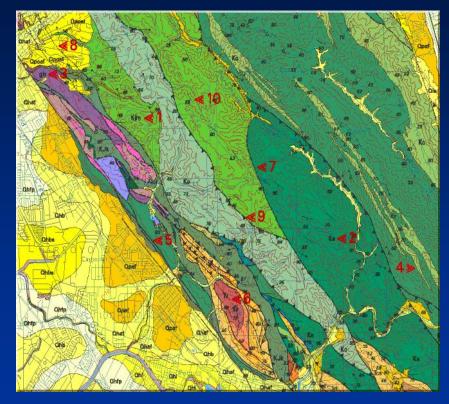


## **Geology Map Laboratory**





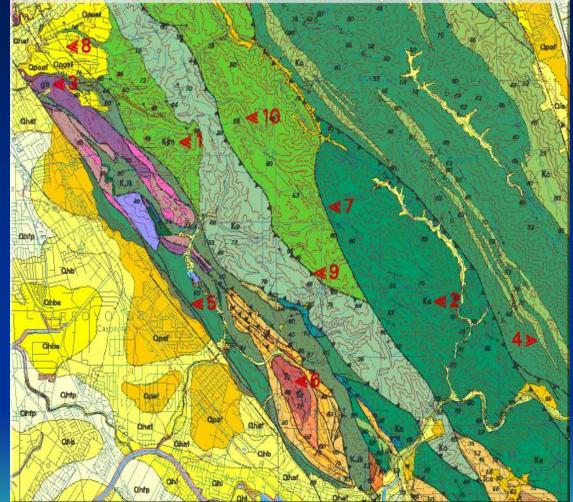
## Geology 101 Lab Ray Rector: Instructor

#### Geologic Map Lab Learning Objectives

- The student should understand and know:
- 1) The terminology and basic symbols of geology maps
- 2) How to read and understand a geology map legend
- 3) The general concepts and field methods used in making a geology map
- 4) How to successfully recognize structures on a geology map such as contacts, bedding orientation, folds and faults
- 5) How to reconstruct the geologic history of the mapped region based on the geologic map information.

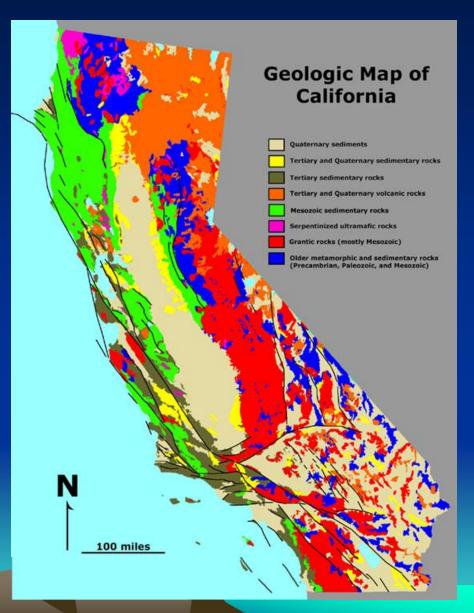
### What is a Geology Map

- 1) A map that displays the types of rocks and sediment exposed at the surface
- 2) Displays the spatial orientation of rock units and rock structures like folds and faults.
- 3) Geology information is typically overlain on a topographic base map



# Usefulness of Geology Maps

- 1) Geology maps have many vital uses:
  - Mineral Prospecting
  - Engineering
  - Earthquakes
  - ✓ Historical geology
  - ✓ Landform studies
  - ✓ Soil development
  - ✓ Biological studies
- Geology maps are even useful when buying a home. Why?



