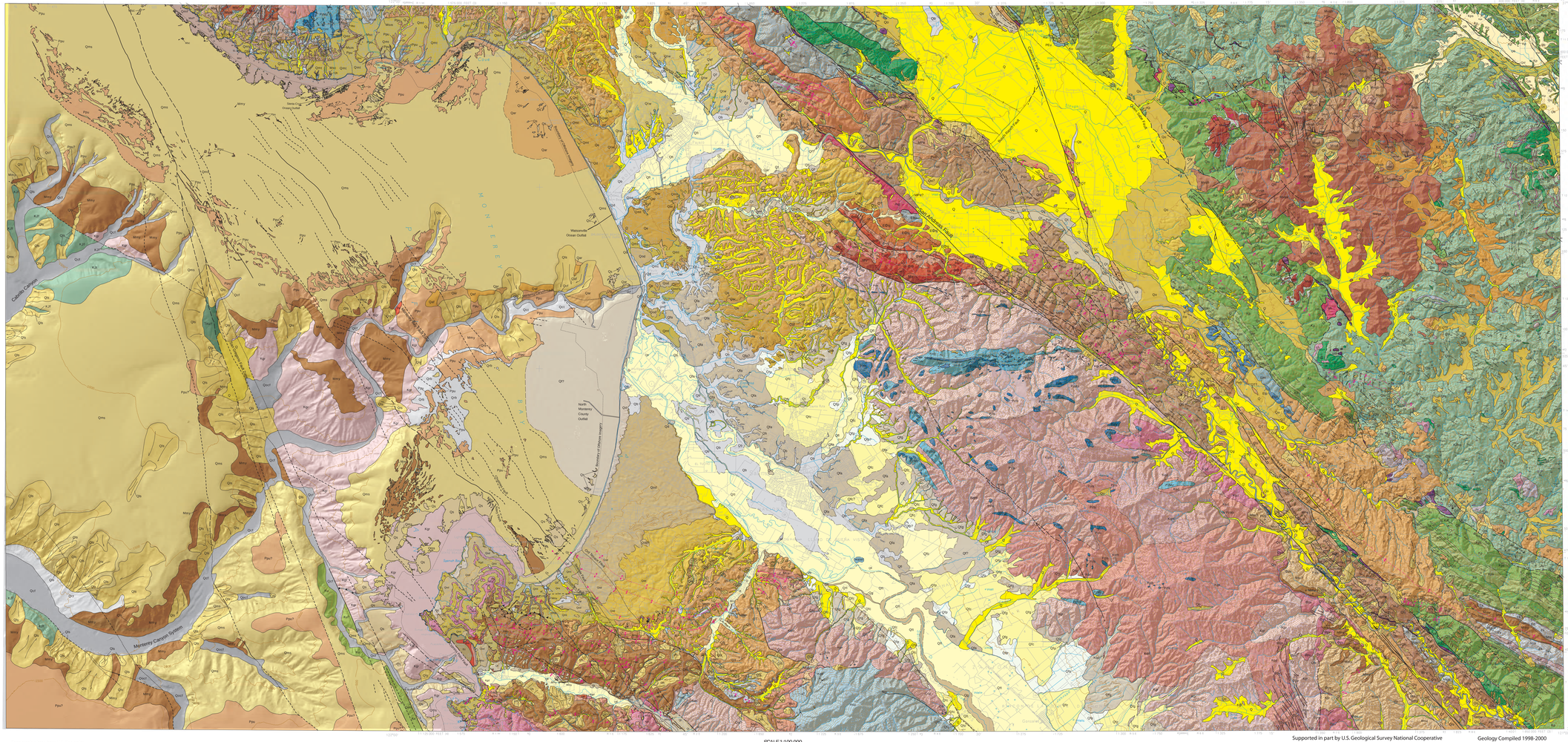

ABBREVIATED EXPLANATION

Approximate stratigraphic relationships only; see Map Explanation (Plate 2) for more detailed information

Holocene

- Q — Alluvium
- af — Artificial fill
- Qe — Eolian sand
- Qo — Older alluvium
- Qt — Terrace deposits
- Qmt — Marine terrace deposits
- Qf — Alluvial fan deposits
- Qfa — Fan deposits of Antioch
- Qfc — Fan deposits of Chular
- Qfp — Fan deposits of Placentia
- Qfg — Fan deposits of Gloria
- Qae — Aromas Sand (undivided)
- Qae — Eolian facies
- Qaf — Fluvial facies
- Qg — Stream gravel
- Qs — Sand
- Qd — Dune sand
- Qls — Landslide deposits
- Qod — Older Dune Sand
- Qtw — Terrace deposits of Watsonville terrace
- Qff — Flood plain deposits
- Qcf — Canyon Fill (offshore)
- Qms — Marine sediments
- Qocf — Older canyon fill (offshore)
- Qrb — Relict beach deposits (offshore)
- Qct — Submarine canyon terrace
- Qb — Basin deposits
- Qp — Patterson Alluvium
- Qsl — San Luis Alluvium
- Qlb — Los Banos Alluvium

