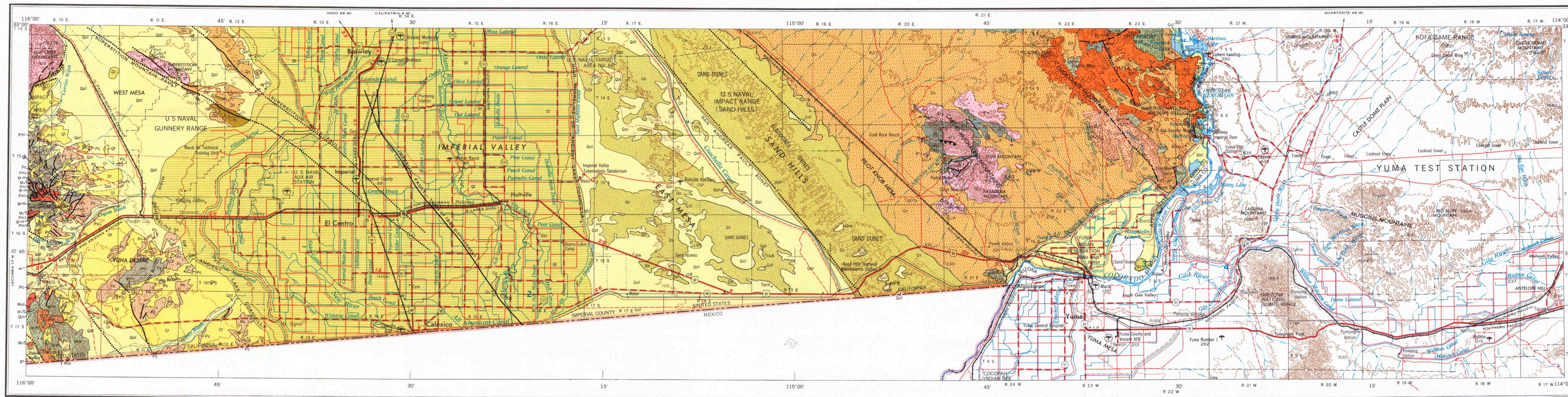




- | QUATERNARY |  | Recent volcanic: Qv <sup>r</sup> - rhyolite;<br>Qv <sup>a</sup> - andesite; Qv <sup>b</sup> - basalt;<br>Qv <sup>c</sup> - pyroclastic rocks |
|------------|--|--|
| Qd         | Dune sand                                      |  |
| Qa         | Alluvium                                       |  |
| Qsc        | Stream channel deposits                        |  |
| Qf         | Fan deposits                                   |  |
| Qb         | Basin deposits                                 |  |
| Qs         | Salt deposits                                  |  |
| Ql         | Quaternary lake deposits                       |  |
| Qg         | Glacial deposits                               |  |
| Qtm        | Quaternary nonmarine terrace deposits          |  |
| Pm         | Pleistocene marine and marine terrace deposits |  |
| Pn         | Pleistocene nonmarine                          |  |
| Pp         | Plio-Pleistocene nonmarine                     |  |
| Pc         | Undivided Pliocene nonmarine                   |  |
| Pu         | Upper Pliocene marine                          |  |
| Pm         | Middle and/or lower Pliocene nonmarine         |  |
| Pml        | Middle and/or lower Pliocene marine            |  |
| Uu         | Undivided Miocene nonmarine                    |  |
| Um         | Upper Miocene nonmarine                        |  |
| Mm         | Middle Miocene nonmarine                       |  |
| Om         | Middle Miocene marine                          |  |
| Lm         | Lower Miocene marine                           |  |
| Oo         | Oligocene nonmarine                            |  |
| Om         | Oligocene marine                               |  |
| Eo         | Eocene nonmarine                               |  |
| Em         | Eocene marine                                  |  |
| Po         | Paleocene nonmarine                            |  |
| Pm         | Paleocene marine                               |  |
| Cn         | Cenozoic nonmarine                             |  |
| Cm         | Tertiary nonmarine                             |  |
| Cl         | Tertiary lake deposits                         |  |
| Cs         | Tertiary marine                                |  |
- 
- | MESOZOIC |  | Cenozoic volcanic: Cv <sup>r</sup> - rhyolite;<br>Cv <sup>a</sup> - andesite; Cv <sup>b</sup> - basalt;<br>Cv <sup>c</sup> - pyroclastic rocks |
|----------|--|--|
| Cm       | Undivided Cretaceous marine  |  |
| Cu       | Upper Cretaceous marine  |  |
| Cl       | Lower Cretaceous marine  |  |
| Kf       | Knoxville Formation  |  |
| Ju       | Upper Jurassic marine  |  |
| Jl       | Middle and/or Lower Jurassic marine  |  |
| Tr       | Triassic marine  |  |
| Ms       | Pre-Cretaceous metamorphic rocks (s = limestone or dolomite)   |  |
| Ms       | Pre-Cretaceous metasedimentary rocks   |  |
| Pm       | Paleozoic marine (s = limestone or dolomite)   |  |
| Fv       | Franciscan volcanic and metvolcanic rocks  |  |
| Ms       | Mesozoic granitic rocks: v <sup>r</sup> - granite and andesite; v <sup>a</sup> - granodiorite; v <sup>b</sup> - tonalite and diorite |  |
| Ms       | Mesozoic basic intrusive rocks   |  |
| Ms       | Mesozoic ultrabasic intrusive rocks  |  |
| Ms       | Jura-Trias metvolcanic rocks   |  |
| Ms       | Pre-Cretaceous metvolcanic rocks   |  |
| Ms       | Pre-Cenozoic granitic and metamorphic rocks  |  |
| Ms       | Paleozoic metvolcanic rocks  |  |
| Ms       | Paleozoic metamorphic rocks  |  |
| Pm       | Permian marine   |  |
| Pm       | Permian metvolcanic rocks  |  |
| Cm       | Undivided Carboniferous marine   |  |
| Cm       | Carboniferous metvolcanic rocks  |  |
| Pp       | Pennsylvanian marine   |  |
| Mm       | Mississippian marine   |  |
| Dm       | Devonian marine  |  |
| Dm       | Devonian metvolcanic rocks   |  |
| Su       | Silurian marine  |  |
| Su       | Devonian and pre-Devonian? metvolcanic rocks   |  |
| Ps       | Pre-Silurian meta-sedimentary rocks  |  |
| Ps       | Pre-Silurian metamorphic rocks   |  |
| Ps       | Pre-Silurian metvolcanic rocks   |  |
| Or       | Ordovician marine  |  |
| Or       | Pre-Silurian igneous and metamorphic rock complex  |  |
| Uu       | Undivided Precambrian metamorphic rocks (sg = gneiss, scl = schist)  |  |
| Uu       | Undivided Precambrian granitic rocks   |  |
| Ls       | Later Precambrian sedimentary and metamorphic rocks  |  |
| Ls       | Precambrian anorthosite  |  |
| Eu       | Earlier Precambrian metamorphic rocks  |  |