# Geology Map Key or Legend

 The map key lists and explains the geologic rock formations and the structural symbols

- ✓ Rock Names
- ✓ Rock Types
- ✓ Rock Ages
- Contacts
- ✓ Strike and Dip
- ✓ Faults and Folds
- 2) Each rock unit has a unique letter symbol and is color-coded

3) Map key is vital to understanding the accompanying geology map

MAP K	EY	
- Anticual Fill (Historic)		Contact
r - Antholal Levee Fill (Historic)	3 <u></u> 3	Contact, approximately located
		Contact, inferred
haf - Alluvial Fan Deposits (Holocene)		Contact, concealed
htp - Floodplain Deposits (Holocane)		Feut
hb - Flood Basin Deposits (Holocene)		Fault, approximately located
hts - Salt Affected Rood Basin Deposits (Holocene)		Foult, inferred
itos - bais valected Hood Basin Lepositis (Horoberte)	?	Feut, uncertain
hi - Natural Levee Deposits (Holocene)		Fault, concealed
pař - Aliuvial Fan Deposits (Pleistopene)	?	Fault, concealed and uncertain
post - Older Alluvial Fan Deposits (Pleistocene)		Oblique fault with thrust or reverse component
<ul> <li>Unnamed volcanic rocks (Miccone)</li> </ul>	<b></b>	Oblique fault with thrust or reverse component, approximately located
v - Orinda conglomerate (Miccene)		
or - Briones sandstone (Miccene)	·*4.	Oblique fault with thrust or reverse component, inferred
- Tice shale (Miccene)	<b>~-</b> ?- <b>~</b>	Oblique fault with thrust or reverse component, uncertain
cs - Claremont shale (Miccene)		
s - Scibrante sandstone (Miccane)		Strike and dip of bedding
sh - Unnamed shale and sandstone (Miccene)	<del>.</del>	Strike and dip of overturned bedding
	+	Strike and dip of vertical bedding

#### The Basic Rules of Structure

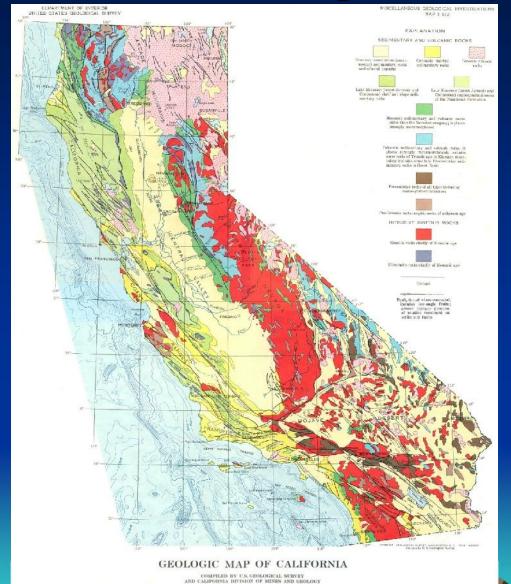
1) Strike of beds is always parallel to the direction of the contacts. 2) Rock layers dip towards the youngest exposed rock layers. 3) Oldest rocks exposed in the center of eroded anticlines and domes. 4) Youngest rocks exposed in the center of eroded synclines and basins. 5) Horizontal folds form parallel sets of belt-like outcrop patterns. 6) Plunging synclines form "V" of "U" shaped, belt-like outcrop patterns. ✓ Fold plunges toward open end of "U" pattern. 7) Plunging anticlines form "V" of "U" shaped, belt-like outcrop patterns. ✓ Fold plunges toward *closed* end of "V" or "U" pattern. 8) Steeper the dip of the layer, the more narrow the width of its outcrop. 9) Hanging wall moves up relative to foot wall in reverse and thrust faults. 10) Hanging wall moves down relative to foot wall in normal faults.

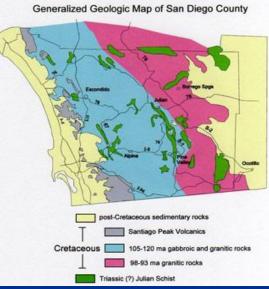
# Geologic Map of North America

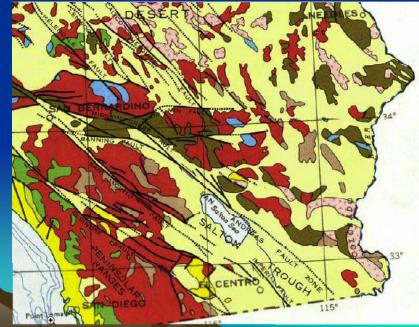
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## Geologic Map of California



