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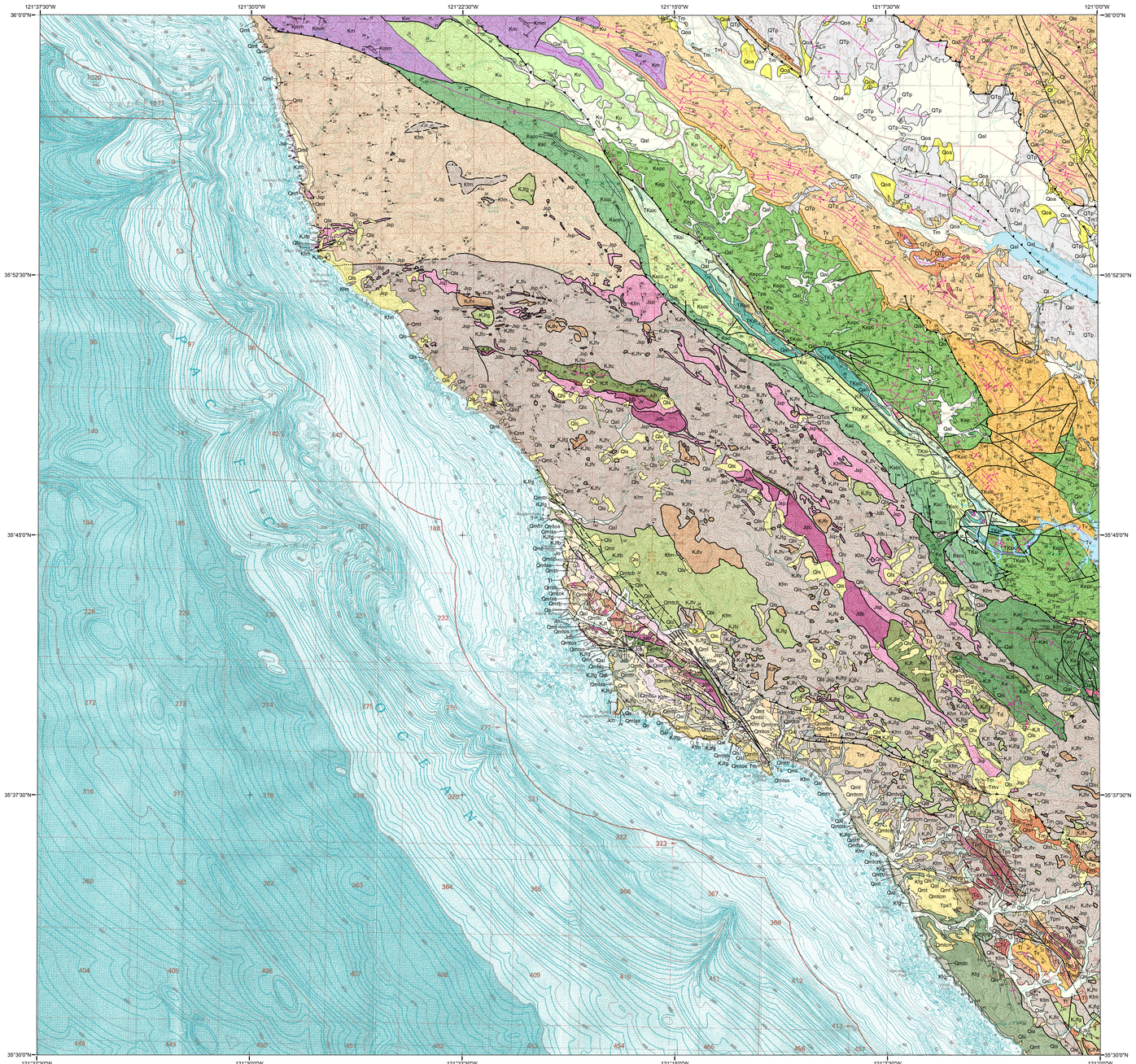
U.S. Department of the Interior
U.S. Geological Survey

Scientific Investigation Map 3287
Pamphlet accompanies map



Topographic base from U.S. Geological Survey, Cambria, 1980
Bathymetry added in 1987 from hydrographics surveys
by the National Ocean Service
Universal Transverse Mercator projection
Shaded-relief base from the USGS National Elevation Dataset
http://ned.usgs.gov

