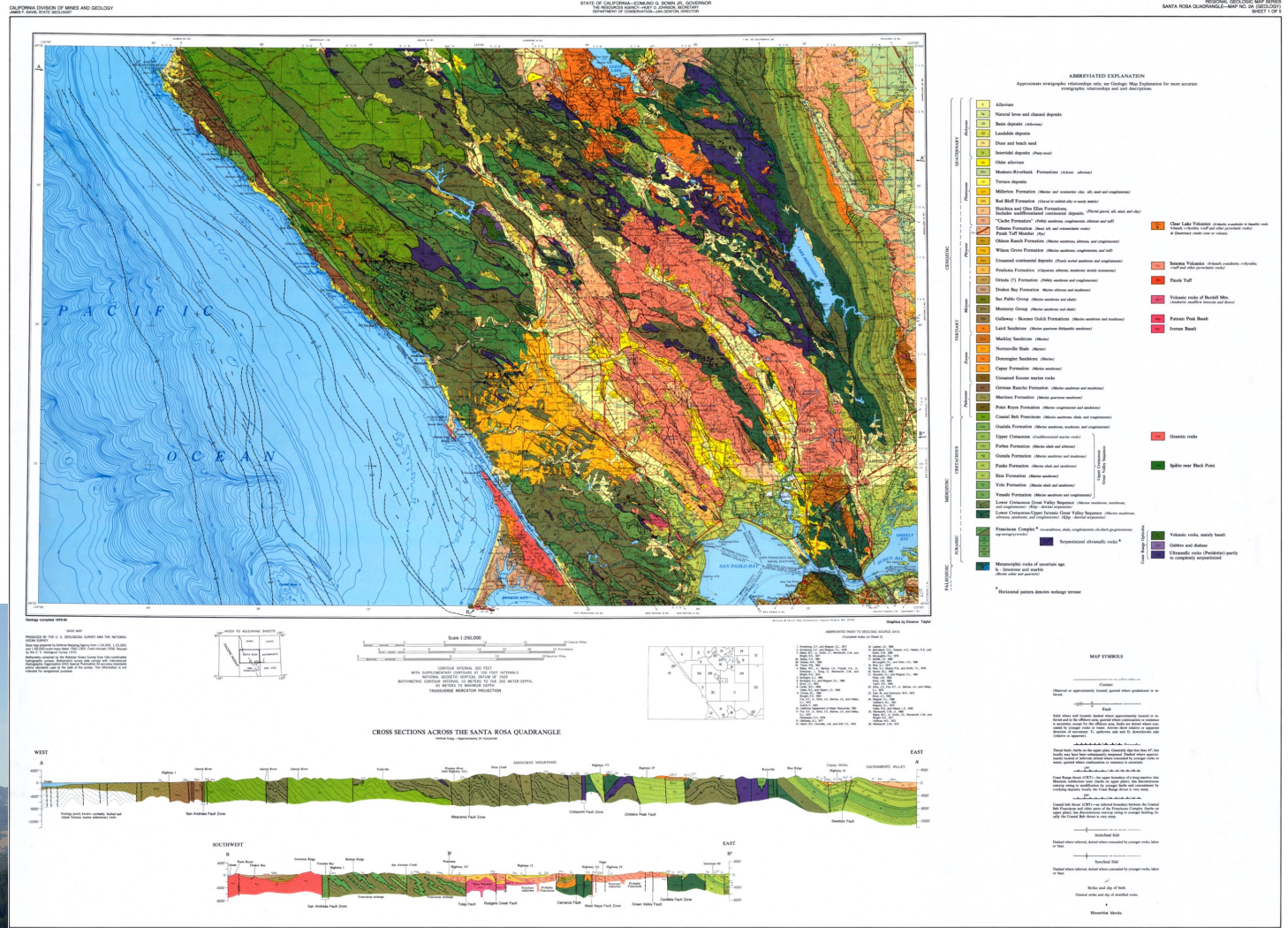


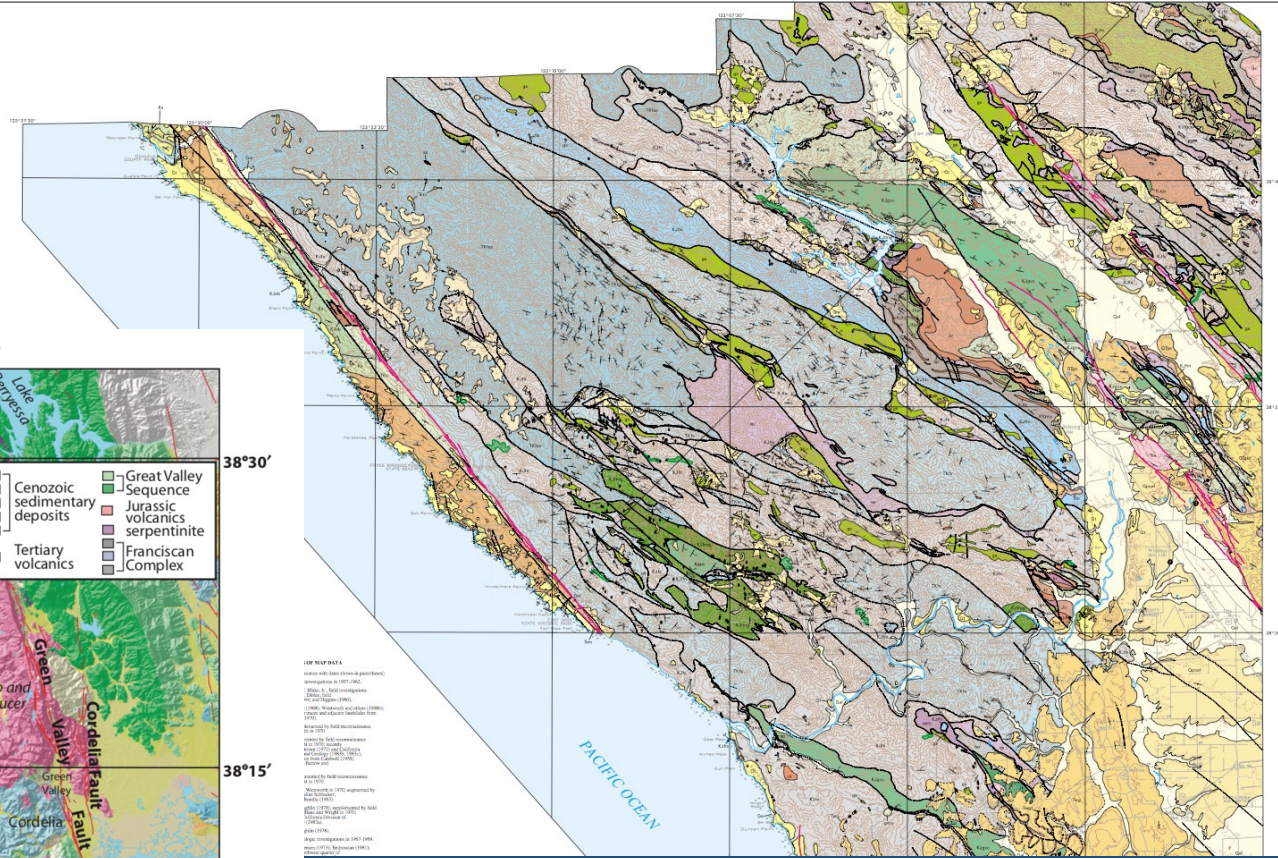
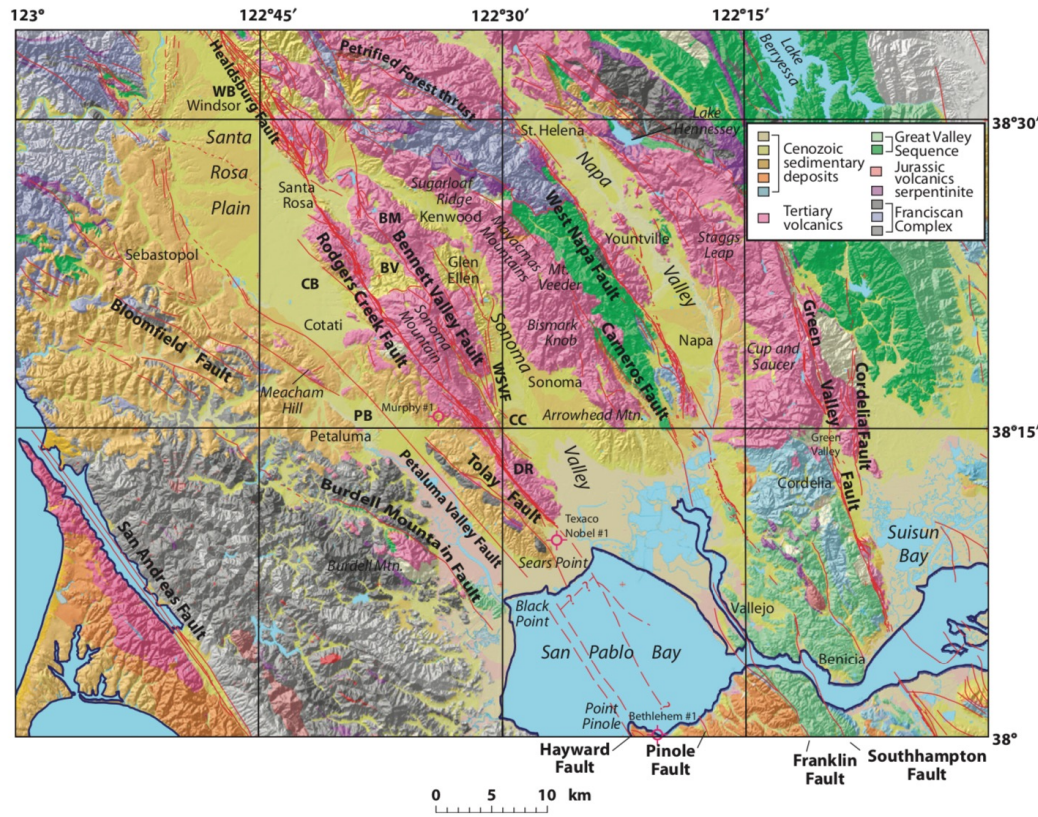
# Geology of Western Sonoma County

with Nicole Myers





# Sonoma County Geo-Chaos



Each color = a rock with a unique origin story  
 3 rock types = igneous, sedimentary, metamorphic



# Geologic Terranes

- Common geologic origin = rock forming environment
- Sonoma County is a patchwork of oceanic & river sediments aligned with faults

