EPS 39

Rudy Wenk
$200 Course Material Fees pays towards:

Car rental
Gas
Campsite fees
Mercer Cavern

3 days of food: breakfast, lunch and dinner

… CHAOS (Cal Hiking and Outdoors Society) for tents…since 1870 with Joseph LeConte
Plate Tectonics
Alfred Wegener 1880-1930, here in Greenland
Die Entstehung der Kontinente und Ozeane

Von

Dr. Alfred Wegener
o. o. Professor der Meteorologie und Geophysik an der Universität Graz

Braunschweig
Druck und Verlag von Friedr. Vieweg & Sohn Akt.-Ges.
1929
Magnetite
$\text{Fe}_3\text{O}_4$
Fred Vine (1963): Magnetic reversals, sea floor spreading
GONDWANALAND

200 million years ago

120 million years ago

56 million years ago

Present
Different plate movements

Extension: sea floor spreading

Compression: subduction

Shear: lateral faults
Ore minerals in subduction zone
Ore minerals in subduction zone: Western N America
Porphyry copper in subduction zones

- Porphyry copper
- Porphyry molybdenum
California
Subduction of Farallon Plate

Collision ~ 145 M y

North American Plate
Geologic ages: Cenozoic – Mesozoic – Paleozoic – Pre Cambrian
Coast Ranges
I recommend EPS 101, Field Geology
Mount Diablo: not a volcano but accreted crust
Folded (kinked) chert: Golden Gate Bridge
Conglomerate, Berkeley Hills
Basalt ~ 10 My
San Andreas Fault
Mid-oceanic ridges, transform faults
San Andreas fault
discovered by Andrew Lawson, UC Berkeley in 1895

1.6 inches per year
1300 km long
Started ~ 30 My ago
Andrew Lawson
Building a house in N Berkeley
Andrew Lawson’s field geology class 1891
San Andreas Fault around Kettleman City
San Andreas Fault around Bakersfield, Maricopa
Great Valley
Tertiary sediments, e.g. Antioch
Oil wells in Kettleman Hills / Bakersfield
Volcanism

- Mt. Lassen, 1915
- Mt. Shasta, 1786
- Clear Lake up to 10’000 y
- Devil’s Postpile, <100’000 y
- Bishop tuff, 767’000 y
- Sutter Buttes, 1.5 my
- Sonoma volcanics up to 2.5 my
- Berkeley Hill basalt ~ 15-20 my
Mount Shasta
Mount Shasta  14,179 feet  (Mt. Whitney  14,505 feet)
Devil's Postpile <100,000 years
Hot Creek, Mammoth
Table Mountain Basalt flow: 10 My
Water Resources
Hetch Hetchy 1923
Old Hetch Hetchy

John Muir: “Dam Hetch Hetchy! As well dam for water-tanks the people's cathedrals and churches, for no holier temple has ever been consecrated by the heart of man.”
Rivers shown are those whose average flow at the mouth is 17,000 ft³/sec or more. Average flow of Yukon River, Alaska, is 240,000 ft³/sec.
Foothills
Stalactites – stalagmites: calcite and some aragonite (CaCO₃)
Sierra Nevada batholith
~ 100 M.y.
Geology Underfoot in Yosemite National Park

Allen F. Glazner and Greg M. Stock
Gold: Eagle’s Nest Mine CA (5cm high)
Kuna Crest 93 My
Initial intrusion and solidification of marginal granodiorite of Kuna Crest

Half Dome 92 My
Surge of fresh magma locally breaches the Kuna Crest and solidifies as the equigranular phase of the Half Dome Granodiorite

Cathedral Peak 86 My
Third surge of magma followed by solidification of Cathedral Peak Granodiorite and emplacement of Johnson Granite Porphyry as final stage

Johnson 81 My
New surge of magma followed by solidification of porphyritic phase of Half Dome Granodiorite
Granite: crystallization from a melt

Significance of water
Glaciation in Yosemite

Tahoe (~190-130 Ky bp)

Tioga (~70-20 Ky bp)
Bridal Veil Fall in Yosemite
Pleistocene Glaciation in North America (~24 Ky)

Pleistocene: 2.6 My – 12 Ky
GISP2 Y%, Greenland (0-11 y bp, Holocene)

CO2 record Antarctica (0-800000 y bp, Pleistocene)
Evidence for glaciation: boulders
Moraines near Lee Vining
Evaporite Lakes
Basin and Range
Fieldtrip Logistics

Wed. April 3, 5 p.m.

Fieldtrip

Thu. April 11, 6:30 a.m.

McCone Hall