UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

PRELIMINARY GEOLOGIC MAPS SHOWING QUATERNARY DEPOSITS OF THE CERES, DENAIR AND MONTPELIER 7 1/2 QUADRANGLES, STANISLAUS AND MERCED COUNTIES, CALIFORNIA

by

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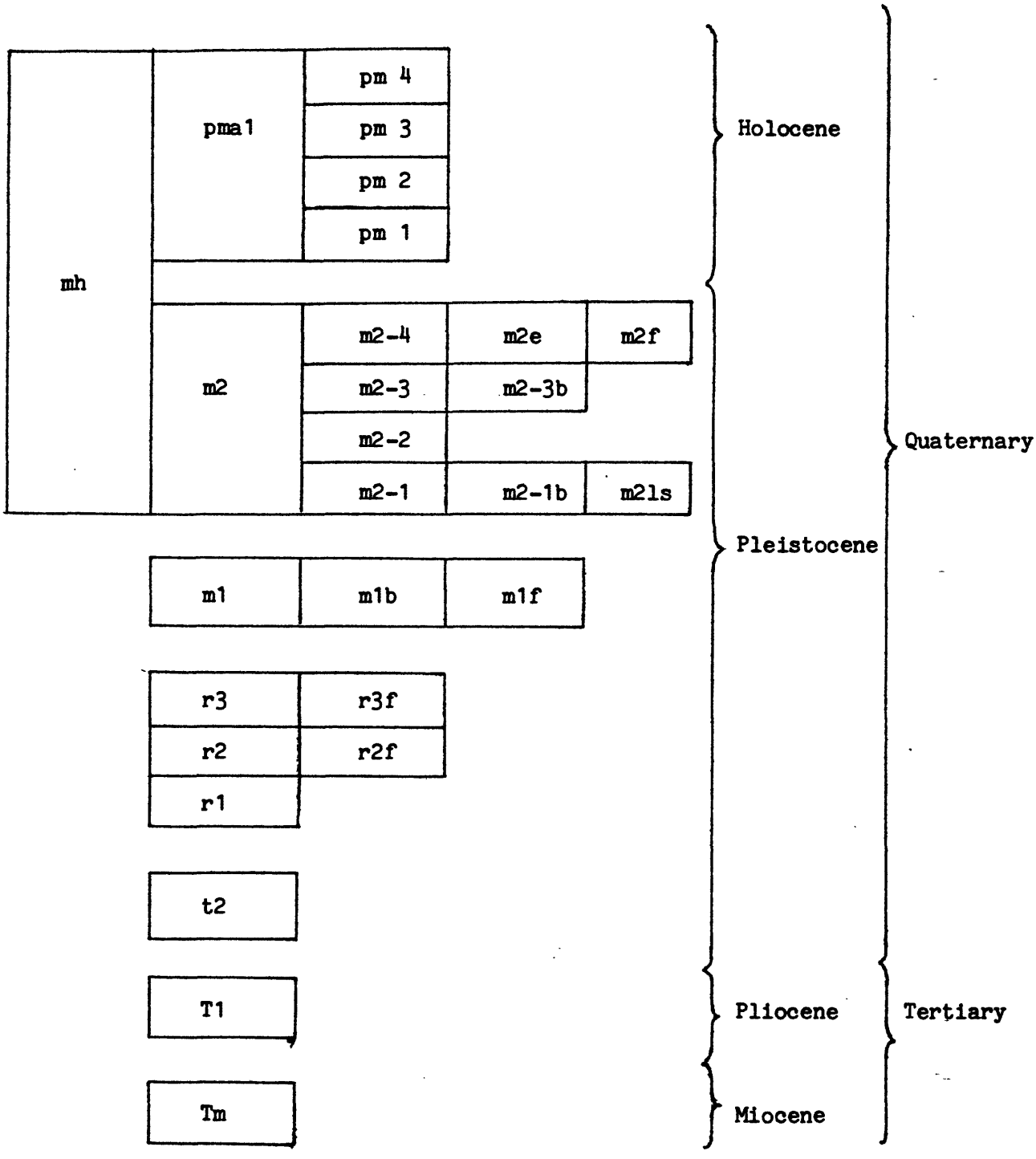
INTRODUCTION

This map is one of a series of preliminary geologic maps depicting the late Cenozoic deposits of the San Joaquin Valley. Quaternary map units are differentiated on the basis of surface morphology, geomorphic relations, comparative soil development, superposition, and lithology, as discussed by Marchand and Allwardt (1977). Please also refer to this latter reference for more detailed description of the ages and characteristics of the stratigraphic units on this map.

Faults are inferred where prominent lineaments coincide with abrupt breaks in the reconstructed depositional surface of the Turlock Lake Formation or with linear geologic contacts. Fold axes are inferred from apparent deformation of the reconstructed Turlock Lake depositional surface and of the reconstructed post-Tertiary, pre-Pleistocene erosional surface.

CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS[1/]

mh — Undifferentiated late Modesto and post-Modesto alluvium, locally derived

POST-MODESTO DEPOSITS

pmal — Undifferentiated post-Modesto alluvium; arkosic and locally derived deposits

pm4 — Modern alluvial deposits of the Tuolumne River, mainly arkosic sand and gravel (Riverwash soils)

pm3 — Historic (last 1500 years B. P.) arkosic alluvial sand, gravel, and silt along the Tuolumne River associated with natural levees, meanders, and meander scars less than 2 m above base flow levels (Grangeville, Tujunga soils)

pm2 — Late Holocene arkosic alluvial sand, silt, and gravel along the Tuolumne River about 0.5-1.5 m above pm3 levels (Grangeville, Hanford, Tujunga soils)

pm1 — Early Holocene(?) alluvium along the Tuolumne River about 1-2 m above pm2 levels and below m2-4 levels (Hanford, Grangeville, Tujunga soils)

MODESTO FORMATION

Upper Member includes:

m2 — Arkosic alluvial sand, gravel, and silt of terraces and fan distributaries, not differentiated as to phase (Hanford, Oakdale, Tujunga soils)

m2e Arkosic eolian sand forming low dunes on all Tuolumne River late Modesto terrace and fan surfaces (Delhi, Tujunga soils)

m2f Locally (foothill) derived alluvial silt, sand, and gravel; contains abundant volcanic detritus in places; terraces grade to m2-4 level on Tuolumne River (Bear Creek, Honcut, Hanford, Greenfield soils)

m2-4 Arkosic alluvial sand, and subordinate silt and gravel associated with phase 4 (lowest) terraces along the Tuolumne River (Hanford, Oakdale, Tujunga soils)

m2-3 Arkosic alluvial sand, and subordinate silt and gravel associated with phase 3 terraces along the Tuolumne River, about 3-4 m above m2-4 levels (Hanford, Oakdale, Tujunga soils)

m2-3b Arkosic alluvial fine sand and silt of phase three fan interdistributary areas and floodbasins; commonly stratified (Dinuba soils)

m2-2 Arkosic alluvial sand and subordinate silt and gravel associated with phase 2 terraces and upper fans along the Tuolumne River, about 3-4 m above m2-3 levels (Hanford, Oakdale, Tujunga soils)

m2-1 Arkosic alluvial sand and subordinate silt and gravel associated with the phase 1 (highest) late Modesto terraces and fan along the Tuolumne River, about 3-4 m above m2-2 levels (Hanford, Greenfield, Oakdale soils)

m2-1b Arkosic fine sand and silt of phase 1 (highest) fan interdistributary areas and floodbasins; commonly stratified (Dinuba soils)

m2ls Local swamp and lacustrine silt and clay usually associated with depressions along the margins of the Tuolumne River m2-1 alluvial fill where small drainages were blocked by rapid mainstream aggradation (Meikle soils)

Lower Member includes;

m1 Arkosic alluvial sand, silt, and gravel of terraces and fan distributaries (Greenfield soils)

m1b Arkosic alluvial fine sand and silt of fan interdistributaries and floodbasins; commonly stratified (Dinuba soils)

m1f Locally (foothill) derived alluvial gravel, sand, and silt; contains some volcanic detritus from the Mehrten Formation (Greenfield soils)

RIVERBANK FORMATION

Upper unit includes:

r3 Arkosic sandy alluvium forming Tuolumne River terraces and alluvial fan, slightly higher than Modesto terraces (Madera, Snelling soils)

r3f Foothill-derived alluvium containing volcanic detritus from the Mehrten Formation (Madera, Snelling, San Joaquin soils)

Middle unit includes:

r2 Arkosic sandy alluvium forming terraces and fan, 5-10 m above r3 levels (Snelling, San Joaquin soils)

r2f Foothill-derived alluvium containing volcanic detritus from the Mehrten Formation (Snelling, San Joaquin soils)

Lower unit includes:

r1 Arkosic sandy alluvium occurring as isolated remnants of fans 5-15 m above r2 levels (San Joaquin soils)

TURLOCK LAKE FORMATION

Upper unit includes:

t2 — Arkosic alluvium forming extensive hilly topography in the Montpelier quadrangle; grain size increases upward in the unit from bedded silt at the base to coarse pebbly sand at the top (Montpelier, Whitney, Rocklin soils) Lower unit not present in this area but crops out in the quadrangles to the east.

LAGUNA FORMATION

Tl — Siltstone and fine-grained sandstone of mixed volcanic, metamorphic, and plutonic derivation; poorly exposed (Hopeton soils)

MEHRTEN FORMATION

Tm — Andesitic mudstone and siltstone; elsewhere (to the east) contains lahars, cross bedded sandstone, and conglomerate (Peters, Raynor, Pentz)

1/ The most typical soil series in this area as mapped by Arkley (1962b, 1964) are given in parentheses for all units

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p — Photolineament; dashed where less evident

x — Topographic lineament; dashed where not strongly defined

Fault; dashed where approximately located, queried where uncertain


Anticlinal axis, showing plunge; dashed where approximately located, queried where uncertain

Strike and dip of bedding

REFERENCES

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