Pleistocene

- Qtf — Pleistocene continental deposits
- Qtf — Plio-Pleistocene fluvial deposits
- Qtf — Plio-Pleistocene lacustrine deposits

Pliocene

- Puc — Unnamed Pliocene continental mudstone
- Pus — Unnamed Pliocene Continental sandstone
- Ppm — Purisima Formation
- Ppr — Rancho Rico Formation
- Pb — Pliocene Basaltic rocks (Coyote Volcanics)
- MPe — Etchegoin Formation
- Msc — Santa Cruz Mudstone
- Mzv — Unnamed Miocene volcanic rocks
- Mzu — Unnamed Miocene sedimentary rocks
- Mzs — Santa Margarita Sandstone (Mz-Basalt interbed)
- Mmy — Monterey Formation
- Mzo — Organic mudstone
- Mzb — Temblor
- Mzt — Lone Tree Formation
- Mlo — Lompico Sandstone
- Muc — Unnamed Miocene sandstone

QUIEN SABE VOLCANICS:
- Mvap — Andesitic flows and breccia
- Mvqb — Basaltic flows and breccia
- Mvqd — Dacite flows
- Mvqr — Rhyolite flows
- Mvpa — Intrusive andesite
- Mvpb — Intrusive basalt
- Mvpd — Intrusive dacite
- Mvpr — Intrusive rhyolitic rocks

Miocene

- Tva — Andesite
- Tvb — Basalt
- Tertiary volcanic rocks

Oligocene

- Qrb — Red beds
- Qvq — Vaqueros Sandstone
- Qbj — San Juan Bautista Formation
- Qpv — Pinnacles volcanic formation
- Qcl — Carmelite of Lawson

Paleocene-Eocene

- Eou — Unnamed Eocene sedimentary rocks
- Ec — Carmelo Formation
- Elm — Los Muertos Formation
- Etp — Tres Pinos Sandstone
- Eso — Arkosic sandstone
- PEu — Paleocene-Eocene sedimentary rock
- Ek — Kreyenhagen Formation
- Ed — Domengine Sandstone
- Etc — Cantua Sandstone

Cretaceous

- Ku — Upper Cretaceous sedimentary rock
- KJf — Franciscan Complex (part of KJf is melange (KJfm))
- cg — Conglomerate
- ss — Sandstone
- ch — Chert
- Kp — Panoche Formation
- Kps — Sandstone
- Kpc — Conglomerate
- Kgr — Granitic rocks
- Kqm — Quartz monzonite
- Kqd — Quartz diorite
- Kgd — Granodiorite
- Klu — Jurassic-Cretaceous sedimentary rocks

Jurassic

- gr — Greenstone
- Serpentinized ultramafic rock
- bs — Blueschist and semischist
- ls — Limestone
- Gabbro
- Hornblende Gabbro of Logan quarry
- Pelitic — Pedarhollitic metasedimentary rocks (Pzb - Carbonate rocks)

Coast Range Ophiolite:
- JKh — Breccia
- Volcanic rocks (greenstone)
- Gabbro
- Serpentinized ultramafic rock
- Hmz — Schist of Sierra de Salinas

SYMBOLS

Contact; solid where well located; dashed where approximately located or inferred; dotted where concealed; queried where uncertain.

Fault; solid where well located; dashed where approximately located or inferred; dotted where concealed; queried where existence or continuation is uncertain. Arrows show direction of dip when known.

Thrust fault; barbs on upper plate; solid where well located; dashed where approximately located or inferred; dashed where concealed; queried where existence or continuation uncertain. Arrow indicates direction of dip when known.

Anticlinal fold; solid where well located; dashed where inferred; dotted where concealed; queried where existence or continuation is uncertain.

Synclinal fold; solid where well located; dashed where inferred; dotted where concealed; queried where existence or continuation is uncertain.

80 — Strike and dip of stratified rocks. Number indicates dip angle in degrees when known.

Vertical beds

60 — Overturned beds

Horizontal beds

25 — Strike and dip of foliations

Arrows on landslides indicate direction of movement.

Topographic base from U.S. Geological Survey Monterey and Palo Alto 30'x60' quadrangles. Shaded topographic base from USGS digital elevation models. Shaded bathymetric base from Monterey Bay Aquarium Research Institute.

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SCALE 1:100,000

2 0 2 4 6 Miles

2 0 2 4 6 Kilometers

Contour Interval: 50 meters
Bathymetric Contour Interval: 500 meters

GEOLOGIC MAP OF THE MONTEREY 30'x60' QUADRANGLE AND ADJACENT AREAS, CALIFORNIA

Compiled by
David L. Wagner[1], H. Gary Greene[2], George J. Saucedo[1] and Cynthia L. Pridmore[1]
2002
Digitized by
Sarah E. Watkins[1], Jason D. Little[1] and Joseph J. Bizzarro[2]

1. Department of Conservation, California Geological Survey.
2. Moss Landing Marine Laboratories and Monterey Bay Aquarium Research Institute.