APPROXIMATE MEAN DECLINATION 2014

SCALE 1:100 000

1 0 1 2 3 4 5 6 7 8 MILES

1 0 1 2 3 4 5 6 7 8 9 10 KILOMETERS

CONTOUR INTERVAL 40 FEET
NORTH AMERICAN DATUM 1983

MAP LOCATION

Geology mapped by Seiders, Graymer
Geochronology by K. McDougall-Reid (foraminifera)
Geophysical data compiled by V.E. Langenheim
GIS database and digital cartography by M.A. Roberts
and R.W. Graymer
Edited by J.L. Zigler
Manuscript approved for publication January 24, 2014

EXPLANATION OF GEOPHYSICAL SYMBOLS

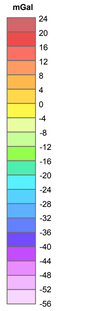
[See pamphlet for more information about data aquisition and processing]

Gravity Anomaly Contours

Contour interval, 2 mGal. Hachures indicate gravity low. Contours were computer generated based on a 300-m grid. Red circles are density boundaries automatically calculated from grid; larger circles indicate greater than average magnitude of gravity gradient. Smaller circles indicate less than average magnitude of gravity gradient.

Gravity Station Location/Source

- Defense Mapping Agency
- Offshore data from DNAG 6-km grid
- Previous data from CDMG
- PACES, January 2010

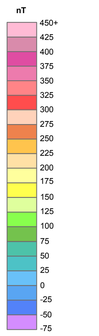


EXPLANATION OF GEOPHYSICAL SYMBOLS

[See pamphlet for more information about data aquisition and processing.]

Aeromagnetic Anomaly Contours

Contour interval, 20 nT. Hachures indicate magnetic low. Contours were computer generated based on a 200-m grid. Red circles are magnetization boundaries automatically calculated from grid; larger circles indicate greater than average magnitude of magnetic potential gradient. Smaller circles indicate less than average magnitude of magnetic potential gradient.

