

U.S. DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY

Geologic Map of the Steele Peak 7.5-minute Quadrangle,
Riverside County, California

by

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U.S. Geological Survey

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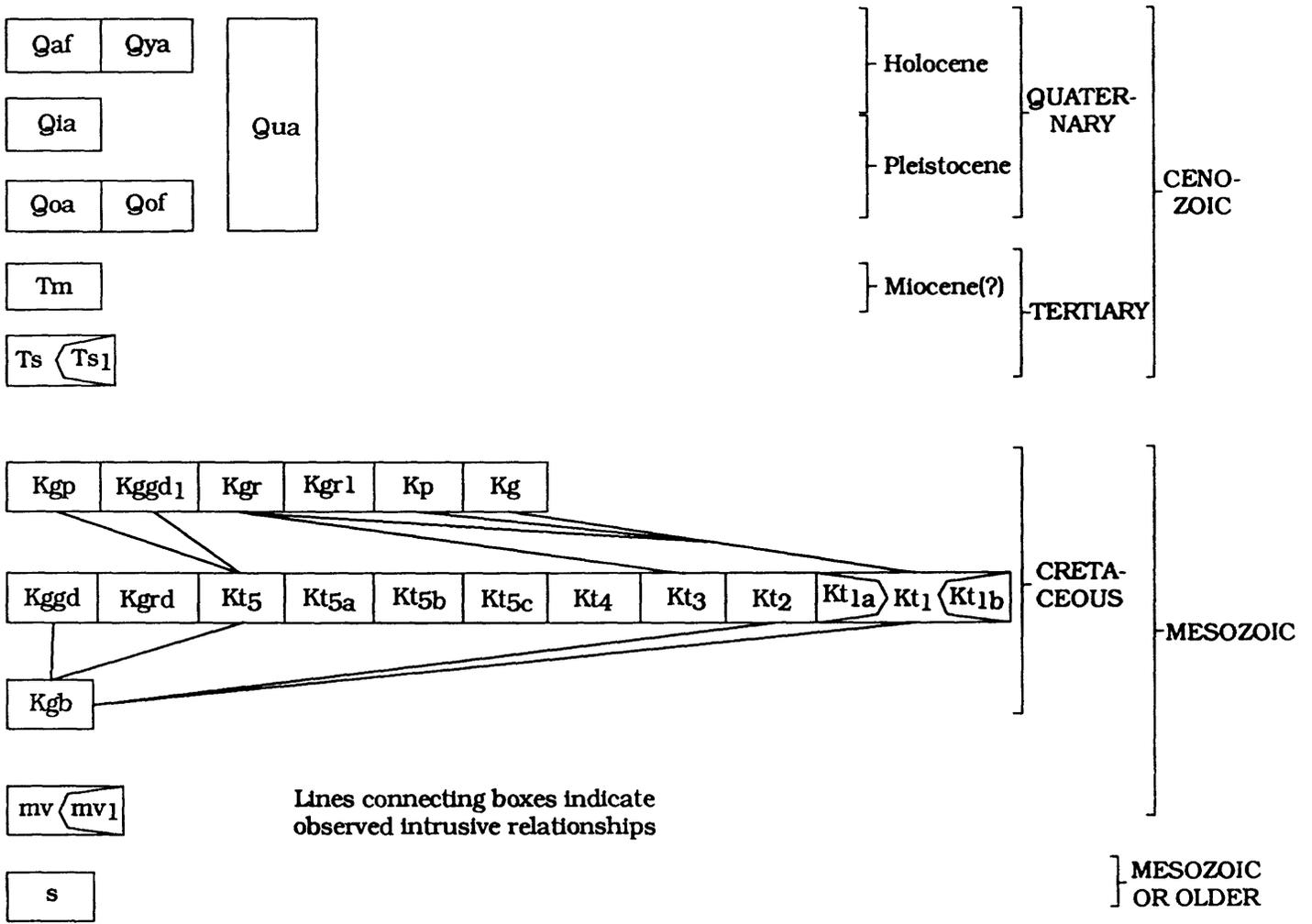
Prepared in cooperation with The State of California,
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¹ Riverside, California