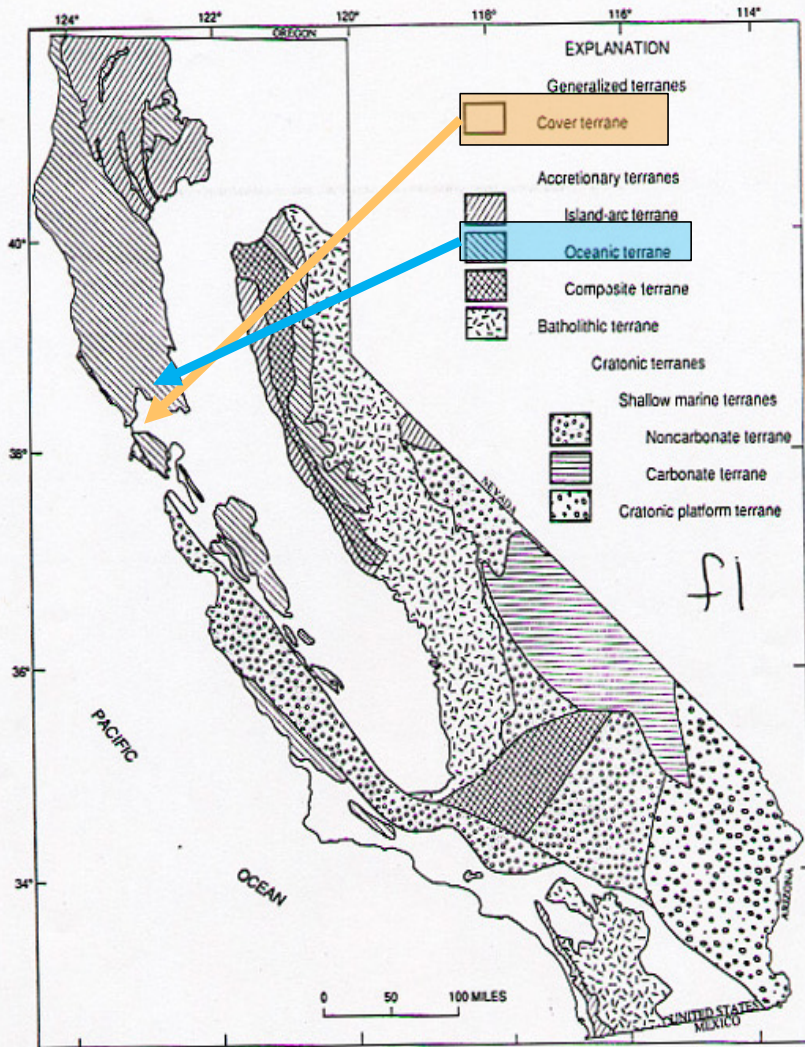
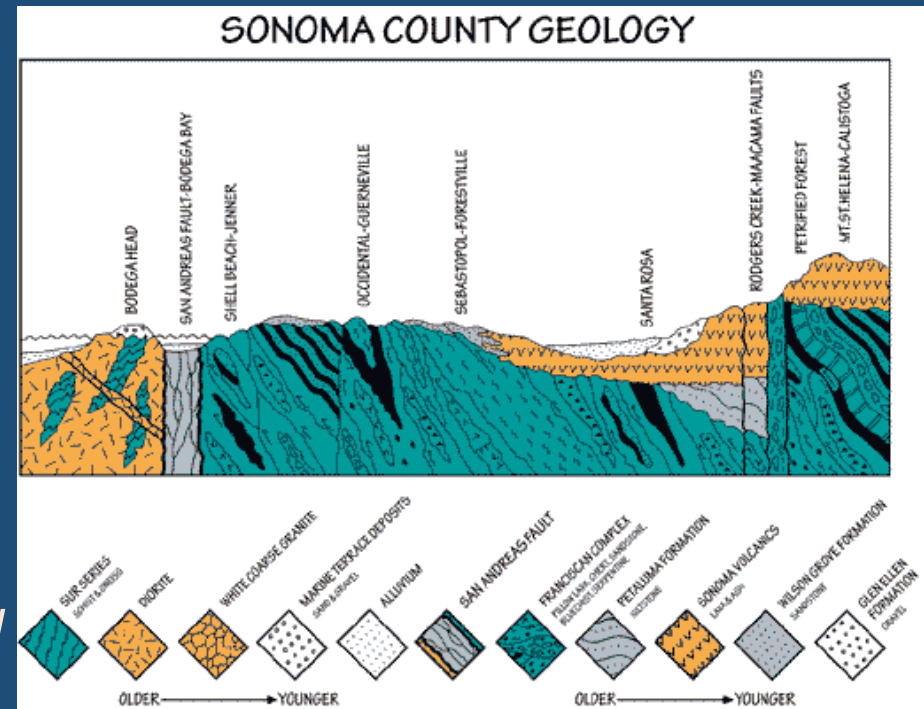


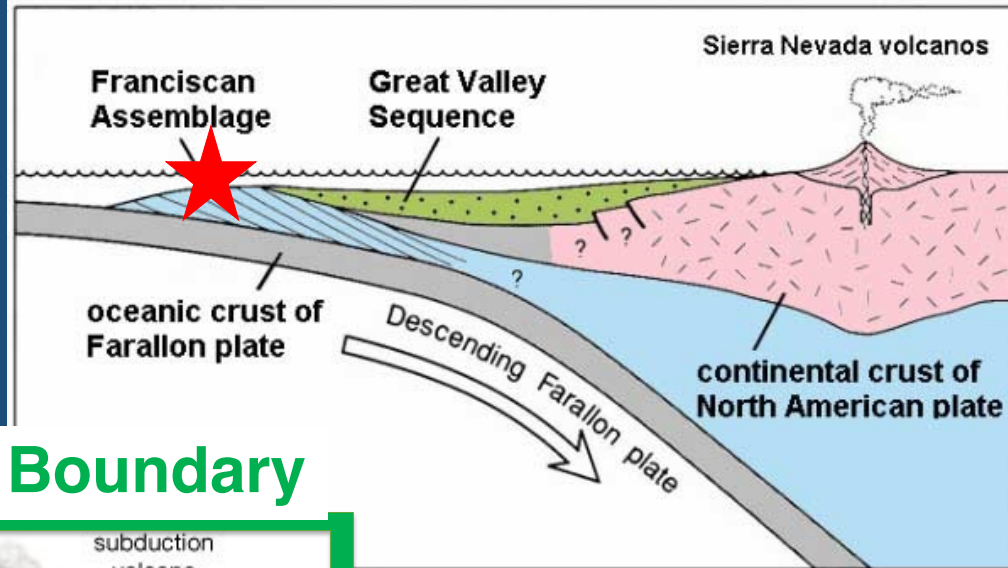
Figure 1. Generalized geologic terranes of California (modified from Albers and Fraticelli, 1984).