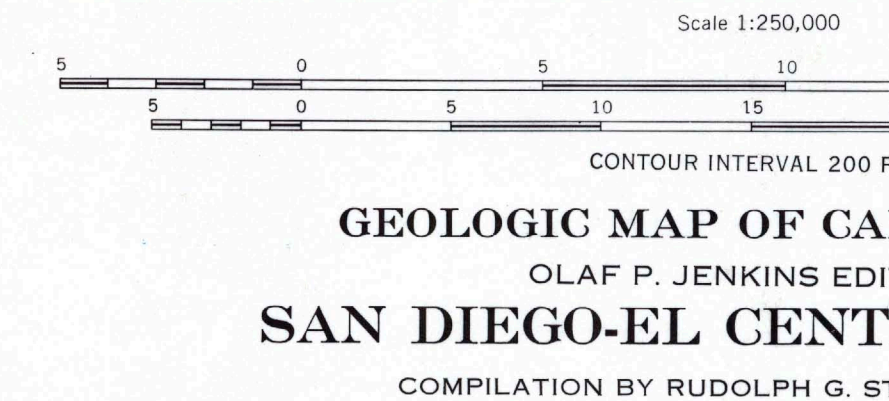
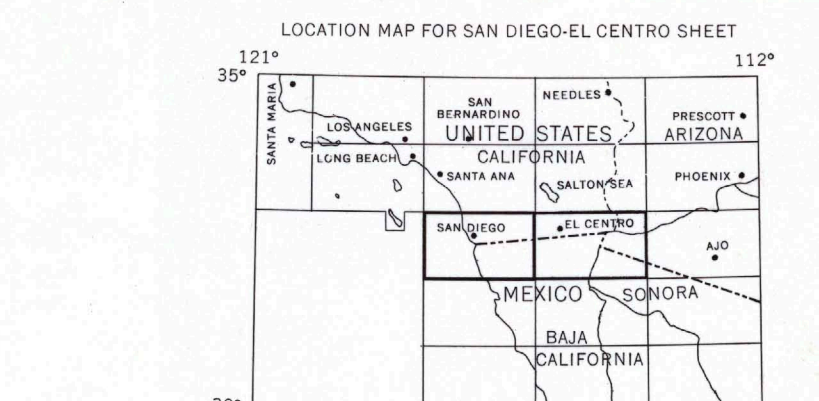
- | MESOZOIC |  | Cenozoic volcanic: Cv <sup>r</sup> - rhyolite;<br>Cv <sup>a</sup> - andesite; Cv <sup>b</sup> - basalt;<br>Cv <sup>c</sup> - pyroclastic rocks |
|----------|--|--|
| Cm       | Undivided Cretaceous marine  |  |
| Cu       | Upper Cretaceous marine  |  |
| Cl       | Lower Cretaceous marine  |  |
| Kf       | Knoxville Formation  |  |
| Ju       | Upper Jurassic marine  |  |
| Jl       | Middle and/or Lower Jurassic marine  |  |
| Tr       | Triassic marine  |  |
| Ms       | Pre-Cretaceous metamorphic rocks (s = limestone or dolomite)   |  |
| Ms       | Pre-Cretaceous metasedimentary rocks   |  |
| Pm       | Paleozoic marine (s = limestone or dolomite)   |  |
| Fv       | Franciscan volcanic and metvolcanic rocks  |  |
| Ms       | Mesozoic granitic rocks: v <sup>r</sup> - granite and andesite; v <sup>a</sup> - granodiorite; v <sup>b</sup> - tonalite and diorite |  |
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| Ms       | Mesozoic ultrabasic intrusive rocks  |  |
| Ms       | Jura-Trias metvolcanic rocks   |  |
| Ms       | Pre-Cretaceous metvolcanic rocks   |  |
| Ms       | Pre-Cenozoic granitic and metamorphic rocks  |  |
| Ms       | Paleozoic metvolcanic rocks  |  |
| Ms       | Paleozoic metamorphic rocks  |  |
| Pm       | Permian marine   |  |
| Pm       | Permian metvolcanic rocks  |  |
| Cm       | Undivided Carboniferous marine   |  |
| Cm       | Carboniferous metvolcanic rocks  |  |
| Pp       | Pennsylvanian marine   |  |
| Mm       | Mississippian marine   |  |
| Dm       | Devonian marine  |  |
| Dm       | Devonian metvolcanic rocks   |  |
| Su       | Silurian marine  |  |
| Su       | Devonian and pre-Devonian? metvolcanic rocks   |  |
| Ps       | Pre-Silurian meta-sedimentary rocks  |  |
| Ps       | Pre-Silurian metamorphic rocks   |  |
| Ps       | Pre-Silurian metvolcanic rocks   |  |
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| Or       | Pre-Silurian igneous and metamorphic rock complex  |  |
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| Uu       | Undivided Precambrian granitic rocks   |  |
| Ls       | Later Precambrian sedimentary and metamorphic rocks  |  |
| Ls       | Precambrian anorthosite  |  |
| Eu       | Earlier Precambrian metamorphic rocks  |  |

