DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

Prepared on behalf of the
OFFICE OF NUCLEAR REGULATORY RESEARCH,
UNITED STATES NUCLEAR REGULATORY COMMISSION

MISCELLANEOUS FIELD STUDIES
MAP MF-1070
SHEET 2 OF 3

EXPLANATION

INTRODUCTION

This map portrays what is known about the time of latest movement along each mapped fault. Faults are shown by line symbols for location. Symbols superposed on the fault traces indicate known late Cenozoic stratigraphic or geomorphic evidence that brackets the age of the most recent movement for each fault. A fault is placed in one of seven age classes, shown by letter symbol or date, that most closely restricts the age of its latest movement.

MAP SYMBOLS

LINE SYMBOLS

Onshore fault

Queried where connection, continuation, or existence is uncertain; dotted where inferred beneath covering deposits or water. Star indicates fault with relatively young movement along it but fault trace too short to show at map scale. Short dashes indicate photo lineaments inferred to be faults

Offshore fault

Inferred from subbottom acoustic-reflection profiles. Location approximate

GEOLOGIC CONTROL SYMBOLS

Indicate location and age of late Cenozoic geologic features that place one or more limits on the age of latest movement for each fault. Numbers within the symbols indicate the age of each geologic control as based on the generalized time spans of the age-range chart; the youngest reasonable age is assumed for deposits whose age is uncertain

- ○ Oldest known unfaulted stratigraphic unit that is deposited across the fault. Age of unit provides minimum limit on age of latest movement
- □ Youngest known stratigraphic unit displaced by fault. Age of unit provides maximum limit on age of latest movement
- △ Fault-produced geomorphic feature. Age of feature provides maximum limit on age of latest movement

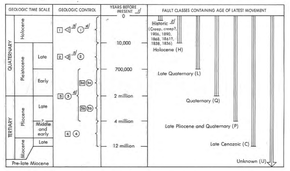
AGE CLASS SYMBOLS

Each fault is placed in an age class according to the time span containing evidence of its latest known movement and, except for historic faulting, is so designated by a letter symbol. A fault is assigned to one of seven age classes chiefly from the youngest known late Cenozoic stratigraphic or geomorphic evidence of faulting preserved along it. Faults lacking evidence of late Cenozoic movement either are designated "unknown" or are assigned to another class on the basis of geometric and spatial relations to a fault whose history is better understood. The entire length of a fault is assigned to a single age class unless contrary evidence is available.

Class	Symbol
Historic	CREEP, CREEP?, 1906, 1890, 1868, 1861?, 1838, 1836
Holocene	H
Late Quaternary	L
Quaternary	Q
Late Pliocene and Quaternary	P
Late Cenozoic	C
Unknown	U, Un

Each age class encloses progressively longer spans of time within which movement may have occurred (see chart). The time span containing the latest movement may be restricted further by unfaulted overlying deposits indicated on the map by minimum geologic symbols. Faults classed as unknown (U) could have moved as recently as those of any other age class, except for those faults of unknown age with minimum age control (Un).

AGE RANGE CHART OF GEOLOGIC CONTROLS AND AGE CLASSES



1/ Years are approximate and are based in part on radiometric dates from strata in southern California. Column is not to scale.

2/ 1861 event queried as exact location of ground rupture is uncertain. Approximate lengths of 1836 and 1838 ground rupture indicated by brackets.

3/ Geomorphic criteria for Holocene faulting: sag depression; offset stream course in Holocene deposits; linear scarp in Holocene deposits; or linear submarine scarp in seafloor sediments above wave base.

4/ Control from overlapping Holocene strata not shown on map except where such deposits are known to be at least 3,000 years old.

5/ Geomorphic criteria for late Quaternary faulting: offset stream course in Pleistocene or older deposits; linear scarp in Pleistocene deposits; markedly linear steep mountain front associated with adjacent concealed fault trace; or linear submarine scarp in seafloor sediments below wave base.

6/ Numeral 3 designates nonmarine strata of late Pliocene to early Pleistocene age. Numerals 3a and 3b designate marine strata of early Pleistocene and of late Pliocene age, respectively.

GEOLOGIC UNITS

(onshore areas only)

Chiefly bedrock at or near ground surface

Chiefly alluvial or terrace deposits generally more than 15 m thick

EXAMPLES OF AGE CLASSIFICATION AND LIMITING GEOLOGIC CONTROL

Fault is classed as late Pliocene and Quaternary (P), indicating that its most recent movement occurred within the past 4 million years. Faulted marine strata of late Pliocene age (about 2 million to 4 million years) are present (square with numeral 3b) but minimum age control is lacking

Fault is classed as Quaternary (Q). Faulted marine deposits of early Pleistocene age (about 2 million to 700,000 years) are present (square with numeral 3a) to provide a maximum limit on the most recent movement. Unfaulted deposits with an age between about 700,000 and 10,000 years (circle with numeral 2) constitute a minimum limit on latest movement

Fault is classed as unknown (U) because no faulted late Cenozoic deposits are preserved along it. A minimum limit on age of movement is lacking

Fault is classed as unknown with minimum limit on age of latest movement (Um). No faulted late Cenozoic deposits are preserved along it, but the latest movement predates unfaulted early Pleistocene marine strata between about 2 million and 700,200 years old (circle with numeral 3a)

Fault is classed as late Quaternary (L). Maximum age control is provided both by fault-produced geomorphic feature (triangle with numeral 2) and by faulted rocks (square with numeral 2) with an age between about 700,000 and 10,000 years. Minimum geologic control on the age of the most recent faulting is lacking