*The beginning of the story is buried at the bottom & exposed by faulting*



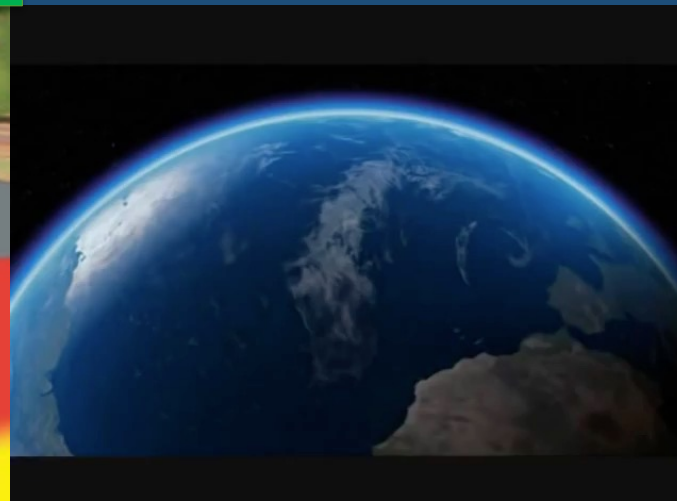
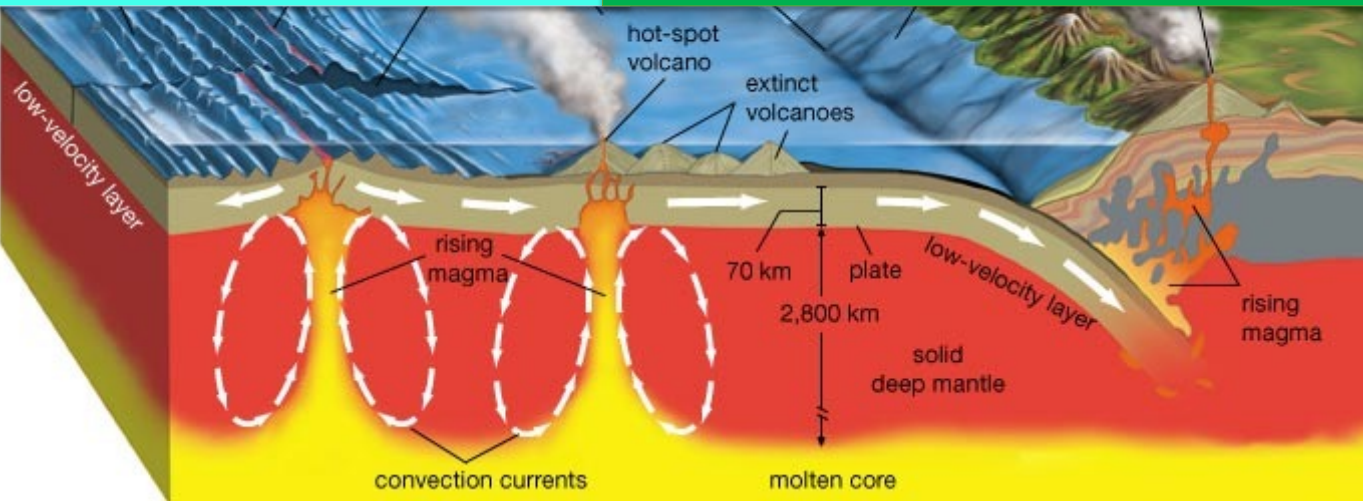
# Basement: Franciscan Complex

