U.S. DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY

Geologic Map of the Cucamonga Peak 7.5-minute Quadrangle, San Bernardino County, California

by

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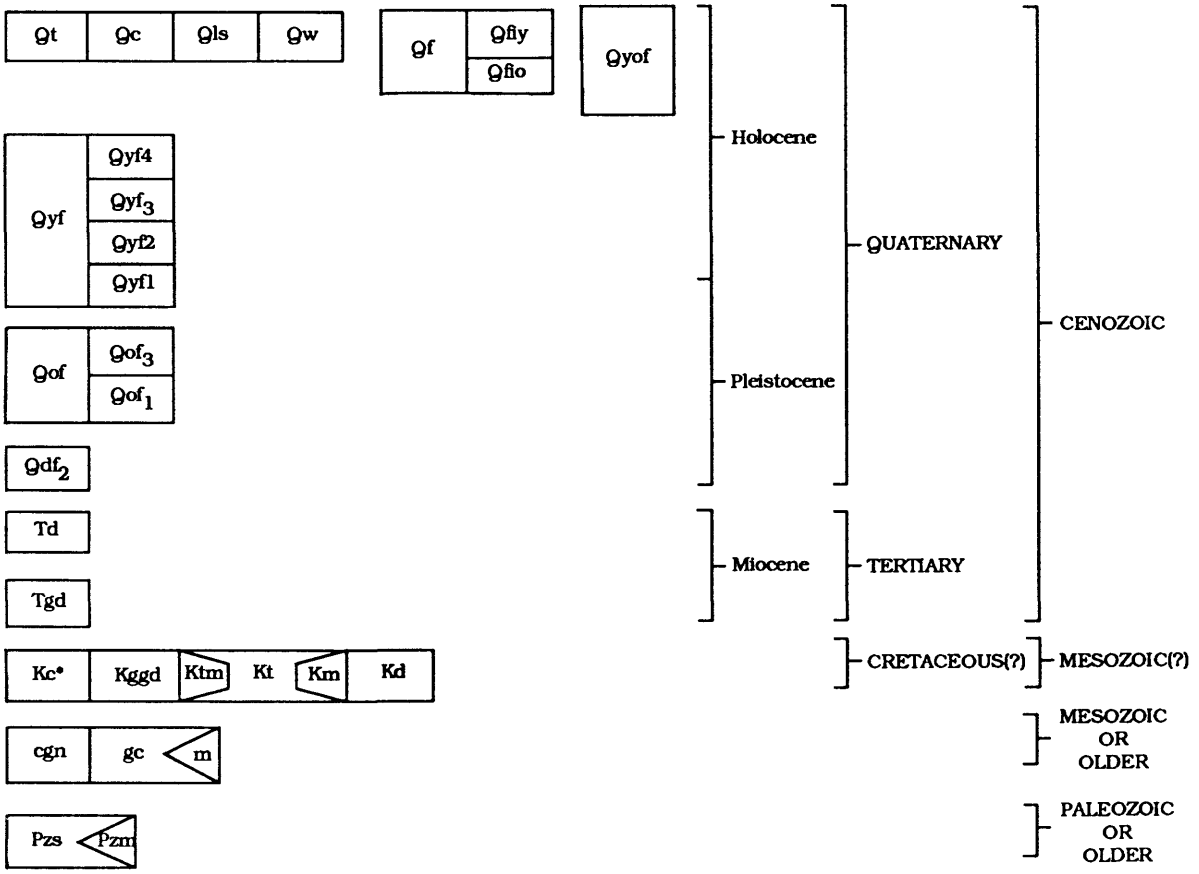
CORRELATION OF MAP UNITS



* See description of map units for exact age assignments.

DESCRIPTION OF MAP UNITS

Qt — **Talus (Holocene)** -- Unconsolidated accumulations of angular rock fragments, devoid of vegetation cover, located on or at the bases of steep slopes

Qc — **Colluvium (Holocene)** -- Unconsolidated deposits of soil and angular rock debris occurring along the base of slopes. Consists of matertial ranging from almost wholly rock fragments to soil and humus-rich material

Qls — **Landslides (Holocene)** -- Landslides mostly consisting of a crown area and landslide deposit. Most landslide deposits are composed of massive unconsolidated rock debris. The direction of principal landslide movement shown by arrows. Areas, or deposits of inferred or questionable landslide origin are queried

Qw — **Alluvium of active channels and washes (Holocene)** -- Unconsolidated coarse-grained sand to bouldery alluvium of active channels and washes flooring drainage bottoms within the mountains and on alluvial fans along the base of the mountains. Most alluvium is, or recently was, subject to active stream flow. Contains some low-lying terrace deposits along alluviated canyon floors' and areas underlain by colluvium along base of some slopes

Qf — **Alluvium of modern alluvial fans (Holocene)** - Unconsolidated deposits of coarse-grained sand to bouldery alluvium of modern alluvial fans with undissected surface. Locally, includes:

