</td>
</tr>
</tbody>
</table>

### MARICOPA COUNTY (MA)

| MA-1 | Kgd | Late  | Cretaceous | 68.4 m.y. | Wickenburg batholith composed mainly of equigranular biotite granodiorite and lesser amounts of diorite and porphyritic quartz monzonite. The two large outcrops north of Wickenburg, formerly mapped as Precambrian (Wilson and others, 1969), are part of Wickenburg batholith (Steven Reynolds, Arizona Bureau of Geology and Mineral Technology, oral commun., 1984). Intrudes Precambrian granite and granite gneiss. | Rehrig and others, 1980; Wilson and others, 1969 |
| Bg   | Proterozoic | 1,700+ m.y. | Non-foliated, coarse-grained, porphyritic biotite granite (in part called quartz monzonite). Intrudes Precambrian granite gneiss. |
| MA-2 | Kg   | Late  | Cretaceous |  | Intrusive rocks; formerly designated as Precambrian. | Reynolds, 1980; Wilson and others, 1969 |
| pég  | Precambrian |  |  |  |  |
| MA-3 | pég  | Precambrian |  | Granitic rocks. | Wilson and others, 1969 |
| MA-4 | TKg  | Tertiary and Cretaceous |  | Leucocratic granitic rocks. | Wilson and others, 1969 |
| MA-5 | pég  | Precambrian |  | Granitic rocks. Intrudes Precambrian metamorphic rocks. | Wilson and others, 1969 |
| MA-6 | TKg  | Tertiary and Cretaceous |  | Granitic rocks. | Wilson and others, 1969 |
| pég  | Precambrian |  |  | Granitic rocks of Maricopa batholith. | Wilson and others, 1969 |
MA-7 pég Precambrian Medium- to coarse-grained quartz monzonite porphyry, part of Maricopa batholith (unpublished field data); age about 1,400 m.y. Wilson and others, 1969

MA-8 pég Precambrian Granitic rocks of Maricopa batholith. Wilson and others, 1969

MA-9 TKg Tertiary and Cretaceous Granitic rocks. Wilson and others, 1969

MA-9 pég Precambrian Granitic rocks of Maricopa batholith. Wilson and others, 1969


pág Precambrian Massive plutonic rocks ranging from muscovite garnet alaskites to biotite granodiorites. Coarse-grained, holocrystalline, granitic rocks in northwest corner of the White Tank Mountains. Wilson and others, 1969

MA-11 TKg Tertiary and Cretaceous Granitic rocks. Wilson and others, 1969

pég, péd Precambrian Granitic rocks and several masses of diorite, diorite porphyry, and gabbro. Wilson and others, 1969

MA-12 TKd, TKg Tertiary and Cretaceous Diorite porphyry occurs as dikes in the central Bradshaw Mountains. Composition of other, small, scattered masses unknown. Originally designated Precambrian but later of Tertiary and Cretaceous age. Condie, 1981; Wilson, 1939; Wilson and others, 1969

pég Precambrian 1,340 and 1,630 m.y. Granite constitutes majority of plutonic rocks in southern Bradshaw Mountains. Granite is coarse textured, contains large orthoclase phenocrysts, and intrudes large mass of pyroxenite at Mount Ord. Pendants of Precambrian rocks occur within the granite. Only two age dates available; most plutonic rocks are poorly described. Wilson and others, 1969

MA-13 pég Precambrian Granitic rocks. Wilson and others, 1969

MA-14 Tgd, Tg Tertiary 25 m.y. East half of South Mountains is occupied by mylonitic porphyritic granodiorite that is intruded by small Tertiary granite pluton, which now separates the granodiorite from Precambrian gneiss. The mountains are a metamorphic core complex. Reynolds and Rehrig, 1980; Wilson and others, 1969

MOHAVE COUNTY (M)