- ~200-65Ma
- Oceanic-Continental subduction
- Accretionary wedge



## Divergent Boundary

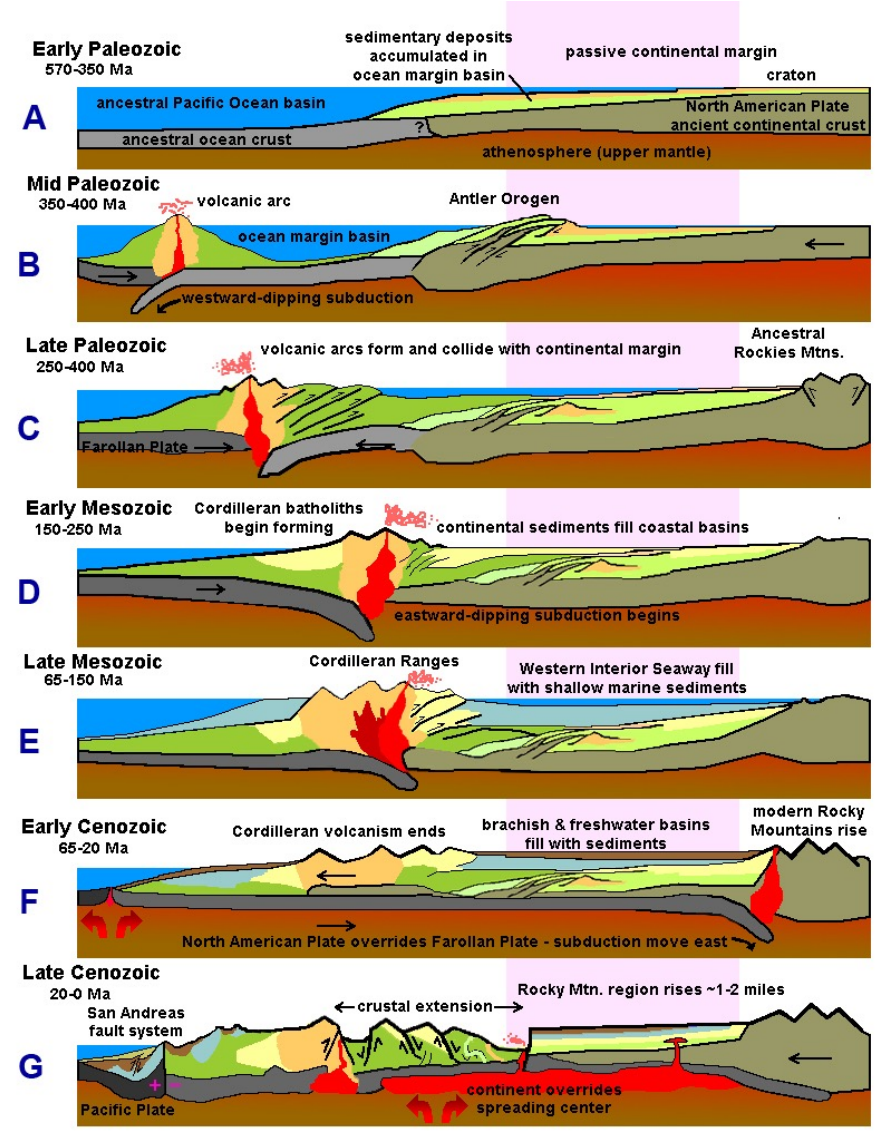
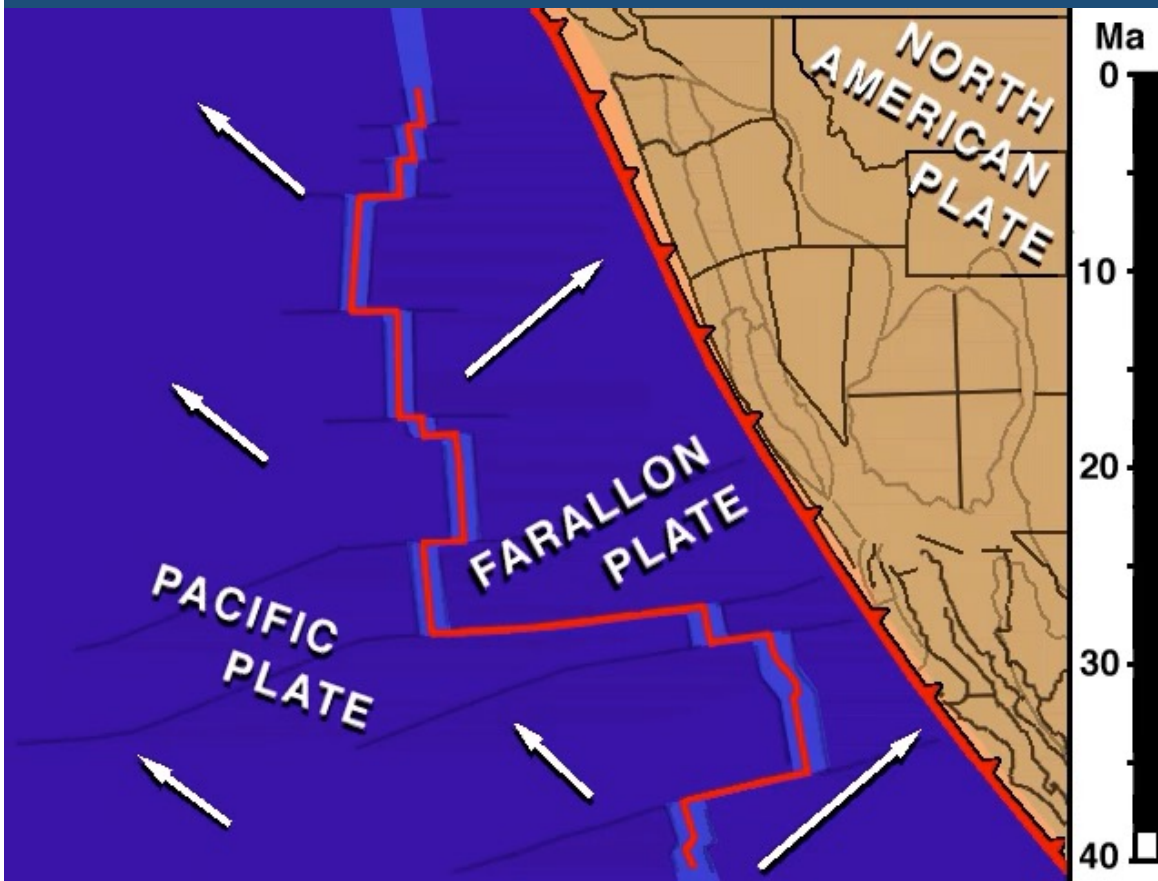
## Convergent Boundary