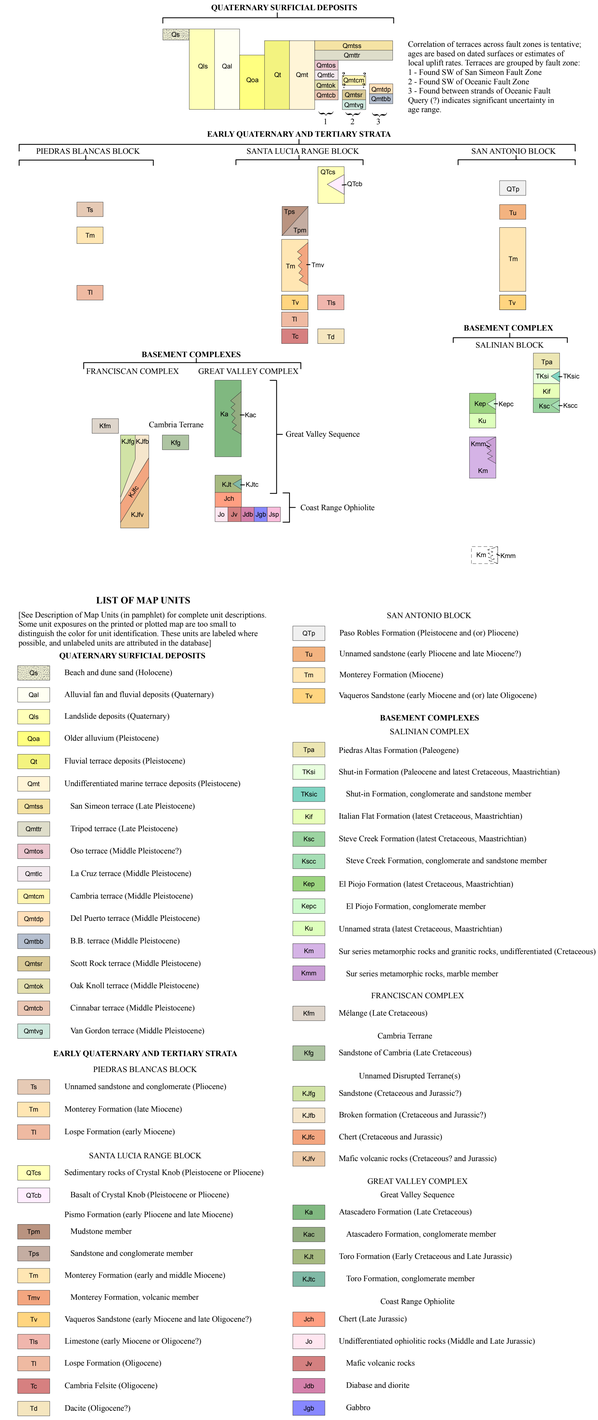


Fossil localities, with collection number

Estimated Age	Chevron	USGS
late Miocene	▲ 3000	—
middle to late Miocene	▲	—
middle Miocene	▲	■ 7000
Miocene	▲	■
early to middle Miocene	▲	—
early Miocene	▲	■
Oligocene to recent	▲	—
probably Eocene or older	—	■
Paleocene	—	■
Late Cretaceous	▲	■
Cretaceous	▲	■
Barren or indeterminate	—	■

CORRELATION OF MAP UNITS

[See Description of Map Units (in pamphlet) for precise unit ages. Dashed line indicates protolith]



Correlation of terraces across fault zones is tentative; ages are based on dated surfaces or estimates of local uplift rates. Terraces are grouped by fault zone:
1 - Found SW of San Simeon Fault Zone
2 - Found SW of Oceanic Fault Zone
3 - Found between strands of Oceanic Fault
Query (?) indicates significant uncertainty in age range.

LIST OF MAP UNITS

[See Description of Map Units (in pamphlet) for complete unit descriptions. Some unit exposures on the printed or plotted map are too small to distinguish the color for unit identification. These units are labeled where possible, and unlabeled units are attributed in the database]

QUATERNARY SURFICIAL DEPOSITS

- Qs — Beach and dune sand (Holocene)
- Qal — Alluvial fan and fluvial deposits (Quaternary)
- Qls — Landslide deposits (Quaternary)
- Qoa — Older alluvium (Pleistocene)
- Qt — Fluvial terrace deposits (Pleistocene)
- Qmt — Undifferentiated marine terrace deposits (Pleistocene)
- Qmtss — San Simeon terrace (Late Pleistocene)
- Qmttr — Tripod terrace (Late Pleistocene)
- Qmtos — Oso terrace (Middle Pleistocene?)
- Qmtlc — La Cruz terrace (Middle Pleistocene)
- Qmtcm — Cambria terrace (Middle Pleistocene)
- Qmtdp — Del Puerto terrace (Middle Pleistocene)
- Qmtbb — B.B. terrace (Middle Pleistocene)
- Qmtsr — Scott Rock terrace (Middle Pleistocene)
- Qmtok — Oak Knoll terrace (Middle Pleistocene)
- Qmtcb — Cinnabar terrace (Middle Pleistocene)
- Qmtvg — Van Gordon terrace (Middle Pleistocene)

EARLY QUATERNARY AND TERTIARY STRATA

PIEDRAS BLANCAS BLOCK

- Ts — Unnamed sandstone and conglomerate (Pliocene)
- Tm — Monterey Formation (late Miocene)
- Tl — Lospe Formation (early Miocene)

SANTA LUCIA RANGE BLOCK

- QTcs — Sedimentary rocks of Crystal Knob (Pleistocene or Pliocene)
- QTcb — Basalt of Crystal Knob (Pleistocene or Pliocene)

Pismo Formation (early Pliocene and late Miocene)

- Tpm — Mudstone member
- Tps — Sandstone and conglomerate member
- Tm — Monterey Formation (early and middle Miocene)
- Tmv — Monterey Formation, volcanic member
- Tv — Vaqueros Sandstone (early Miocene and late Oligocene?)
- Tls — Limestone (early Miocene or Oligocene?)
- Tl — Lospe Formation (Oligocene)
- Tc — Cambria Felsite (Oligocene)
- Td — Dacite (Oligocene?)

