GEOLOGIC MAP OF THE BLACK MOUNTAINS ACCOMMODATION ZONE, MOHAVE COUNTY, ARIZONA

By James E. Faulds

SCALE 1:12,000

0 0.25 0.5 MILE

0 0.25 0.5 KILOMETER

Contour Interval 40 feet

N MN 14°

EXPLANATION

DESCRIPTIONS OF MAP UNITS

QUATERNARY

- **Qal** — Alluvium--poorly sorted gravel, sand, and silt in active and recently active washes.
- **Qc** — Colluvium--unconsolidated angular blocks; generally large talus cones derived from Tb; blocks locally cemented by caliche.
- **Qs** — Sand dunes; near Colorado River; slightly vegetated.
- **Qt** — Discrete terraces of weakly consolidated, well-rounded sand and gravel along Colorado River; contains abundant well-rounded pebbles and cobbles of Paleozoic strata.
- **Qst** — Weakly consolidated, well-rounded silt, sand, and gravel along Colorado River; contains abundant pebbles and cobbles of Paleozoic strata.
- **Qp** — Thin veneer of poorly sorted gravel on pediment surface.

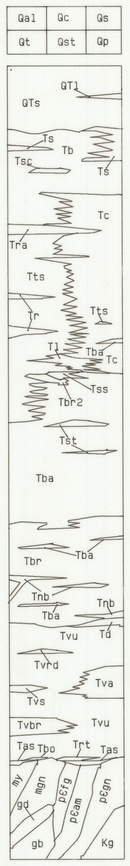
TERTIARY

- **QTs** — Late Miocene to Quaternary pebble to cobble conglomerate and subordinate medium- to coarse-grained sandstone; weakly to moderately indurated; primarily of fanglomerate origin. 0-700 m thick.
- **QTl** — Thin deposits of megabreccia intercalated in QTs; probable landslide origin.
- **Ts** — Moderately indurated light brown to reddish-brown sandstone and pebble to cobble conglomerate generally intercalated in Tb. Roughly bracketed between 13.7 and 11 Ma. 0-300 m thick.
- **Tsc** — Lapilli and scoria accumulations intercalated in Tb. 0-50 m thick.
- **Tb** — Basalt flows containing small amounts of olivine, augite, and plagioclase phenocrysts; locally includes thin layers of sandstone, scoria, and lapilli; ranges from 14.3 +/- 0.4 to 13.1 +/- 0.3 Ma. 0-600 m thick.
- **Tc** — Light reddish-brown to brown, poorly sorted pebble to cobble conglomerate; weakly to moderately indurated; largely of fanglomerate origin; thin breccias, tuffaceous sedimentary rock, and pyroclastic flows locally intercalated, especially near base; in east-tilted domain--contains clasts of metamorphic and plutonic rock, including mylonitized and mineralized rock; volcaniclastic in west-tilted domain. Bracketed between about 15.9 and 13.7 Ma in east-tilted domain. 0-1,000 m thick.
- **Tl** — Layers of generally monolithologic breccia consisting of older volcanic, plutonic, and metamorphic rock types; probable landslide origin; confined to east-tilted domain; bracketed between approximately 15.9 and 13.7 Ma. 0-220 m thick
- **Tbs / Tra** — Rhyolitic ash-flow tuff containing sanidine, biotite, and plagioclase phenocrysts; locally is clearly correlative with Tuff of Bridge Spring (Tbs); otherwise probably correlative with Tbs (Tra); 40Ar/39Ar age (sanidine)--15.23 +/- 0.02 Ma. 0-15 m thick.
- **Tr** — Rhyolite flows intercalated with Tts and Tc; commonly flow-banded; typically contain sanidine, biotite, and plagioclase phenocrysts; quartz generally rare. Flow in lower part of section yields 40Ar/39Ar age (sanidine) of 15.48 +/- 0.05 Ma.
- **Tts** — White to yellowish-brown tuffaceous sedimentary rocks, surge deposits, thin pyroclastic flows and air-fall tuff, and subordinate rhyolite flows; tuffs commonly contain phenocrysts of sanidine,biotite, plagioclase, and minor hornblende, quartz rare to absent; locally contains volcaniclastic sandstone and conglomerate; thickest in growth-fault basins in west-tilted domain; generally thin to absent in east-tilted domain; interfingers with Tc; bracketed between 16.4 +/- 0.4 and 14.1 +/- 0.4 Ma. 0-600 m thick.
- **Tss** — Fine- to medium-grained, moderately sorted sandstone of probable fluvial origin; moderately indurated; subordinate volcanic breccia. 0-150 m thick.
- **Tba** — Mainly basaltic andesite flows containing augite and olivine phenocrysts; lesser andesite flows, biotite-bearing dacite flows, and agglomerate; locally includes thin beds of volcanic breccia and tuffaceous sedimentary rock; bracketed between 15.94 +/- 0.04 and 16.08 +/- 0.04 Ma in northern part of map area. 320-650 m thick.
- **Tbr2** — Dark reddish-brown volcanic breccia intercalated and interfingering with Tba.
- **Tst** — Light brown to yellowish-brown tuffaceous sedimentary rock intercalated with Tba. 0-40 m thick.
- **Tbr** — Gray to reddish-brown volcanic breccia, volcaniclastic sandstone, and conglomerate; locally includes thin basaltic andesite flows and sills; 125-850 m thick.
- **Tnb** — Basaltic andesite sills (?) and lava flows; generally intruded in or intercalated with Tbr; commonly associated with areas of propylitic alteration.
- **Td** — Dacite and rhyodacite flows, containing hornblende and biotite phenocrysts, and lesser breccia. 0-80 m thick.
- **Tvu** (Tva, Tvba, Tvbr, Tvrd, Tvs) — Commonly undifferentiated (Tvu), complex section of hornblende andesite flows and lesser basaltic andesite flows (Tva), basaltic andesite flows (Tvba), volcanic breccia and lesser volcaniclastic sandstone (Tvbr), volcaniclastic sandstone and conglomerate with subordinate volcanic breccia (Tvs), and dacite/rhyodacite flows (Tvrd); characterized by laterally discontinuous units; dacite flow near base yields 40Ar/39Ar age (biotite) of 18.27 +/-0.05 Ma; roughly bracketed between 20 and 16.1 Ma. 400-750 m thick.
- **Trt** — Rhyolitic ash-flow tuff containing phenocrysts of sanidine, biotite, and plagioclase; feldspars generally altered to sericite; directly underlies or intercalated in basal part of Tvu. Probably correlative with Peach Springs Tuff. 40Ar/39Ar age (sanidine) of 18.50 +/- 0.01 Ma directly north of map area. 0-10 m thick.
- **Tbo** — Thin sequence of basalt flows containing olivine phenocrysts near base of Tertiary section; probably correlative with 19.5-20 Ma basalt flows in northern Cerbat Mountains east of map area. 0-15 m thick.
- **Tas** — Reddish-brown to purplish-gray, pre-volcanic arkosic sandstone and conglomerate. Probably early Miocene in age; 18.5-20 Ma volcanic units rest conformably on Tas. 0-35 m thick.
- **Tbi** (Tri, Tqm; Tbai, Tdi, Tai) — Tertiary intrusions (probable early to middle Miocene age): Tbi-basaltic dikes; Tri-rhyolite dikes; Tqm-porphyritic quartz monzonite to granodiorite dikes; Tbai-basaltic andesite dikes and sills; Tdi-mafic to intermediate (diorite) dikes; Tai-porphyritic hornblende andesite plugs, dikes, and sills.
- **Kg** — Weakly foliated to massive, muscovite-biotite-bearing quartz monzonite pluton in northeastern part of map area; locally garnet-bearing; commonly significantly altered; 73.3 +/- 1.5 Ma.
- **db** — Diabase dikes of unknown age in southeastern part of map area.
- **qv / pg** — qv-quartz veins, locally mineralized; pg-pegmatite bodies; both of unknown age.
- **gb** — Augite gabbro; augite locally altered to chlorite; locally contains fresh olivine or hornblende; age is uncertain; may be Miocene or possibly Proterozoic.
- **gd** — Weakly foliated granite of unknown age; contains abundant microcline and quartz, lesser plagioclase and biotite, and accessory garnet, hornblende, and clinopyroxene; may be similar in age to Kg.
- **my** — Mylonite of probable Proterozoic age; truncated by early Miocene nonconformity; protolith generally granitic; quartz ductilely deformed; feldspars brittlely deformed.