M-1 pég Precambrian Coarsely crystalline granite in fault contact with Precambrian metamorphic rocks. Moore, 1972
| M-2 | Kg | Miocene | Largely the Wilson Ridge pluton. Ranges from abundant poorly foliated hornblende-biotite granodiorite to sparse pyroxene-biotite diorite and leucocratic granite. Xenoliths of metamorphic rocks common. Northern contact inferred; small exposure south of Hoover Dam is part of the separate Boulder City pluton. Intrudes Precambrian metamorphic rocks. | Anderson, R.E., 1978; Anderson, R.E., and others, 1972; Bohannon, 1978 |
| M-3 | Kg | Late Cretaceous | Seriate to porphyritic, leucocratic quartz monzonite, and minor aplite and pegmatite; associated with peripheral gold-quartz veins. Outcrop probably extends west of map boundary. Intrudes Precambrian paragneiss. | Blacet, 1975 |
| Bg | Proterozoic | 1,400 to >1,700 m.y. | Mainly porphyritic to seriate, biotite-quartz monzonite grading to biotite-hornblende granodiorite; includes some leucocratic quartz monzonite, porphyritic granite, and alaskite. Part of Garnet Mountain pluton. Intrudes Proterozoic migmatitic gneiss and paragneiss. | |
| M-4 | TKg | Tertiary and Cretaceous | Granite, intrudes Precambrian schist. | Wilson and others, 1969 |
| Bg | Middle Precambrian | 1,180±40 m.y. | Granite. | |
| M-6 | pGg | Precambrian | Granite. | Wilson and others, 1969 |
| M-7 | Tkg | Tertiary and Cretaceous | Granite. | Wilson and others, 1969 |
| M-8 | Kd | Cretaceous(?) | Diorite containing hornblende, and biotite-hornblende granodiorite cut by leucoclastic biotite monzogranite. Resembles plutonic rocks of adjacent Chemehuevi Mountains in Nevada; probably of Cretaceous age. Intrudes Precambrian gneiss and granite. | Howard and others, 1982 |
| pGg | Precambrian | Quartz monzodiorite with interstitial K-feldspar, and porphyritic granite composed of phenocrysts of alkali feldspar in matrix of quartz, biotite, and plagioclase. Granite grades into augen gneiss in southern part of Mohave Mountains and northern part of Bill Williams Mountains. Intrudes Precambrian metamorphic rocks. | |
M-9 Tkg  Tertiary and Cretaceous  Granite; intrudes Precambrian metamorphic rocks.

p6g  Precambrian
1,312 to 1,397 m.y.
Intrusive bodies, comprising the western Hualapai plutonic complex, extend along west flank of Hualapai Mountains and are composed of granodiorite and porphyritic quartz monzonite, and small bodies of slightly porphyritic, muscovite-biotite granite, containing xenoliths of micaceous rocks. Intrudes Precambrian metamorphic rocks. Age dates are from northern Hualapai Mountains.

M-10 Tkg  Tertiary and Cretaceous  Granite; intrudes Precambrian metamorphic rocks and granite.

p6g  Precambrian
1,390±40 m.y.
Granite; intrudes Precambrian metamorphic rocks. Single age date from biotite granite in northeast part of area.

M-11 p6g  Precambrian  Granite; intrudes Precambrian metamorphic rocks.

M-12 p6g  Precambrian  Granite; intrudes Precambrian metamorphic rocks.

