ABBREVIATED EXPLANATION

Approximate stratigraphic relationships only; see Geologic Map Explanation for more accurate age determinations and unit descriptions.

CENOZOIC

QUATERNARY

Holocene

- Q — Alluvium
- af — Artificial fill
- Qi — Intertidal deposits *(Peaty mud)*
- Qdp — Dos Palos Alluvium
- Qf — Alluvial fan deposits
- Qls — Landslide deposits
- Qt — Terrace deposits
- Qsl — San Luis Ranch Alluvium
- t — Dredge or mine tailings
- Qs — Dune sand
- Qp — Patterson Alluvium

Pleistocene

- Qc — Continental and marine deposits
- Qmr — Modesto-Riverbank Formations Undivided *(Arkosic alluvium)*
  - Qm — Modesto Formation
  - Qr — Riverbank Formation
- Qo — Older alluvium
- Qtl — Turlock Lake Formation *(Nonmarine sand, silt, and gravel)*
- QTt — Tulare Formation *(Alluvium)*
  - Qlb — Los Banos Alluvium
  - QTnm — North Merced Gravel *(Thin pediment veneer)*
- QTm — Merced Formation *(Marine sandstone)*
- QT — Plio-Pleistocene nonmarine deposits *(Sand and gravel)*

TERTIARY

Pliocene

- Pl — Laguna Formation *(Consolidated alluvium)*
- Pt — Tehama Formation *(Sand, silt, and volcaniclastic rocks)*
- Ppu — Purisima Formation *(Marine sandstone and siltstone)*
- Pta — Tassajara Formation *(Nonmarine mudstone)*
  - Pcv — Basaltic rocks
  - Plt — Lawlor Tuff

Miocene

- Msc — Santa Cruz Mudstone *(Marine)*
- Msm — Santa Margarita Sandstone *(Marine)*
- Msp — San Pablo Group *(Marine sandstone)*
- Mmy — Monterey Formation *(Marine shale and sandstone)*
  - Mcc — Contra Costa Group *(Nonmarine sedimentary rocks)*
  - Mf — Fanglomerate
  - Mpt — Pinole Tuff
  - Mv^b — Bald Peak Basalt
  - Mpm — Page Mill Basalt
  - Mv — Miocene volcanic rocks *(Mv^a-andesite; Mv^b-basalt)*
  - Mv^d — Dacite
  - Mmb — Mindego Basalt
  - Mtm — Table Mountain Latite
  - Tv — Tertiary Volcanic; Tv^b Tertiary Basalt

Oligocene

- Mlo — Lompico Sandstone *(Marine)*
- Mls — Lambert Shale *(Marine)*
- Mte — Temblor Formation *(Marine sandstone)*
- Tm — Mehrten Formation *(Andesitic conglomerate)*
- Tvs — Valley Springs Formation *(Rhyolitic tuff and sedimentary rocks)*
- Tu — Undivided Tertiary marine sedimentary rocks
- ϕvq — Vaqueros Sandstone *(Marine)*
- ϕk — Kirker Formation *(Marine tuffaceous sandstone)*

Eocene

- Eϕs — San Lorenzo Formation *(Marine mudstone)*
- Epf — Poverty Flat Sandstone *(Marine and nonmarine)*
- Ek — Kreyenhagen Formation *(Marine sandstone and shale)*
  - Emk — Markley Sandstone *(Marine)*
  - En — Nortonville Shale *(Marine)*
- Eb — Butano Sandstone *(Marine)*
- Ed — Domengine Sandstone *(Marine)*
- Em — Meganos Formation *(Marine sandstone)*
- Ei — Ione Formation *(Quartzose sandstone and kaolinitic clay; mostly nonmarine)*
- Tg — "Auriferous" Gravels
- Eum — Unnamed Eocene marine rocks