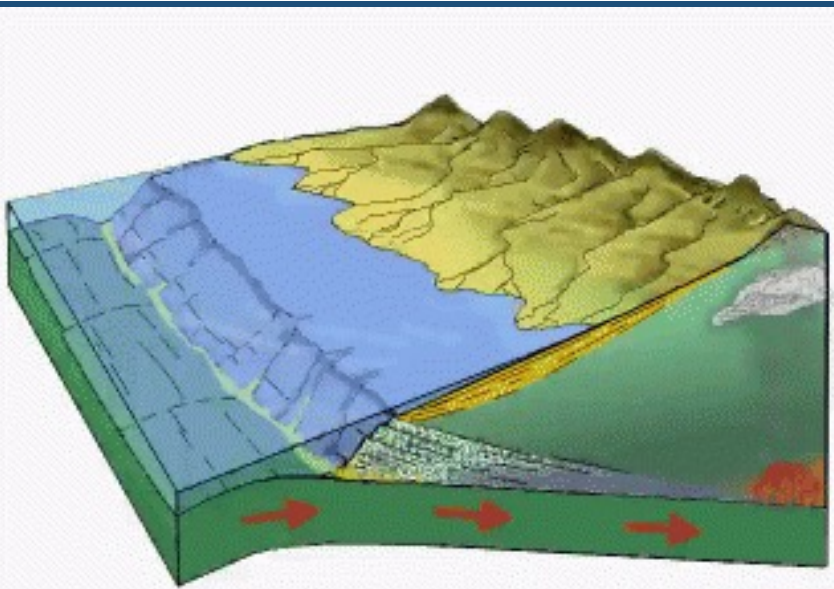
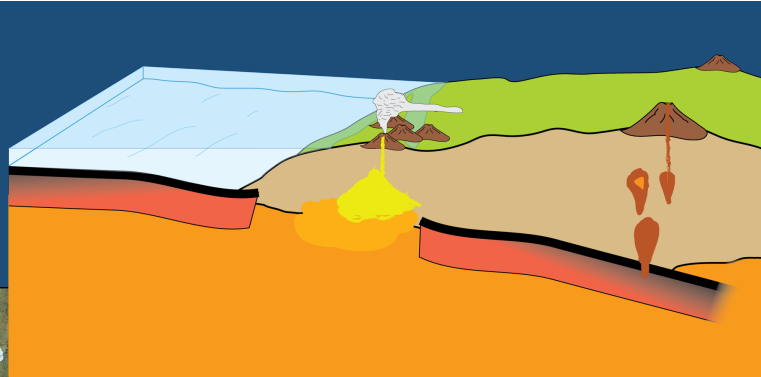
# Formation of the San Andreas Transform Boundary

Tectonic Transition from Convergent → Transform = faults + volcanos + mountains + valleys

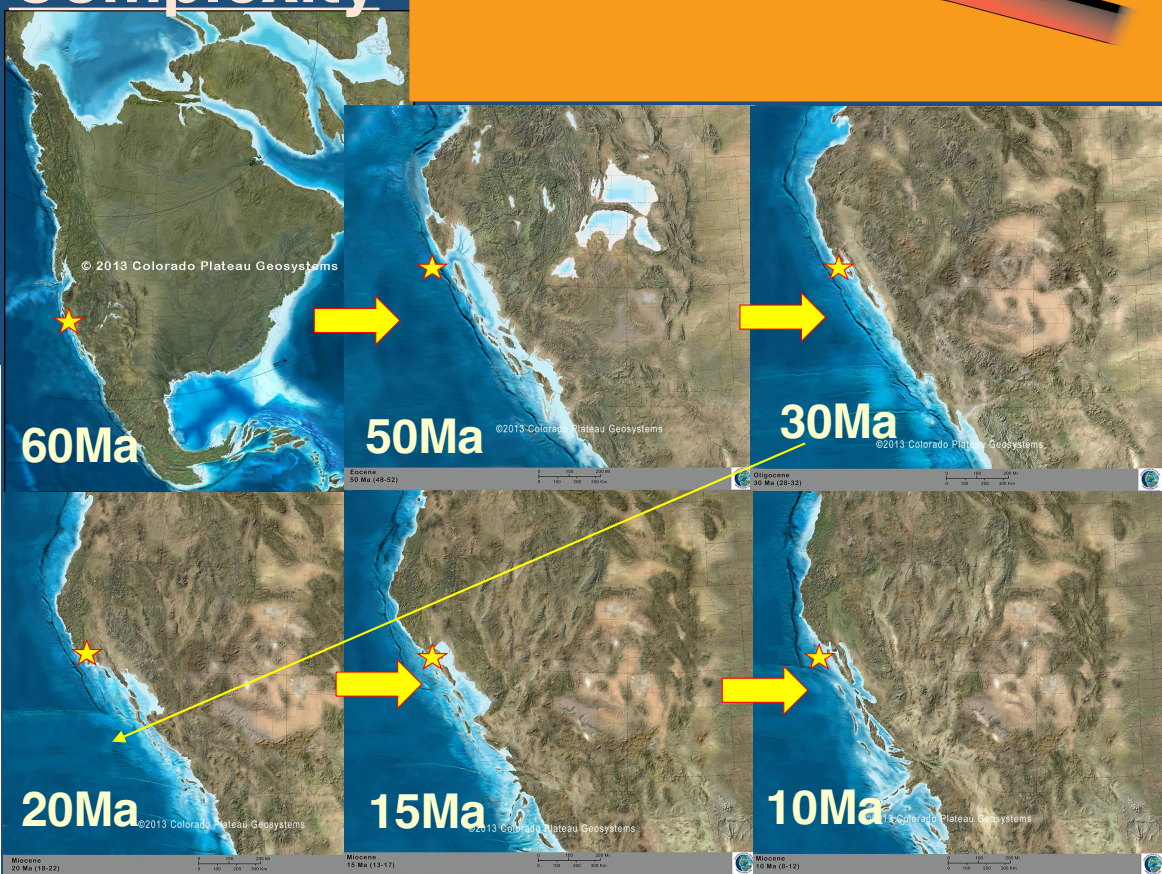
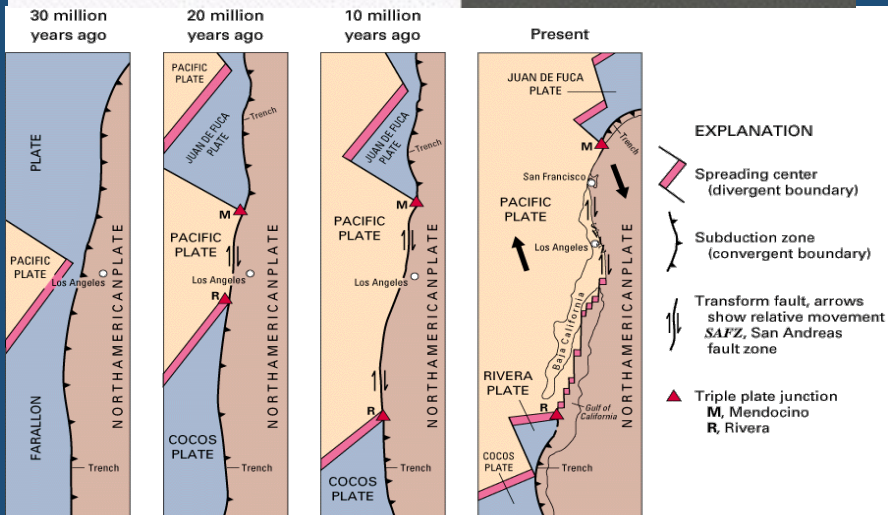