Shafiqullah and others, 1980; Wilson and others, 1969

Stensrud and More, 1980; Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969

Wilson and others, 1969
<table>
<thead>
<tr>
<th>PM-2</th>
<th>Tg</th>
<th>Paleocene(?)</th>
<th>Quartz-latite porphyry.</th>
<th>Drewes, 1971a; Finnell, 1971; Marvin and others, 1978</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kg</td>
<td>Cretaceous</td>
<td>71.9±2.6, 75.3±2.9, 75.5±2.0 m.y.</td>
<td>Mostly stocks of quartz monzonite but some of quartz diorite.</td>
<td>Marvin and others, 1973, 1978</td>
</tr>
<tr>
<td>Yg</td>
<td>Middle Proterozoic</td>
<td>Gneissic quartz diorite, porphyritic quartz monzonite, and microcline-muscovite-quartz pegmatite.</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PM-3</th>
<th>Tg</th>
<th>Eocene to Paleocene</th>
<th>Generally granodiorite and quartz-monzonite stocks and a few quartz-diorite stocks.</th>
<th>Drewes, 1971a, 1971b, 1980; Marvin and others, 1973, 1978</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yg</td>
<td>Middle Proterozoic</td>
<td>1,360±200 and 1,450±160 m.y.</td>
<td>Granodiorite porphyry and quartz-monzonite porphyry and associated aplite and fine-grained quartz monzonite (Continental Granodiorite).</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PM-4</th>
<th>Tgd</th>
<th>Paleocene</th>
<th>Biotite granodiorite, some porphyritic quartz monzonite, and locally many small bodies aplite, and a younger (56.9 m.y.) plug of quartz-monzonite porphyry. Plutons associated with extensive copper-molybdenum mineralization in Pima mining district.</th>
<th>Cooper, 1973; Drewes 1980; Drewes and Cooper, 1973; Marvin and others, 1973</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kd</td>
<td>Late Cretaceous</td>
<td>67 m.y.</td>
<td>Diorite.</td>
<td>-</td>
</tr>
<tr>
<td>Jg</td>
<td>Jurassic</td>
<td>145±5 and 150 m.y.</td>
<td>Coarse-grained granite and quartz monzonite and associated aplite; grades northward into gneiss.</td>
<td>-</td>
</tr>
<tr>
<td>Kg</td>
<td>Triassic</td>
<td>190±20 and 210±30 m.y.</td>
<td>Quartz monzonite, monzonite, granite, and granophyre.</td>
<td>-</td>
</tr>
<tr>
<td>Yg</td>
<td>Middle Proterozoic</td>
<td>Granodiorite and quartz monzonite; includes some granite and diorite; in part gneissic and porphyritic.</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PM-5</th>
<th>TKg</th>
<th>Tertiary or Cretaceous</th>
<th>Many intrusive bodies of granitic rocks, alaskite, granodiorite, quartz monzonite, and quartz diorite, probably closely related in age.</th>
<th>Drewes, 1980; Keith and Theodore, 1975; Shafiqullah and others, 1980; Wilson and others, 1969</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kd</td>
<td>Cretaceous</td>
<td>Diorite and quartz diorite; not mapped in detail to the west.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Jg</td>
<td>Jurassic</td>
<td>145, 148, and 154±4 m.y.</td>
<td>Granite, quartz monzonite, and granodiorite. Radiometric dates on Amado granodiorite at north end of Tumacacori Mountains.</td>
<td>-</td>
</tr>
</tbody>
</table>
Mostly rhyodacite porphyry, containing phenocrysts mainly of plagioclase, potassium feldspar, quartz, altered biotite, and magnetite, that largely intrudes the west margin of the Jurassic intrusive mass generally in north-half of area. Leucocratic monzogranite, containing a biotite phase and a younger muscovite-garnet phase, underlies the Pozo Verde Mountains, and occurs as intrusions in the rhyodacite porphyry. At north border of area in Coyote Mountains, weakly foliated, in part gneissic quartz monzonite, diorite, and alaskite of questionable Mesozoic age (Keith, 1976) is contiguous with monzogranite of Tertiary age along latitude 32°00'.

A number of plutons composed of hornblende-biotite and biotite granodiorite and monzogranite, leucocratic biotite monzogranite and syenogranite, perthite granite, and some hornblende diorite and quartz diorite, much of which is foliated.


Diorite, as below. Keith, 1976

Hornblende and biotite diorite; similar to Cretaceous diorite but generally finer grained.

Amole Granite is Late Cretaceous stock in which granite on west side grades eastward through granite porphyry into quartz monzonite. Andesite porphyry, dated at 155 m.y., that intrudes the nearby Recreation Red Beds (previously considered to be Cretaceous by Brown, 1939) is probably not related directly to the Amole Granite.

A complex of plutons, sills, and dikes composed mainly of leucocratic quartz monzonite, quartz-latite porphyry, granodiorite, and quartz-monzonite porphyry; related temporally to Silverbell porphyry copper deposit. Intrudes Paleozoic and Mesozoic sedimentary rocks and volcanics. Active mining area.

Porphyritic quartz monzonite and cross-cutting quartz monzonite.

Porphyritic to nonporphyritic biotite-hornblende monzogranite, locally quartz monzonite. Bergquist, Blacet, and Miller, 1978