Qfi_y — Relatively younger deposits intermittently subject to inundation and reworking by high-water stream flows

Qfi_o — Relatively older deposits that recently have been abandoned by active stream flows or deposits subject to inundation and reworking only by the highest flood waters

Qyof — **Deposits of younger alluvial fans (Holocene)** -- Unconsolidated deposits of coarse-grained sand to bouldery alluvium of younger alluvial fans. Fans posses slightly dissected surfaces; fans abandoned by active stream flow

Qyf — **Deposits of younger alluvial fans (Holocene and Pleistocene)** -- Unconsolidated to moderately consolidated coarse-grained sand to bouldery alluvial fan deposits with slightly to moderately dissected surfaces. Locally, includes:

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Qfy_4 — Alluvial-fan deposits with slightly dissected surfaces and stage S7 soils (Holocene)

Qyf_3 — Alluvial-fan deposits with slightly dissected surfaces and stage S6 or incipiently developed stage S5 soils (Holocene)

Qyf_2 — Alluvial-fan deposits with moderately dissected surfaces and moderate stage S5 soils (Holocene)

Qyf_1 — Alluvial-fan deposits with moderately dissected surfaces and well developed stage S5 soils (Holocene and latest Pleistocene)

Qof — **Deposits of older alluvial fans (Pleistocene)** -- Unconsolidated to well consolidated deposits of coarse-grained sand to bouldery alluvium of older alluvial fans with moderately to well dissected surfaces. Deposits of this age range includes three different age mappable units along the south side of the eastern San Gabriel Mountains; in the Cucacamonga Peak quadrangle two units occur, the youngest (Qof_3 and oldest (Qof_1); the intermediate age unit (Qof_2) is missing. Locally, includes:

Qof_3 — Alluvial fan deposits with moderately dissected surfaces and stage S4 soils (late Pleistocene)

Qof_1 — Alluvial fan deposits with dissected surfaces and stage S3 soils (middle Pleistocene)

Qdf_2 — **Deposits of older well-dissected alluvial fans (Pleistocene)** -- Unconsolidated to well consolidated deposits of coarse-grained sand to bouldery alluvium of older alluvial fans with extremely dissected surfaces and stage S2 soils (middle Pleistocene). Qdf_1, alluvial fan deposits with extremely dissected surfaces and stage 1 soils (middle to early Pleistocene), which occur along the south side of the eastern San Gabriel Mountains do not occur in the Cucacamonga Peak quadrangle

Td — **Dacite (Miocene?)** -- White, fine-grained porphyritic dacite containing phenocrysts of subhedral to euhedral biotite. Occurs as a fault-bounded tabular mass within Cucamonga fault zone near the west margin of the quadrangle. This rock type resembles dacite exposed to the east in the San Gabriel Mountains where granodiorite related to the dacite has been dated as about 14 Ma (Miller and Morton, 1977)

Tgd — **Granodiorite to granite (Miocene)** -- Medium-to coarse-grained, mostly massive hypidiomorphic-granular, white-weathering, biotite granodiorite to granite. Restricted to a fault sliver in the northeast corner of the quadrangle. Has been dated at about 14 Ma (Miller and Morton, 1977)

Kc — **Charnockitic rock (Cretaceous)** -- Principally an irregular sill-like mass on west side of Day Canyon. Gray, coarse-grained, massive to foliated, equigranular, plagioclase-rich rock type, locally with large garnets and pyroxene crystals. Contains quartz, hypersthene, hornblende, biotite, and garnet. Garnet commonly has kelyphytic rims and most of the hypersthene is rimmed by hornblende. Has been dated as Cretaceous (70 Ma) by the U-Pb method (Walker and May, 1986)

Kggd — **Granite and granodiorite (Cretaceous?)** -- Light gray to near-white weathering, medium-grained, subporphyritic massive granite and granodiorite. Constitutes east-to northeast striking dikes cutting tonalitic rock. Phenocrysts are potassium feldspar and quartz. More resistant than enclosing tonalitic rocks

Kt — **Tonalitic rocks (Cretaceous?)** -- Foliated, gray, medium-to coarse-grained granitic rock mostly of tonalitic composition. Mostly equigranular, locally subporphyritic with phenocrysts of feldspar. Foliation produced by oriented biotite and hornblende; common dark, plate-like inclusion parallel foliation. Locally contains septa of gneiss and schist; some rocks contains scattered garnets with kelyphytic rims. Locally, includes:

Ktm — Some tonalite contains widespread mylonitized rocks

Km — Part of the tonalitic rocks unit is thoroughly mylonitized giving rise to a uniform porphyroblastic textured mylonite. This mylonitic rock constitutes a zone 250-400 meters wide in Cucamonga Canyon. Mylonite is gray, porphyroblastic mainly of tonalite composition locally with diorite to granite composition. Mylonite is very fine-grained to aphanitic with porphyroclasts of plagioclase and quartz and very striking porphyroblasts(?) and porphyroclasts of hornblende up to one inch in length. Most of the elongate porphyroblasts are preferentially oriented down dip. Contains dark gray to black aphanitic mylonite and ultramylonite layers (pseudotachylyte) about one inch thick