# Tectonic Transition = Geologic Complexity

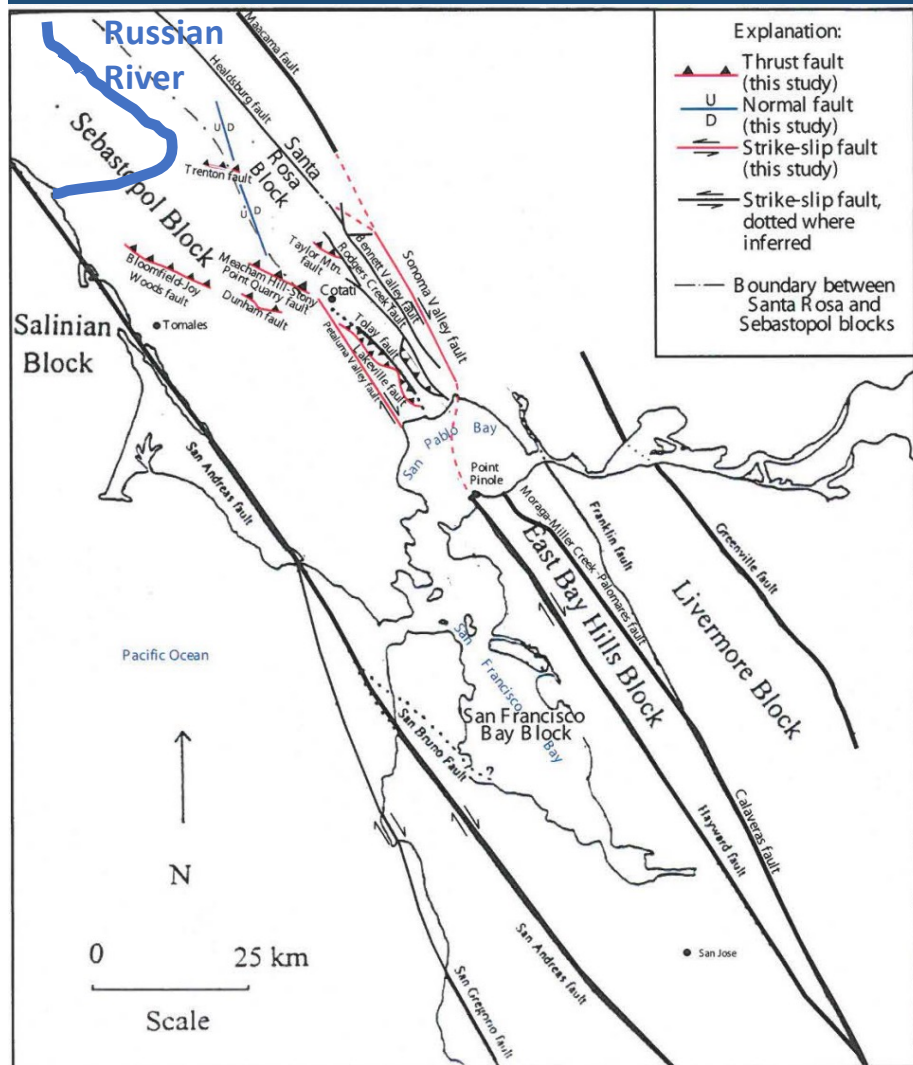


MAKE GIFS AT GIFSOUP.COM