Hornblende-biotite granodiorite, locally porphyritic, grades into diorite.
<table>
<thead>
<tr>
<th>Sample</th>
<th>Rock Type</th>
<th>Tectonic Setting</th>
<th>Geologic Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM-11</td>
<td>TKg</td>
<td>Tertiary or Cretaceous</td>
<td>Muscovite quartz monzonite that intrudes Mesozoic schist in North Comobabi Mountains. Muscovite monzogranite and syenogranite in Artesa Mountains.</td>
</tr>
<tr>
<td>Jg</td>
<td></td>
<td></td>
<td>Mostly leucocratic quartz monzonite grades into granite and subordinate granodiorite and associated porphyritic and aplite rocks; contains masses of rhyodacite porphyry gradational with and in places intrusive into the quartz monzonite. In southern part of South Comobabi Mountains and in Artesa Mountains plutonic rocks are mainly monzogranite and hornblende quartz diorite. The 100 m.y. is a K-Ar date from a diorite overlain disconformably by Cretaceous sedimentary rock.</td>
</tr>
<tr>
<td>PM-12</td>
<td>TKg</td>
<td>Tertiary or Cretaceous</td>
<td>Granitic rocks.</td>
</tr>
<tr>
<td>PM-13</td>
<td>TKg</td>
<td>Tertiary or Cretaceous</td>
<td>Plutons of rhyolite porphyry, granite, and quartz monzonite that intrude Jurassic pluton.</td>
</tr>
<tr>
<td>Jg</td>
<td></td>
<td>Jurassic</td>
<td>Coarse-grained quartz monzonite having roof facies of quartz latite porphyry.</td>
</tr>
<tr>
<td>PM-14</td>
<td>TKg</td>
<td>Tertiary and/or Cretaceous 67.6 m.y.</td>
<td>Granitic rocks of variable composition, ranging from granite to leucocratic and biotitic quartz monzonites, to locally porphyritic granodiorite, and quartz diorite. Intrudes Precambrian schist.</td>
</tr>
<tr>
<td>PM-15</td>
<td>TKg</td>
<td>Tertiary or Cretaceous</td>
<td>Granitic rocks. K-Ar age of 39.3±0.6 m.y. probably a reset date.</td>
</tr>
<tr>
<td>PM-16</td>
<td>Mzg</td>
<td>Mesozoic</td>
<td>Granitic rocks.</td>
</tr>
<tr>
<td>PM-17</td>
<td>TKg</td>
<td>Tertiary and Cretaceous 54 to 65 m.y.</td>
<td>Quartz monzonite, in part porphyritic, having border facies of quartz diorite; related to Ajo porphyry copper deposit.</td>
</tr>
<tr>
<td>Mzg</td>
<td></td>
<td>Mesozoic, possibly early Tertiary to Late Cretaceous</td>
<td>Extensive outcrops of the Chico Shunie Quartz Monzonite. Although Gilluly (1946) assigned only a Mesozoic date to the rocks, Dixon (1966) states that the New Cornelia ore body is an offshoot of the Chico Shunie Quartz Monzonite stock, so if the dates given above are applicable, the rock is Tertiary and Cretaceous.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PINAL COUNTY (P)

| P-1 | pGg | Precambrian | Granitic rocks. Shown in part on State Geologic Map as of Mesozoic age, but predominately similar to 1.4 b.y. granites of Maricopa batholith to the west (see area MA-7). Gneisses in Estrella Mountains north of granite outcrops are variably foliated Precambrian granites (Steven Reynolds, Arizona Bureau of Geology and Mineral Technology, written commun., 1983). | Wilson and others, 1969 |
| P-2 | Yg | Middle Proterozoic 1,329±40 m.y. | The oldest plutonic rock (1,329 m.y.) is biotite quartz monzonite, principally in northern Table Top Mountains and Haley Hills, which is intruded by Oracle granite, containing very large orthoclase phenocrysts. In Vaiva Hills Oracle is porphyritic, coarse-grained, biotite quartz monzonite. | Balla, 1972; Blacet and others, 1978; Dockter and Keith, 1978 |
| P-3 | Yg | Middle Proterozoic | Oracle granite composed of porphyritic, coarse-grained, biotite quartz monzonite. | Blacet and others, 1978 |
| P-4 | TKd | Tertiary and Cretaceous | Medium- to coarse-grained, biotite quartz diorite to quartz-monzonite porphyry. | Blacet and others, 1978 |
| P-5 | pGg | Precambrian | Granitic pegmatites that intrude Precambrian schist. | Balla, 1972; Wilson and others, 1969 |
| P-6 | TKg | Tertiary and Cretaceous 61.2 to 71.3 m.y. | Two granitic stocks were intruded during Laramide revolution. The Three Peaks monzonite grades from diorite to monzonite, and has an age of 71.3 m.y. Sacaton Peak granite ranges from biotite quartz monzonite to granite containing abundant, large orthoclase phenocrysts. Sacaton Peak is about 61 m.y. old. | Balla, 1972; Bergquist and Blacet, 1979a, 1979b |