Paleocene

- PEt — Tesla Formation *(Marine quartzose sandstone)*
- Pl — Locatelli Formation *(Marine sandstone and conglomerate)*
- Ppr — Pt. Reyes Formation *(Marine conglomerate and sandstone)*
- Pmz — Martinez Formation *(Marine sandstone)*

MESOZOIC

CRETACEOUS

- TKu — Tertiary-Cretaceous marine sedimentary rocks
- Kpp — Pigeon Point Formation *(Marine sandstone and conglomerate)*
- Kv — Cretaceous volcanic rock
- Kc — Chico Formation *(Marine sandstone, shale, and conglomerate)*
- Km — Moreno Formation *(Marine shale)*
- Ku — Upper Cretaceous marine sedimentary rocks
  - Kuss — Sandstone
  - Kush — Shale
- Kp / Kb — Kb Berryessa Formation *(Marine sandstone and shale)*; Kp Panoche Formation *(Marine sandstone and shale)*
- Kl — Lower Cretaceous marine sandstone and shale
- KJu — Upper Jurassic-Lower Cretaceous marine sandstone and shale
- KJf — Franciscan Complex*
  - gs — gs — greenstone
  - ss — ss — sandstone, shale, conglomerate
  - mg — mg — metagraywacke
  - ls — ls — limestone
  - ch — ch — chert
  - um — um — serpentinized ultramafic rock
  - ♦ — blueschist blocks
- Kgr — Cretaceous granitic rocks
- Kqd — Cretaceous quartz diorite
- Mzg — Granitic rocks
- Mzd — Dioritic rocks
- Mzgb — Gabbroic rocks
- um — Ultramafic rocks
- Coast Range Ophiolite
  - Mzv — Rhyolite of uncertain age
  - Jlc — Lotta Creek Tuff
  - Jv — Volcanic rocks, mainly basalt
  - Jgd — Gabbro and diabase
  - um — Ultramafic rocks

JURASSIC

- Jm — Mariposa Formation *(Slate, graywacke, and conglomerate; marine)*
- Jsm — Salt Springs and Merced Falls Slates
- Jch — Copper Hill Volcanics
- Jlr — Logtown Ridge Volcanics
- Jgo — Gopher Ridge Volcanics
- Jpb — Penon Blanco Volcanics
- Jmv — Jurassic metavolcanic rocks
- Jjp — Jasper Point Formation *(Chert, tuff, pillow basalt; marine)*
- Jms — Jurassic(?) metasedimentary rocks
- PzMz — Metamorphic rocks of uncertain age
- gb — Gabbro*

PALEOZOIC

- ms — Metasedimentary rocks*
- ls — Crystalline limestone and dolomite*
- Pzcc — Calaveras Complex *(Metasedimentary rocks)*
- Pzsf — Shoo Fly Complex *(Metasedimentary rocks)*
- mv — Metavolcanic rocks*

* Horizontal line pattern denotes melange terrane

MAP SYMBOLS

Contact
(Observed or dashed where approximately located; queried where gradational or inferred.)

Fault
(Solid where well located; dashed where approximately located or inferred; queried where continuation or existence is uncertain; except for the offshore area, faults are dotted where concealed by younger rocks or water. Arrows show relative or apparent direction of movement. U, upthrown side and D, downthrown side, relative or apparent.)

(Thrust fault-barbs on the upper plate. Generally dips less than 45°, but locally may have been subsequently steepened. Dashed where approximately located or inferred; dotted where concealed by younger rocks or water; queried where continuation or existence is uncertain.)

Blueschist blocks

Overturned fold
(Dashed where inferred; dotted where concealed by younger rocks.)

Strike and dip of beds
(General strike and dip of stratified rocks.)

Strike and dip of overturned beds

Strike and dip of foliation
(General strike and dip of foliation in metamorphic rocks.)

Anticlinal fold
(Dashed where inferred; dotted where concealed by younger rocks or water.)

Synclinal fold
(Dashed where inferred; dotted where concealed by younger rocks or water.)