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CORRELATION OF MAP UNITS



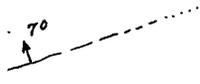
DESCRIPTION OF MAP UNITS

Qaf	Artificial fill (Holocene) -- Uncompacted fill resulting from construction
Qya	Younger alluvium (Holocene) -- Unconsolidated grayish to brownish, medium-to coarse-grained sandy alluvium in large part derived from unit
Qia	Alluvium of intermediate age (Holocene and Pleistocene) -- Unconsolidated to well indurated, brownish sandy alluvium in which part appears intermediate in age between units Qya and Qoa. Includes some areas underlain by units Qya and Qoa
Qoa	Older alluvium (Pleistocene) -- Mostly dissected, well indurated brownish coarse-grained sandy alluvium. Some contain a silica duripan
Qof	Older alluvial fan deposits (Holocene and Pleistocene) -- Mostly dissected older alluvial fan deposits consisting of well indurated brownish coarse-grained sandy alluvium. Some contain a silica duripan
Qua	Undivided alluvium (Holocene and Pleistocene) -- Undivided younger and older coarse-grained sandy alluvium and residual bedrock soils occurring on the 2,100 foot elevation Gavilan-Lakeview erosion surface of Woodford and others (1971)
Tm	Mudstone (Miocene?) -- Very poorly exposed, isolated massive-appearing, clay-rich, greenish-gray mudstone occurring along the west boundary of the quadrangle. Tentatively correlated on the basis of lithology and the elevation of its outcrop with the middle Miocene Lake Mathews Formation of Woodford and others (1971). Located on the 1,500 foot elevation Perris erosional surface of Woodford and others (1971)
Tc	Conglomerate (Tertiary) -- Massive, well indurated, grayish cobble conglomerate with coarse-grained sandstone matrix. Matrix feldspar largely altered to clay minerals. Unit Ts contains only locally derived clasts. Locally includes:
Ts ₁	A conglomerate similar to unit Ts except contains exotic red rhyolite clasts in addition to the locally derived clasts. Both conglomerates (Ts and Ts ₁) occur as thin deposits on the 2,100 foot elevation Gavilan-Lakeview erosion surface of Woodford and others, (1971), in the west central part of the quadrangle
Kgp	Granophyre (Cretaceous) -- Granophyre; weathers to form iron-oxide stained outcrops
Kggd ₁	Granite and granodiorite (Cretaceous) -- Light grayish heterogeneous biotite and biotite-hornblende granite and granodiorite occurring as small intrusive masses primarily in rocks of the Gavilan pluton
Kgr	Leucocratic granite (Cretaceous) -- Off-white to tannish-weathering, texturally and mineralogically heterogeneous leucocratic biotite-bearing granitic rocks. Grain size is medium to very coarse
Kgr ₁	Subporphyritic granite (Cretaceous) -- Grayish, subporphyritic, medium-grained biotite-bearing granitic rocks occurring as three small bodies intruding metamorphic rocks in the area of Steele Peak