Yg | Middle Proterozoic 857(?) to 1,420 m.y. | Mostly the Oracle granite, porphyritic, coarse-grained, and leucocratic, and includes some biotite quartz monzonite containing large phenocrysts of orthoclase. Oracle is about 1,420 m.y. old, and is intruded by small pluton of Sacaton granite, a muscovite-bearing granite yielding questionable age of 857 m.y. The Oracle is cut by aplite and diabase dikes. The diabase is dated at 841 m.y., but probably represents the 1,150 m.y. old diabase event of the State. | Balla, 1972; Bergquist and Blacet, 1979a, 1979b |
<table>
<thead>
<tr>
<th>Page</th>
<th>TkG</th>
<th>Tertiary and Cretaceous</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-7</td>
<td>TKg</td>
<td>62.2±1.8, 64.3±1.3, and 70.3±4 m.y.</td>
</tr>
</tbody>
</table>

Granitic rocks, intruded during Laramide revolution, include several quartz monzonite stocks. The oldest, the Mineral Butte quartz monzonite, is biotite quartz monzonite about 70 m.y. old. The younger intrusive, the Sacaton Peak granite, is also quartz monzonite.

<table>
<thead>
<tr>
<th>Yg</th>
<th>Middle Proterozoic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,341±27 m.y.</td>
<td>Oldest plutonic rock, the San Tan quartz monzonite, intrudes basement schists; it ranges from quartz diorite to quartz monzonite. It is intruded by the younger Oracle granite which is identical to granite in nearby Sacaton Mountains (area P-6).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TkD</th>
<th>Tertiary and Cretaceous</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-8</td>
<td>24.6±0.5 m.y.</td>
</tr>
</tbody>
</table>

Hornblende-biotite granodiorite containing xenoliths of schist.

<table>
<thead>
<tr>
<th>TkD</th>
<th>Medium-grained equigranular diorite containing equal amounts of hornblende and biotite. Appears to intrude Precambrian gneiss. The Picacho Mountains south of this granitic terrane comprise a metamorphic core complex.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Yg</th>
<th>Middle Proterozoic</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 to 28 m.y.</td>
<td>Two plutons of quartz monzonite that are separated from older Tertiary plutons by zone of mylonite. The Tortolita Mountains are part of metamorphic core complex.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Yg</th>
<th>Middle Proterozoic</th>
</tr>
</thead>
<tbody>
<tr>
<td>44 to 51 m.y.</td>
<td>Two plutons of quartz monzonite that are separated from older Tertiary plutons by zone of mylonite. The Tortolita Mountains are part of metamorphic core complex.</td>
</tr>
</tbody>
</table>

Banks, 1980; Davis, 1980; Yeend, 1976

Banks, 1980; Banks and others, 1977

Banks, 1976, 1980; Banks and others, 1977; Keith and others, 1980
Early Tertiary and Late Cretaceous
60 to 70 m.y.

Chirreon Wash granodiorite is composite intrusion of porphyritic biotite-hornblende granodiorite, quartz diorite, diorite, and quartz monzonite; bounded by zones of mylonite and cataclastically deformed along contact with younger Derrio Canyon pluton of Keith and others (1980).

Middle to Early Proterozoic
1,400 to 1,650 m.y.

Mainly coarse- to very coarse grained, porphyritic quartz monzonite to medium-grained, hypidiomorphic quartz monzonite (Oracle granite; Proterozoic Y); grades to augen gneiss and schistose mylonite towards borders of younger plutons. Older (Proterozoic X) quartz diorite separated from Oracle granite by the Proterozoic X Pinal Schist.

Paleocene

Porphyritic granite containing large feldspar phenocrysts—much may be alaskite; extends northward into Tea Cup Granodiorite (61-63 m.y.) around Grayback Mountain (area P-12). Cut by dikes of aplite, pegmatite, rhyodacite porphyry, and mafic rocks. Intrudes Precambrian granites and schist and Tertiary and Cretaceous granodiorite.

Tertiary and Cretaceous
71.3±2 and 123.6±4 m.y.

Equigranular, biotite-hornblende granodiorite and quartz monzonite which has been dated only at north end of area.