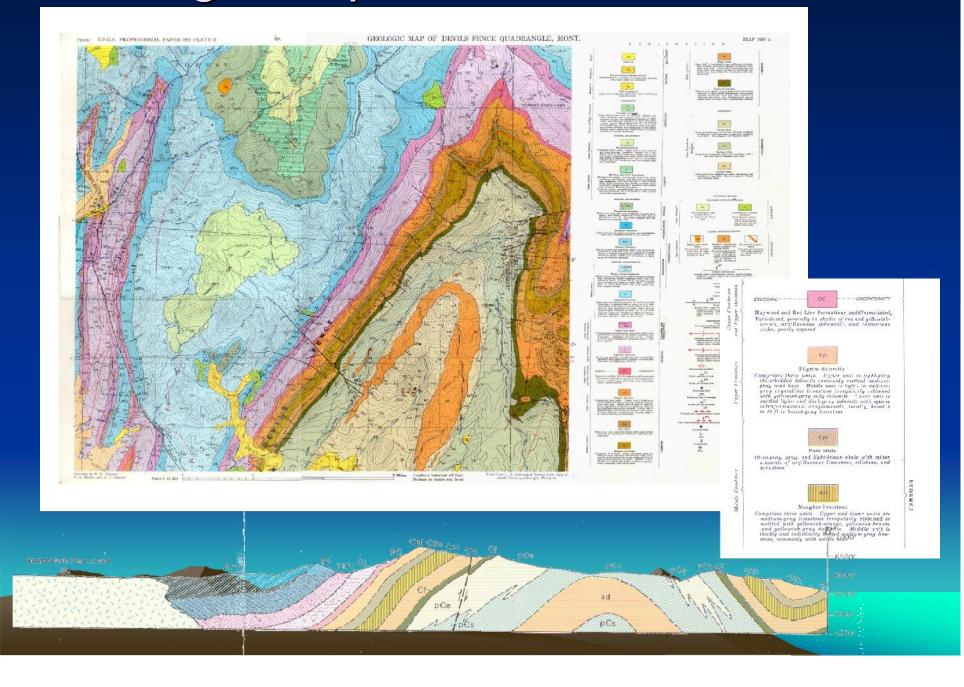




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SCALE 1/2 500 000

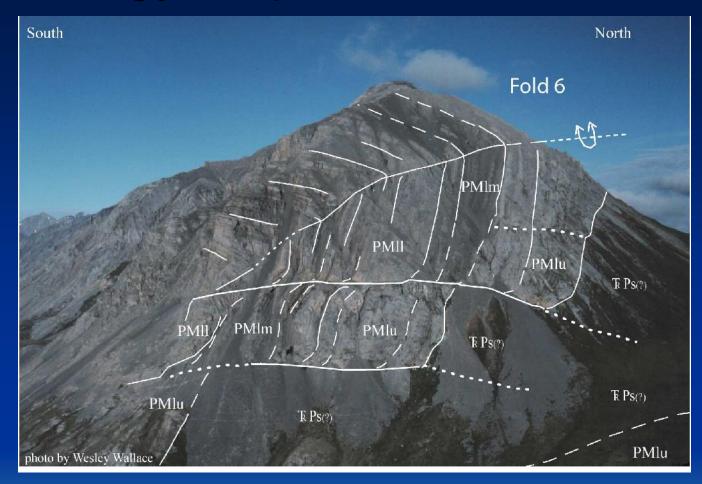
### Geologic Maps – Devil's Fence Quad



### **Devil's Fence Topographic Feature**



### Geology Map Web References



http://www.nature.nps.gov/geology/usgsnps/gmap/gmap1.html#unique

http://www.globalchange.umich.edu/Ben/ES/earthstructure.htm

http://www.winona.edu/geology/MRW/maps.htm

http://www.nps.gov/archive/yell/slidefile/scenics/outsideynp/Page.htm