Segments of fault are assigned to different age classes. Segment classed as Holocene (H) is known to displace deposits younger than 10,000 years (square with numeral 1). Other segment displaces rocks between about 12 million and 4 million years old (square with numeral 4) but is limited by unfaulted deposits from about 700,000 to 10,000 years old (circle with numeral 2), and thus is classed as late Cenozoic (C)

RELIABILITY DIAGRAM - SHEET 2

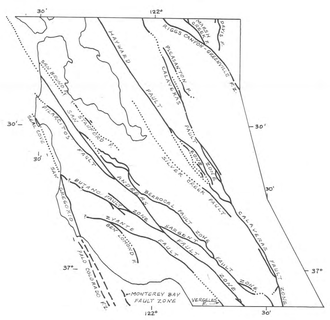
The degree of assurance that faults shown on map do exist, that important existing faults are not omitted, and that available geologic control on age of latest movement is properly depicted for each fault is indicated by numbers within area

Most reliable 1 - Few additions or modifications likely

2 - Some additions or modifications likely

3 - Many additions of modifications likely

Least reliable 4 - Additions or modifications necessary throughout area



INDEX MAP OF MAJOR FAULTS - SHEET 2

DECLINATION AT CENTER OF MAP

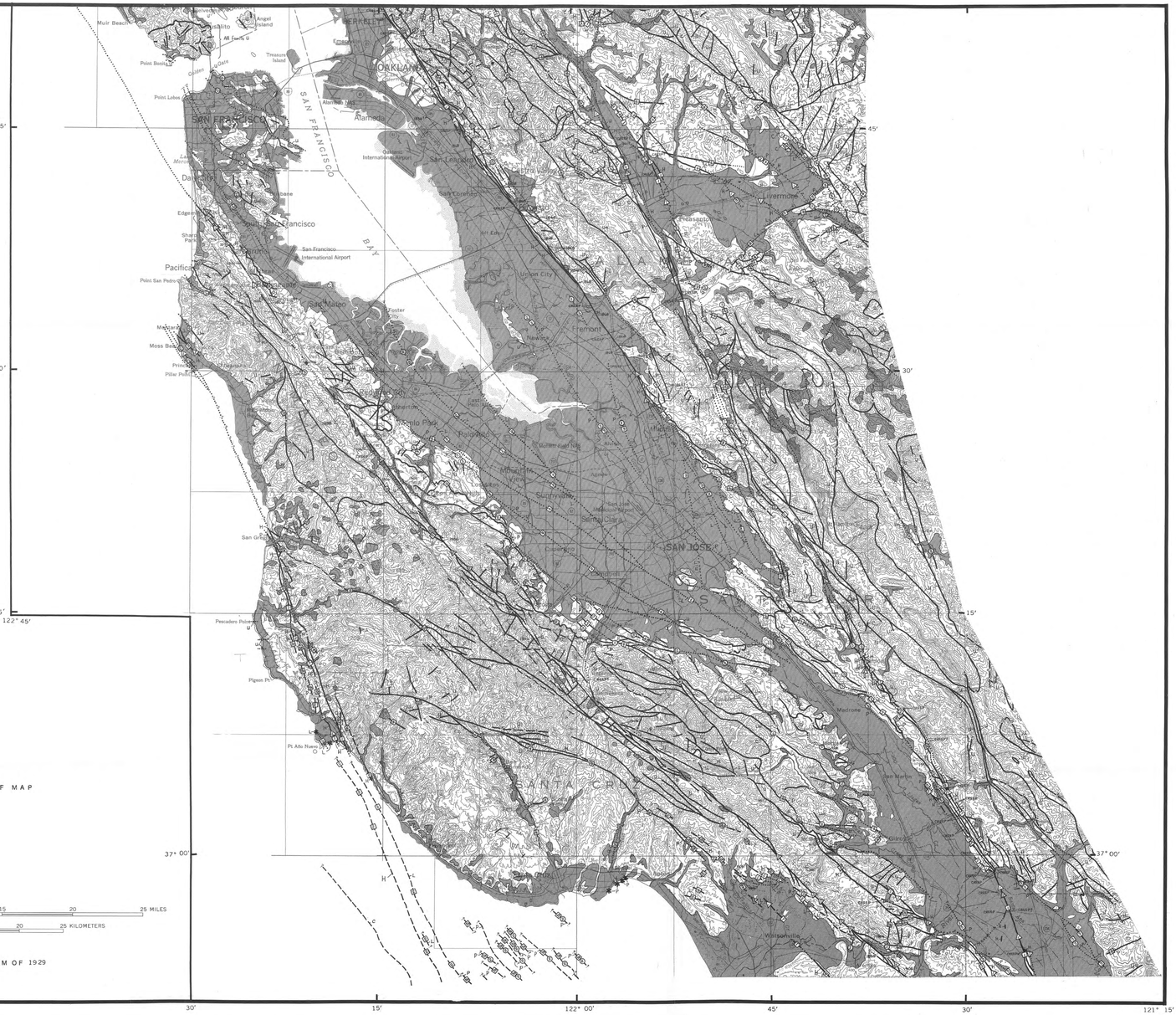
SCALE 1:250 000

5 0 5 10 15 20 25 MILES

5 0 5 10 15 20 25 KILOMETERS

CONTOUR INTERVAL 200 FEET

NATIONAL GEODETIC VERTICAL DATUM OF 1929



Base prepared by U. S. Geological Survey
for Association of Bay Area Governments, 1969

PRELIMINARY MAP SHOWING RECENCY OF FAULTING IN COASTAL NORTH-CENTRAL CALIFORNIA

By
Earl H. Pampeyan

1979

Geology compiled 1975-1978