Prepared within the collaborative program of the Departamento Cartografico Militar de Mexico, Inter American Geodetic Survey and Army Map Service of the United States. Aerial photography 1954-56. Horizontal and vertical control by COM IAGCS USCGS USGS GC USRA US & Mexico Boundary Commission. City of Los Angeles and Los Angeles County. Photography field anno. 1958. Compiled in 1958 by Army Map Service (KCSX & KCAN), Corps of Engineers, U.S. Army, Washington, D.C., by photogrammetric methods and AMS and U.S. Geological Survey, 1:250,000, 1:250,000, 1:50,000, 1:50,000 5107, 1955; USHO Chart 5180, 1955. Planimetric detail in the United States portion partially revised by photo-planimetric methods.

Land not prepared by U.S. Geological Survey, 1957.

Submarine contours adapted from Shepard and Emery Special Paper No. 31 Geol. Soc. America

Corrections and additions to culture by California Division of Mines and Geology, 1962.

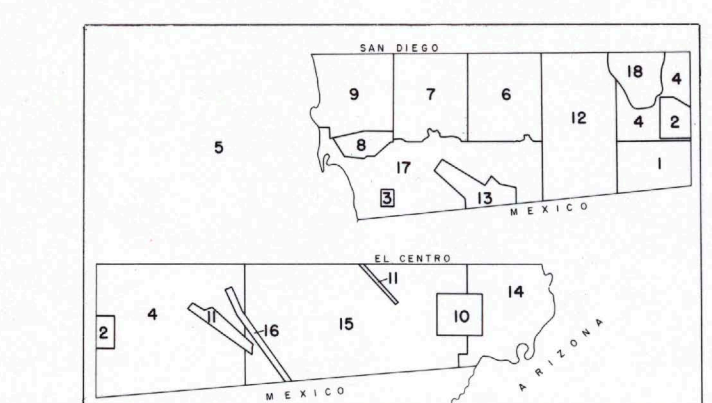


### GEOLOGIC MAP OF CALIFORNIA OLAF P. JENKINS EDITION SAN DIEGO-EL CENTRO SHEET COMPILATION BY RUDOLPH G. STRAND, 1962 FOURTH PRINTING 1993

Contact  
(Dashed where approximately located, gradational or inferred)

Fault  
(Dashed where approximately located; dotted where concealed)

Thrust fault  
(Barbs on upper plate; dashed where approximately located, dotted where concealed)



Williams & Morrow Map Corporation, Capitol Heights, Md. 20743

INDEX TO GEOLOGIC MAPPING  
(COMPLETE INDEX ON EXPLANATORY DATA SHEET)

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HEAVY BORDER ON BOXES INDICATES UNITS THAT APPEAR ON THIS SHEET