- Kp** **Pegmatite dikes (Cretaceous)** -- Whitish, tabular-shaped granite pegmatite dikes. Most dikes consist of medium- to coarse-grained border and wall zones and a coarse-grained pegmatitic intermediate zone. Some pegmatite dikes contain "lime rock" layering in their outer parts. The border and wall zones consist of biotite, quartz, and alkali feldspar; the intermediate zone mainly consists of quartz and alkali feldspar with accessory schorl, garnet, and muscovite with lesser amounts of magnetite, and occasional rare-earth and Ta-Nb-bearing minerals
- Kg** **Granite dikes (Cretaceous)** -- Light tan-weathering, leucocratic, medium-grained to pegmatitic heterogeneous textured granite dikes. Most contain 1-3% biotite. Some contain textural layering parallel to the margins of the dikes
- Kggd** **Undifferentiated granite and granodiorite of the Cajalco pluton (Cretaceous)** -- Off-white to light tan weathering granite and granodiorite. Subporphyritic to hypidiomorphic granular biotite and biotite-hornblende granite and granodiorite. Subporphyritic textured rocks more common on the west edge of the quadrangle
- Ku3** **Undivided granite to granodiorite (Cretaceous)** -- Granite to granodiorite of the Cajalco pluton mixed with more mafic granodiorite
- Kgrd** **Granodiorite of the Arroyo del Toro pluton (Cretaceous)** -- Light gray, medium-grained, massive, very homogeneous, inclusion-free biotite-hornblende granodiorite. Weathers to produce abundant large boulders
- Gavilan pluton -- (Cretaceous)** -- Mostly medium-grained, hypidiomorphic-granular, biotite-hornblende, hypersthene-bearing tonalite. Divided into:
- Kt5** Massive, dark gray tonalite
- Kt5a** Foliated, medium gray tonalite. Appears more variable in mineralogy and texture than Kt5
- Kt5b** Foliated, dark gray tonalite and diorite. Appears darker in field than Kt5 and Kt5a
- K5c** Massive, black tonalite. Nearly black when fresh; weathers to form distinctive dark brown, large bouldery outcrops. Has been quarried as "black granite" for use in building facings
- Ku2** **Undivided granite to tonalite (Cretaceous)** - Extremely heterogeneous mixture of granite, granodiorite, tonalite, hypersthene-bearing tonalite, and schist. Part of unit Km₁ is a mixture of subequal amounts of mafic inclusions and granodiorite
- Kt4** **Coarse-grained tonalite (Cretaceous)** -- Gray weathering, foliated, coarse-grained, hypidiomorphic-granular, biotite-hornblende tonalite. Weathers to form very large boulders
- Kt3** **Medium-grained tonalite (Cretaceous)** -- Gray weathering, heterogeneous, foliated, medium-grained, hypidiomorphic-granular, biotite-hornblende tonalite. Contains common elliptical- to pancake-shaped,

meso- to melanocratic inclusions. Most of the rock is finer-grained than the tonalite of the adjacent Val Verde pluton (K_{t1})

- Kt₂** **Tonalite (Cretaceous)** -- Gray weathering, heterogeneous, foliated, medium-grained, haupautomorphic-granular, biotite-hornblende tonalite with common to abundant admixed amounts of biotite-hornblende granodiorite intruded into the tonalite. Contains common elliptical- to pancake-shaped, meso- to melanocratic intrusions
- Kt₁** **Tonalite of the Val Verde pluton (Cretaceous)** -- Gray weathering, relatively homogeneous, foliated, medium-grained, hypidiomorphic-granular, biotite-hornblende tonalite. Contains common elliptical- to pancake-shaped, meso- to melanocratic inclusions. Locally includes:
- Kt_{1a}** Heterogeneous potassium feldspar-bearing tonalitic rocks along the granitic rock-schist contact
- Kt_{1b}** Migmatitic-appearing rocks consisting of subequal amounts of tonalite and melanocratic inclusion-like rock
- Ku₁** **Undivided granodiorite and tonalite (Cretaceous)** -- Granodiorite mixed primarily with tonalite of the Val Verde pluton and other biotite-hornblende tonalite
- Kgb** **Gabbro and diorite (Cretaceous)** -- Dark gray to blackish, medium- to coarse-grained, mostly massive hornblende gabbro and diorite. Hornblende constitutes 25 to 45% of the rocks; plagioclase constitutes the remainder with local biotite and minor sulfides. Locally coarse- to very coarse-grained with large (1-2 cm) anhedral poikilitic hornblende crystals
- mv** **Metavolcanic rocks (Mesozoic)** -- Largely fresh quartz latite porphyry with a nearly black aphanitic groundmass studded with whitish feldspar phenocrysts. Some of this unit is predominantly a meta-volcanic breccia
- mv₁** Metavolcanic rocks of relatively homogeneous rhyolitic composition
- s** **Schist (Mesozoic [?] or older)** -- Mostly biotite-bearing relatively quartz-rich schist with some impure quartz layers. Mostly well and regularly foliated. Relatively finer-grained in the southern extent where it contains garnet and sillimanite