SAN ANTONIO BLOCK

- QTp — Paso Robles Formation (Pleistocene and (or) Pliocene)
- Tu — Unnamed sandstone (early Pliocene and late Miocene?)
- Tm — Monterey Formation (Miocene)
- Tv — Vaqueros Sandstone (early Miocene and (or) late Oligocene)

BASEMENT COMPLEXES

SALINIAN COMPLEX

- Tpa — Piedras Altas Formation (Paleogene)
- TKsi — Shut-in Formation (Paleocene and latest Cretaceous, Maastrichtian)
- TKsic — Shut-in Formation, conglomerate and sandstone member
- Klf — Italian Flat Formation (latest Cretaceous, Maastrichtian)
- Ksc — Steve Creek Formation (latest Cretaceous, Maastrichtian)
- Kscc — Steve Creek Formation, conglomerate and sandstone member
- Kep — El Piojo Formation (latest Cretaceous, Maastrichtian)
- Kepc — El Piojo Formation, conglomerate member
- Ku — Unnamed strata (latest Cretaceous, Maastrichtian)
- Km — Sur series metamorphic rocks and granitic rocks, undifferentiated (Cretaceous)
- Kmm — Sur series metamorphic rocks, marble member

FRANCISCAN COMPLEX

- Klm — Mélange (Late Cretaceous)

Cambria Terrane

- Klg — Sandstone of Cambria (Late Cretaceous)

Unnamed Disrupted Terrane(s)

- KJfg — Sandstone (Cretaceous and Jurassic?)
- KJfb — Broken formation (Cretaceous and Jurassic?)
- KJfc — Chert (Cretaceous and Jurassic)
- KJfv — Mafic volcanic rocks (Cretaceous? and Jurassic)

GREAT VALLEY COMPLEX

Great Valley Sequence

- Ka — Atascadero Formation (Late Cretaceous)
- Kac — Atascadero Formation, conglomerate member
- KJf — Toro Formation (Early Cretaceous and Late Jurassic)
- KJfc — Toro Formation, conglomerate member

Coast Range Ophiolite

- Jch — Chert (Late Jurassic)
- Jo — Undifferentiated ophiolitic rocks (Middle and Late Jurassic)
- Jv — Mafic volcanic rocks
- Jdb — Diabase and diorite
- Jgb — Gabbro
- Jsp — Serpentinite

EXPLANATION OF MAP SYMBOLS

Contact—Dashed where approximate; dotted where concealed

Faults—Dashed where approximate; dotted where concealed

Thrust or reverse fault—Sawteeth on upper plate

Folds—Dashed where approximate; dotted where concealed

Anticline

Syncline

Strike and Dip of Bedding

- 31 **Inclined**
- 25 **Approximate**
- 17 **Top known from local features**
- **Horizontal**
- **Vertical**
- 37 **Overturned, top known from local features**

Strike and Dip of Foliation

- 50 **Inclined**
- 20 **Approximate**
- 30 **Foliation and bedding**
- 12 **Foliation parallel to bedding**
- **Vertical**
- 20 **Crinkled**

Orientation of Joints

- 20 **Inclined**
- **Vertical**

INDEX TO GEOLOGIC MAPPING

1. Seiders and others (1983); Gilbert (1971); Page (1970); unpublished mapping by Seiders
2. Page (1970); Burch (1968); Loney and others (1971); unpublished mapping by Seiders
3. Durham (1965, 1974); Dibblee (1971); Burch (1968); Loney and others (1971)
4. Unpublished mapping by Seiders
5. Seiders (1989a); Hall (1976); Hall and others (1979); Burch (1968); Loney and others (1971); CDMG (1986a); Hanson and others (1994)
6. Seiders (1989a); Dibblee (1971); Burch (1968); Loney and others (1971)
7. Unpublished mapping by Seiders; Dibblee (1971); Page (1970)
8. Hall (1976); Hall and others (1979); CDMG (1986b,c); Hanson and others (1994)
9. Hall (1976); Hall and others (1979); unpublished mapping by Seiders; Page (1970)
10. Hall (1976); Hall and others (1979)
11. Weber (1983); Hanson and others (1994)

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Geologic and Geophysical Maps of the Eastern Three-Fourths of the Cambria 30′ x 60′ Quadrangle, Central California Coast Ranges

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2014