Middle Proterozoic

Three types of granitic rocks represented. The Ruin Granite, probably the most abundant, is coarse-grained, porphyritic granite and quartz monzonite. Coarse-grained, porphyritic, biotite granodiorite, containing large feldspar phenocrysts in southern part of area, is foliated and intruded by aplite and mafic dikes. Bordering Ruin Granite on the north is medium-grained, leucocratic two-mica granite containing abundant potassium feldspar.

Paleocene

61.4±3.2, 62.9±1.3, and 60 to 63 m.y.

The Tea Cup Granodiorite, mostly around Grayback Mountain, is medium to coarse grained, locally porphyritic, and includes feldspar and quartz phenocrysts. Granite Mountain Porphyry, which is north of Gila River, is porphyritic granodiorite.
<table>
<thead>
<tr>
<th>Code</th>
<th>Age/Period</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kd</td>
<td>Late Cretaceous 65.6±2 to 66.0±2, 71±2, and 83±2 m.y.</td>
<td>Small stocks of quartz diorite, ranging in composition from pyroxene-hornblende diorite through biotite-hornblende quartz diorite, all included as the Tortilla Quartz Diorite. Intrudes the Precambrian granite. Elsewhere, small intrusive bodies of diorite, hornblende diorite, and granodiorite, most of which are younger (about 66 m.y.) than Tortilla Quartz Diorite.</td>
</tr>
<tr>
<td>Yg</td>
<td>Middle and Early Proterozoic 1,420, 1,430, 1,460 m.y.</td>
<td>Batholithic masses principally of coarse-grained granite and quartz monzonite, mapped as the Ruin or Oracle Granite; intrudes Precambrian granodiorite and schist, and is intruded, especially in northern part of area, by many Tertiary and Cretaceous dikes and small intrusive masses. Quartz monzonite is coarse grained and porphyritic, because of phenocrysts of orthoclase, microcline, and microperthite, and books of biotite. Associated with the granite are alaskite, aplite, and muscovite granite in large masses and dikes, most of which appear to be slightly younger than the Ruin Granite. The muscovite granite has a Rb-Sr whole-rock age of 1,550±80 m.y. (Krieger, 1974b); however, this age is older than the age of the Ruin. The granodiorite that is intruded by the Ruin Granite is 1,650 to 1,700 m.y. old, according to Silver (1968).</td>
</tr>
<tr>
<td>YXg</td>
<td>Middle and Early Proterozoic 1,430 to 1,460 and 1,650 to 1,700 m.y.</td>
<td>Madera Diorite locally containing abundant biotite and hornblende; intrudes Precambrian schist. Ruin Granite (same as Oracle granite) and an older granodiorite mapped together. The granodiorite is intruded by the Ruin Granite. The Ruin is porphyritic quartz monzonite, containing books of biotite and phenocrysts of microperthite and K-feldspar. Over parts of the area quartz monzonite grades to alaskite and lesser amounts of alaskite porphyry, aplite, and potassium-rich quartz monzonite. Ruin Granite is the more extensive plutonic rock.</td>
</tr>
<tr>
<td>P-13</td>
<td>Early Tertiary or Late Cretaceous 68 m.y.</td>
<td>Cooper Creek Granodiorite is large stock and sills that intrude older Tertiary or Cretaceous volcanics and Paleozoic sedimentary rocks.</td>
</tr>
</tbody>
</table>

References:
- Damon and others, 1962
- Krieger, 1974a, 1974b, 1974c, 1974d
- Silver, 1968
- Theodore and others, 1978
- Wilson and others, 1969
- Yeend and others, 1977
- Creasey, 1965, 1967a
- Creasey and others, 1961
- Damon and others, 1962
- Krieger, 1968b, 1974b
- Silver, 1968
- Creasey and others, 1961
- Krieger, 1968a
- Simons, 1964
Precambrian

P15 TRd Tertiary or Cretaceous 62 m.y.

Porphyritic diorite containing phenocrysts of hornblende and plagioclase. Also includes apparently related intrusive bodies of feldspar-mica porphyry which occur as large laccolith and smaller stocks, sills, and dikes. Both rock types are same age. Intrudes Paleozoic sedimentary rocks, and Tertiary and Cretaceous volcanics and sedimentary rocks. Associated with Christmas ore body.

Cretaceous 69.8 and 74.4 m.y.