CONTACT - Showing dip. Long dashed where well located, short dashed where approximately located, dotted where gradational



CONTACT - Where vertical



FAULT - Dashed where approximately located



SCARP - Tics at head of downthrown block

STRIKE AND DIP OF FOLIATION



Inclined



Horizontal



Vertical



UNFOLIATED



BEARING AND PLUNGE OF MINOR FOLD AXIS



BEARING AND PLUNGE OF MINERAL LINEATION

GEOLOGIC SUMMARY

The Steele Peak quadrangle is located in the central part of the Perris block of the northern Peninsular Ranges of southern California. The Perris block is a stable structural block bounded on the west by the Elsinore fault zone and on the east by the San Jacinto fault zone. It is underlain by rocks of the Peninsular Ranges batholith of Cretaceous age and prebatholithic metasedimentary and metavolcanic rocks of presumed Mesozoic age (Todd, and others, 1988). Metasedimentary rocks occur in northwest-striking pendants and septa within and between plutons. The metasedimentary rocks are of greenschist grade in the southeast part of the quadrangle and of amphibolite grade in the central and northern parts. Metavolcanic rocks of silicic composition occur in the southwest corner of the quadrangle.

The batholithic rocks range in composition from gabbro to granite but tonalite is the predominant lithology. Much of the quadrangle is underlain by part of the large Val Verde pluton, composed of foliated biotite-hornblende tonalite, probably equivalent to the Bonsall-type tonalite of Larsen (1948). Hypersthene-bearing tonalitic rocks of the Gavilan pluton occur in the southern half of the quadrangle. These rocks form the northeastern part of a discontinuous plutonic ring complex. Part of the Gavilan pluton (Kqd_{5c}) has been quarried as a source of "black granite" used for building facing and other purposes. Several currently inactive gold mines (e.g., Gavilan, Ida Leona, and Santa Rosa), part of the Pinacate gold district, are located in the Gavilan pluton.

Located along the southern edge of the quadrangle is the north half of the Arroyo del Toro pluton. This pluton consists of a very uniform light gray, massive, medium grained, hypidiomorphic-granular, hornblende-biotite granodiorite. Rocks of most of the pluton are devoid of inclusions. Parts of the pluton have been quarried for building stone.

The Perris block is capped by a series of near-horizontal erosional surfaces of low topographic relief (Woodford, and others, 1971). The youngest of these, the Paloma surface, at an elevation of 1,500 feet and capped by older alluvium (Qof), occurs in the northeast corner of the quadrangle. An older, Miocene(?) surface, the Perris surface, is developed mainly on bedrock at elevations of 1,600 to 1,700 feet and extends over much of the eastern half of the quadrangle. Along the northern part of the west boundary of the quadrangle this surface includes a small area underlain by poorly exposed sedimentary rocks (Tm) that are tentatively correlated with the Miocene continental Lake Mathews Formation of Woodford, and others, 1971. A west-trending paleostream channel covered by dissected Pleistocene alluvium, extends over most of the width of the quadrangle just south of Cajalco Road. Sedimentary rock-fill beneath the Pleistocene alluvium in this channel has been considered to be Miocene in age.

The Gavilan-Lakeview erosional surface is cut on bedrock at elevations of 2,000 to 2,100 feet in the west-central part of the quadrangle. Two isolated erosional remnants of continental conglomerate (Ts and Ts₁) are present on this erosional surface.

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