Kd — **Diorite (Cretaceous?)**-- Coarse grained gray hornblende diorite. Fabric ranges from massive through foliated to cataclastic. Locally contains biotite, pyroxene, and as much as 5% quartz. Locally intermingled with tonalite and cut by dikes and small irregular bodies of granite and granodiorite

cgn — **Cataclastic gneiss (Mesozoic or older)** -- Cataclastic-mylonitic amphibolite grade biotite gneiss intruded by mylonitic granitic rocks. Crops out in the northeastern corner of quadrangle. Gneiss is layered and intensely folded

gc — **Granulitic gneiss, mylonite, and cataclasite (Mesozoic or older)** -- Prograde granulitic gneiss now largely retrograde to amphibolite and greenschist grade mylonite and cataclasite. Gneiss includes quartz-feldspar gneiss, garnet-quartz-feldspar, amphibolite, garnet-hornblende, biotite-garnet-feldspar-quartz, garnet-pyroxene, and spinel-pyroxene rich rocks. Mylonitic rocks increase in amount along the southern margin of the gneiss. Locally, includes:

m — Coarse-grained marble lenses occur in the layered gneiss.

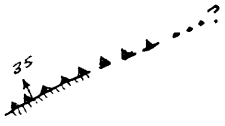
P_Z s — **Schist and gneiss (Paleozoic or older)** -- Undivided schist and gneiss septa within tonalite. The undivided schist and gneiss lithology is of variable composition, but most common is biotite-bearing schist. Locally contains quartz-feldspar rich rock, graphitic and sulfide rich rock, calc-silicate rock, and discontinuous masses of coarse-grained marble which in part contains wollastonite. Locally, includes:

P_Z m — Scattered pods of marble occur within the schist and gneiss

CONTACT - Dashed where approximately located; dotted where concealed

ALLUVIAL CONTACT - Showing younger alluvial unit incised into older alluvial unit; hachures on younger unit

FAULT - Showing dip. dashed where approximately located; dotted where concealed; queried where inferred; arrows indicates relative horizontal movement.



THRUST FAULT - Showing dip. Dashed where approximately located; dotted where concealed; queried where inferred. Sawteeth on upper plate; hachures at base of slope on downthrown block of fault scarp.

STRIKE AND DIP OF FOLIATION IN PLUTONIC ROCKS

Inclined

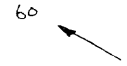
Vertical

STRIKE AND DIP OF FOLIATION AND (OR) LAYERING IN METAMORPHIC ROCKS

Inclined

Vertical

BEARING AND PLUNGE OF MINOR FOLD AXIS - In metamorphic and plutonic rocks



BEARING AND PLUNGE OF MINERAL LINEATION - In metamorphic and plutonic rocks

LANDSLIDE - Arrows indicate direction of movement; hachures indicate headwall of crown area

GEOLOGIC SUMMARY

The northern part of the Cucamonga Peak quadrangle covers part of the eastern San Gabriel Mountains in the east-central Transverse Ranges Province of southern California. The southern part of the quadrangle covers part of the upper Santa Ana River valley in the northernmost part of the Peninsular Ranges Province. The Cucamonga fault zone separates the mountains from the valley. Most of the structural grain within the San Gabriel Mountains is east-trending. Basement rocks within the mountains include a Paleozoic or older metasedimentary sequence of schist, quartzite, and marble. These rocks occur as pendants within Cretaceous granitic rocks, most of which are of tonalitic composition. Much of the granitic rock is mylonitic. South of the granitic terrain is a complex assemblage of metamorphic rocks of Cretaceous or older age. This assemblage is in large part metasedimentary. It was initially metamorphosed to upper amphibolite and lower granulite grade. It was subsequently retrograded and intensely mylonitized at greenschist grade, and intruded by charnokitic rocks of Cretaceous age (Walker and May, 1986). Mylonitic deformation produced rocks with a pronounced foliation and lineation. Most of the foliation strikes east and dips north and the lineation plunges at small angles mosty to the east and west.

The east-striking and north dipping Stoddard Canyon-South Fork Lytle fault zone extends across the quadrangle westward from the South Fork of Lytle Creek. Three northwest-striking right-lateral, strike-slip faults, the Demens Canyon, Day Canyon, and Duncan Canyon faults, are located between the Stoddard Canyon-South Fork Lytle Creek fault and the Cucamonga fault zone. Within the quadrangle, displacement on the Cucamonga fault zone has produced a number of spectacular scarps on the Day Canyon alluvial fan and a number of occurrences of basement thrust over older alluvium (Morton and Matti, 1988).

The valley area south of the Cucamonga fault zone is covered by boulderly alluvium which forms a series coalesced fans emanating from the mountains.

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