Rattler Granodiorite ranges from quartz diorite to sodic-granite aplite, containing variable proportions of hornblende and biotite. Occurs mainly as stock that cuts Precambrian and Paleozoic sedimentary rocks and Precambrian diabase.

Granodiorite and rhyodacite porphyry.

Stocks, dikes, and a sill of quartz-latite porphyry.

Coarse-grained quartz diorite and large masses of quartz monzonite and some biotite quartz latite, and dikes of dioritic, andesitic, and diabasic rock. Pyroxene syenodiorite at south end of Santa Rita Mountains. The younger of the listed age dates were obtained by analytical methods having wide range of error, and Drewes (1980) assigns unit a Cretaceous age.

Stocks of quartz monzonite.

Coarse-grained granodiorite, with porphyritic and melanocratic phases.

An older very coarse grained monzonite and quartz diorite (184 m.y.) intruded by younger rocks, including coarse-grained granite and quartz monzonite and some aplite bodies (145 and 161 m.y.); the granite designated as Triassic by Drewes (1971b, 1980).

Granodiorite porphyry and quartz-monzonite porphyry.
<table>
<thead>
<tr>
<th>Location</th>
<th>Age</th>
<th>Formation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tg</td>
<td>Tertiary</td>
<td>Pyroxene monzonite, porphyritic; mainly intrusive rock but some may be in thick flows. Designated as Cretaceous by Simons (1974), but considered Tertiary by Drewes (1980).</td>
<td></td>
</tr>
<tr>
<td>Tgd</td>
<td>Paleocene</td>
<td>Mostly equigranular to porphyritic, biotite-hornblende granodiorite and some porphyritic, biotite granodiorite.</td>
<td></td>
</tr>
<tr>
<td>Kd</td>
<td>Late Cretaceous</td>
<td>Biotite syenodiorite.</td>
<td></td>
</tr>
<tr>
<td>Jg</td>
<td>Jurassic</td>
<td>Mostly equigranular granite and subordinate porphyritic granite, alkali syenite, and granodiorite in Patagonia Mountains. Largely biotite-hornblende quartz monzonite and quartz monzonite in Mount Benedict area. Includes monzonite porphyry correlated with 184-m.y.-old intrusive in area SC-1 designated as Triassic by Drewes (1980).</td>
<td></td>
</tr>
<tr>
<td>Yg</td>
<td>Middle</td>
<td>Mostly biotite and biotite-hornblende quartz monzonite and some hornblende diorite. On west flank of Patagonia Mountains includes considerable hornblende-rich metamorphic and igneous rocks, including gabbro. Intruded by Jurassic and Tertiary plutonic rocks.</td>
<td></td>
</tr>
</tbody>
</table>

**YAVAPAI COUNTY (YA)**

<table>
<thead>
<tr>
<th>Location</th>
<th>Age</th>
<th>Formation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>YA-1 Yg</td>
<td>Middle</td>
<td>Granite of Chino Creek pluton.</td>
<td>Krieger, 1967a; Shariquallah and others, 1980</td>
</tr>
<tr>
<td>YA-3 Yg, p6g</td>
<td>Middle Proterozoic 1,360 m.y. and Precambrian</td>
<td>A complex of gabbro and related rocks, anorthorite, and quartz diorite east and west of Bagdad; intruded by the younger, widespread Lawler Peak Granite and less extensive Cheney Gulch Granite, and by alaskite porphyry and aplite. Chief minerals in gabbro are hornblende and plagioclase, and rock is foliated. Lawler Peak is porphyritic biotite-muscovite granite, containing large orthoclase phenocrysts, and Cheney Gulch is of similar character. Age of Lawler Peak Granite is 1,360 m.y. Plutonic rocks intruded metamorphic rocks of Proterozoic Yavapai Series.</td>
<td>Anderson, C.A., and others, 1955; Condie, 1981; Wilson and others, 1969</td>
</tr>
</tbody>
</table>
Granitic rocks; a single age date from biotite granite south of Kirkland at east edge of area is 1,250±28 m.y.

Granitic rocks.

Granitic rocks in the area are poorly studied, except where plutons extend north of latitude 34°15' into Mount Union and southwest corner of Mayer quadrangles. In those quadrangles the rocks are of about equal amounts granodiorite and quartz monzonite, both in part porphyritic. Gabbro and diorite at Towers Mountain in the Bradshaw Mountains probably are related to similar rocks southeast of Prescott (area YA-7). The plutonic rocks intruded Precambrian metamorphic rocks. Dated rocks are from only three localities in the northeast and east parts of area; the youngest listed date is on the Crazy Basin Quartz Monzonite, and the older dates on the Brady Butte Granodiorite.