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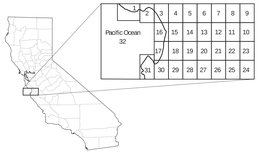
Geology Compiled 1998-2000



ABBREVIATED INDEX TO GEOLOGIC SOURCE DATA*

1. Santa Cruz Quadrangle
   Clark, J.C., 1981; Stanley, R.G., and McCaffery, Robert, 1983.
2. Soquel Quadrangle
   Brabb, E.E., 1989.
3. Watsonville West Quadrangle
   Brabb, E.E., 1989; Dupre, W.R., and Tinsley, J.C., III, 1980; Hall, N.T., Sarna-Wojcicki, A.M., and Dupre, W.R., 1974.
4. Watsonville East Quadrangle
   Brabb, E.E., 1989; Bryant, W.A., Smith, D.P., and Hart, E.W., 1981; Dupre, W.R., and Tinsley, J.C., III, 1980; Dibblee, T.W., Jr., 1970; Hall, N.T., Sarna-Wojcicki, A.M., and Dupre, W.R., 1974; Graymer, R.W., 1997.
5. Chittenden Quadrangle
   Allen, J.E., 1946; Armstrong, C.F., 1980; Bishop, C.C., 1971; Bryant, W.A., Smith, D.P., and Hart, E.W., 1981; Dibblee, T.W., Jr., and Brabb, E.E., 1980; Graymer, R.W., 1997; Wagner, D.L., 2000.
6. San Felipe Quadrangle
   Armstrong, C.F. and Wagner, D.L., 1978; Bryant, W.A., Smith, D.P., and Hart, E.W., 1981; Dibblee, T.W., Jr. and Rogers, T.H., 1975; Graymer, R.W., 1997; Rogers, T.H., 1993; Rosenberg, L.I., 1998.
7. Three Sisters Quadrangle
   Bryant, W.A., 1985; Osuch, L.H., 1970; Wagner, D.L., 1989.
8. Mariposa Peak Quadrangle
   Dinkelmeier, J.L., Song, D.H., and Russell, P.C., 1992.
9. Los Banos Valley Quadrangle
   Dibblee, T.W., Jr., 1975; Lettis, W. R., 1982.
10. Ruby Canyon Quadrangle
    Dibblee, T.W., Jr., 1975.
11. Quien Sabe Valley Quadrangle
    Anderson, P.C., 1983; Dibblee, T.W., Jr., 1975; Prowell, D.C., 1974.
12. Tres Pinos Quadrangle
    Bryant, W.A., 1985; Dibblee, T.W., Jr., 1979.
13. Hollister Quadrangle
    Dibblee, T.W., Jr. and Rogers, T.H., 1975; Rogers, T.H., 1993; Rosenberg, L.I., 1998.
14. San Juan Bautista Quadrangle
    Allen, J.E., 1946; Bishop, C.C., 1971; Dibblee, T.W., Jr., 1979; Dupre, W.R., and Tinsley, J.C., III, 1980.
15. Prunedale Quadrangle
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16. Moss Landing Quadrangle
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17. Marina Quadrangle
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20. Mount Harlan
    Dibblee, T.W., Jr., and Ross, D.C., 1973; Ross, D.C., 1972.
21. Paicines Quadrangle
    Dibblee, T.W., Jr., 1979.
22. Cherry Peak Quadrangle
    Dibblee, T.W., Jr., 1979; Wilson, I.F., 1943.
23. Panoche Pass Quadrangle
    Dibblee, T.W., Jr., 1979; Wilson, I.F., 1943.
24. San Benito Quadrangle
    Dibblee, T.W., Jr., 1979; Enos, Paul, 1965; Wilson, I.F., 1943.
25. Bickmore Canyon Quadrangle
    Dibblee, T.W., Jr., 1979; Wilson, I.F., 1943.
26. Mount Johnson
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27. Gonzales Quadrangle
    Dibblee, T.W., Jr., and Ross, D.C., 1973; Tinsley, J.C., III, 1975.
28. Chualar Quadrangle
    Bowen, O.E., 1973; Dibblee, T.W., Jr., 1999; Tinsley, J.C., III, 1975.
29. Spreckels Quadrangle
    Clark, J.C., Brabb, E.E., Dupre, W.R., and Rosenberg, L.I., 1999.
30. Seaside Quadrangle
    Clark, J.C., Dupre, W.R., and Rosenberg, L.I., 1997.
31. Monterey Quadrangle
    Clark, J.C., Dupre, W.R., and Rosenberg, L.I., 1997.
32. Offshore area
    Continental slope and Monterey submarine canyon system:
    Greene, H.G., 1977; Greene, H.G., 1999; McCulloch, D.S., and Greene, H.G., 1990.

    Continental Shelf (less than 150 meter water depth):
    Eittreim, S.L., Anima, R.J., and Stevenson, A.J., in press; Eittreim, S.L., Anima, R.J., Stevenson, A.J., and Wong, F.L., 2001.

*see enclosed text for complete references.

1. Department of Conservation, California Geological Survey.
2. Moss Landing Marine Laboratories and Monterey Bay Aquarium Research Institute.