PROTEROZOIC

- **mgn** — Coarse-grained muscovite gneiss; largely mylonitic in some areas; probable Proterozoic age; truncated by early Miocene nonconformity.
- **p€fg** — Fine-grained metavolcanic (?) rock composed of plagioclase, quartz, and biotite (20%); also contains about 1% coarse-grained to pebble size, commonly augen-like microcline; sparse muscovite schist.
- **p€am** — Amphibolite; subordinate quartz-bearing hornblende-biotite gneiss (e.g., Gold Bug Mine area); sparse pegmatite; 40Ar/39Ar total gas age on hornblende-1522.5 +/-2.1 Ma.
- **p€gn** — Banded quartzo-feldspathic gneiss commonly containing biotite and garnet.

RELATIONS BETWEEN MAP UNITS



SYMBOLS

Lithologic contact-dashed where approximately located, dotted where concealed.

Moderately to steeply dipping fault-showing dip and trend of striae (arrow); bar and ball on downthrown side; dashed where approximately located, dotted where concealed.

Gently dipping normal fault-hachures on downthrown side; dashed where approximately located, dotted where concealed.

Syncline

Anticline

Axial trace of folds, showing trend and plunge of hingeline; dashed where approximately located; dotted where concealed.

Strike and dip of bedding or layering:

Inclined Vertical Overturned Horizontal

Strike and dip of foliation in volcanic rocks:

Inclined Vertical

Strike and dip of foliation in metamorphic\plutonic rocks:

Inclined Vertical

Sample locality for isotopic age determination (40Ar/39Ar dates are weighted mean plateau ages).

Mapping completed by James E. Faulds from 1987 to 1992.

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ARIZONA GEOLOGICAL SURVEY
Contributed Map CM-93-F
1993
sheet 1 of 4

FIRE MOUNTAIN QUADRANGLE
ARIZONA–NEVADA
7.5 MINUTE SERIES (TOPOGRAPHIC)

NW/4 MT. PERKINS 15' QUADRANGLE