Mostly granodiorite but includes locally porphyritic quartz monzonite, and in western part, quartz monzonite. Intrudes Precambrian metamorphic, plutonic, and volcanic rocks.

The oldest plutonic rocks are gabbro and related gabbroic to dioritic rocks. Granodiorite in Government Canyon and Prescott plutons is most abundant rock, and is associated with quartz monzonite, some porphyritic, and alaskite, in part porphyritic, and coarse grained, and some intensely foliated granite and fine-grained granite. Plutonic rocks intrude Precambrian metamorphic and metasedimentary rocks. Younger date on Dells Granite, and older on Government Canyon Granodiorite. Precambrian metamorphic and plutonic rocks in area southwest of Prescott poorly described.

Mostly Prescott Granodiorite but includes some alaskite, gabbro, and quartz diorite.

Quartz diorite, the most widespread granitic rock in the area, contains conspicuous hornblende prisms, biotite, and plagioclase, and is cut by many dikes of granodiorite porphyry. Older, but less abundant, plutonic rocks include gabbro and quartz porphyry, and locally granophyre. Intrudes Precambrian sedimentary and volcanic rocks. Age date on Mingus Mountain quartz diorite.
| YA-10 | p6gd, p6g | Precambrian | Two granodiorite plutons that intruded smaller masses of gabbro and locally foliated quartz-diorite porphyry. In the Badger Spring Granodiorite the dominant mafic mineral is biotite, and locally the pluton has a leucocratic facies. Bumblebee Granodiorite has a mafic border facies of quartz diorite characterized by hornblende. Gabbro is largely dioritic in composition and occurs essentially as pendants in the granodiorite plutons. Character of plutons south of latitude 34°15' poorly known. Intrude older Precambrian volcanics. | Anderson, 1972; Anderson and Blacet, 1972a; Wilson and others, 1969 |
| YA-11 | p6d, p6g | Precambrian | Chiefly diorite and quartz porphyry that intrude metamorphosed Precambrian volcanics. | Twenter and Metzger, 1963; Wilson and others, 1969 |
| YA-12 | p6g | Precambrian | Granite. In Pine Mountain area (northern part of YA-12), plutonic rock is primarily granite, containing hornblende as principal mafic mineral and considerable magnetite as accessory mineral; locally grades to granodiorite or quartz diorite. West of Horseshoe Reservoir, the granite resembles the Ruin Granite to southeast in Miami-Globe mining district. Intrudes metamorphosed Precambrian volcanics and sedimentary rocks. | Canney and others, 1967; Wilson, 1939; Wilson and others, 1969 |

**YUMA COUNTY (Y)**

| Y-1 | Mzg | Mesozoic | Granitic rocks. | Wilson and others, 1969 |
| Y-2 | Tkg | Tertiary and Cretaceous | Granitic rocks. | Wilson and others, 1969 |
| Y-3 | Mzg | Mesozoic | Granite to quartz diorite. | Wilson and others, 1969 |
| Y-4 | p6g | Precambrian | Originally designated as Mesozoic granite but age later changed to Precambrian. | Shafiqullah and others, 1980; Wilson and others, 1969 |
Rocks of extensive Gunnery Range batholith consist of leucocratic two-mica granite which intrudes Mesozoic metamorphic rocks. Contacts are sharp, and in Cabezas Prieta Mountains gneissic roof pendants "float" in granite. In southern Aquila and northern Granite Mountains, plutonic rock is highly fractured and foliated monzonite, containing potassium feldspar phenocrysts. In northern Mohawk Mountains, plutonic rocks consist of hornblende-biotite granite intruded by leucocratic biotite granite; they are in upper plate of detachment fault. Designated as Mesozoic by Wilson and others (1969), but ages of 52.5±1.3 and 53.1±1.3 m.y. recorded on biotite at two localities in western part.
REFERENCES CITED


Condie, K. C., compiler, 1981, Precambrian rocks of southwestern United States and adjacent areas of Mexico: New Mexico Bureau of Mines and Mineral Resources Map 13, scale 1:1,000,000, 2 sheets.