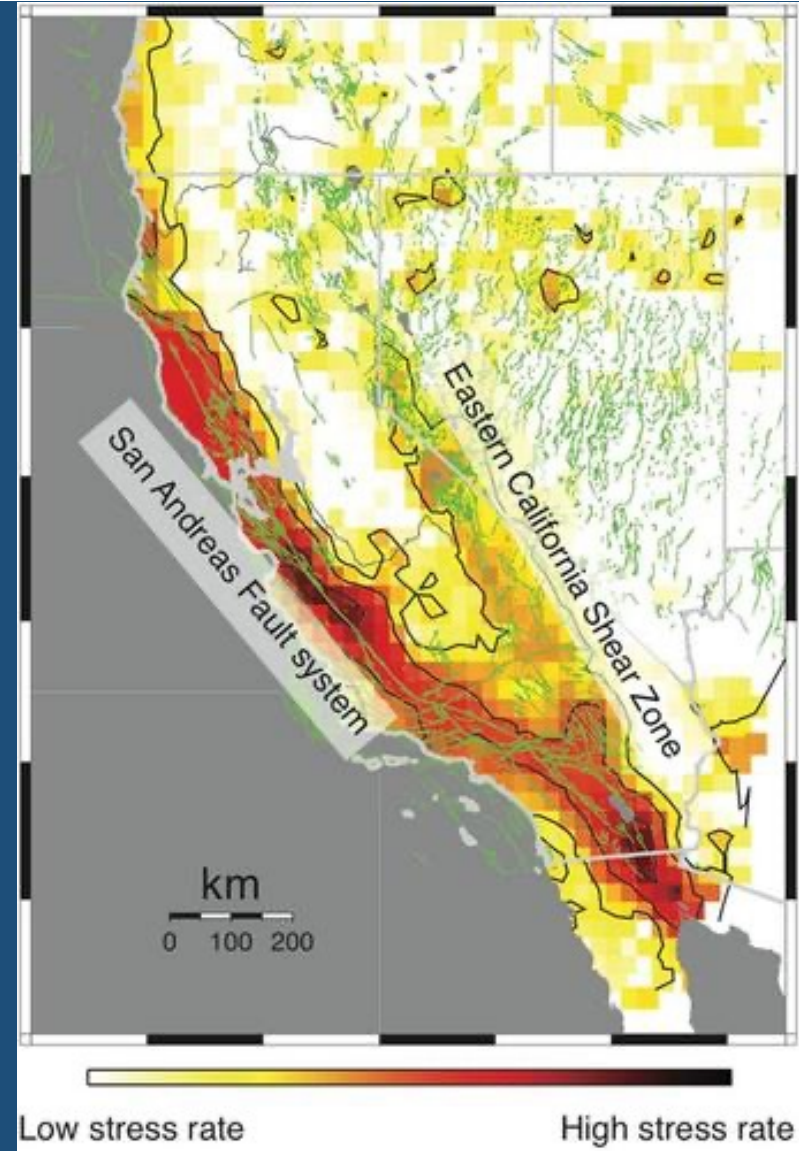




# San Andreas Fault System = Transform Boundary



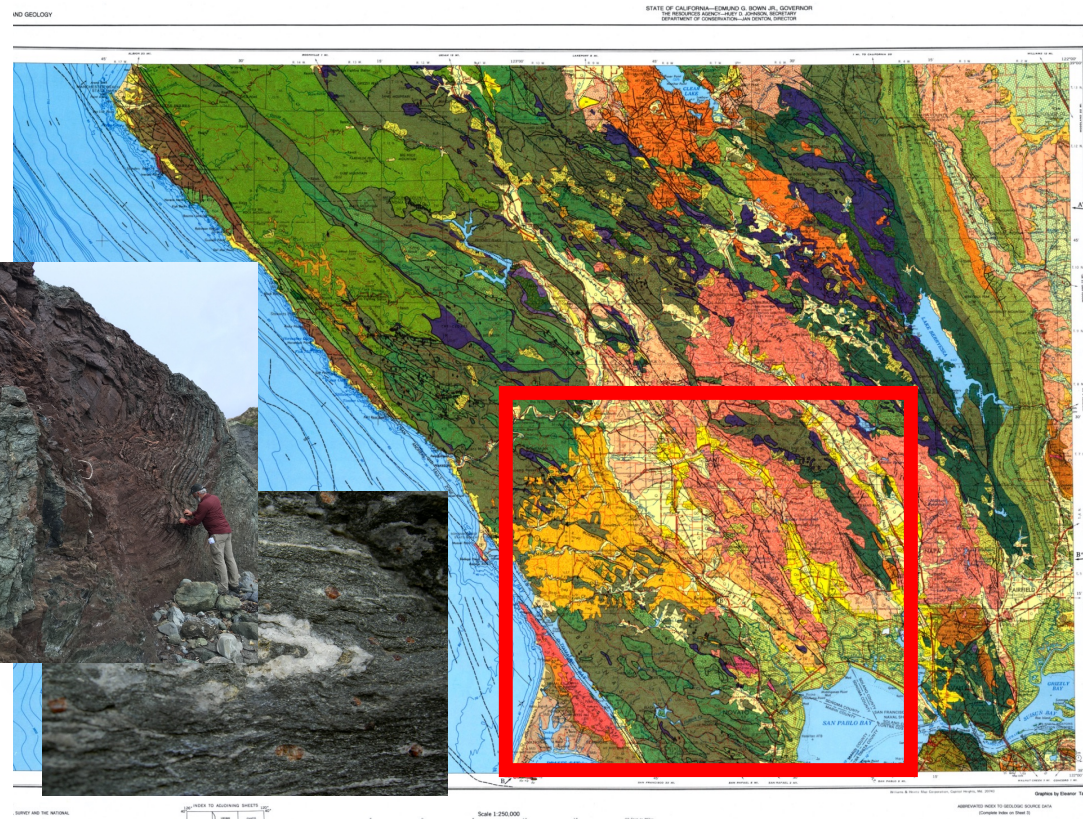
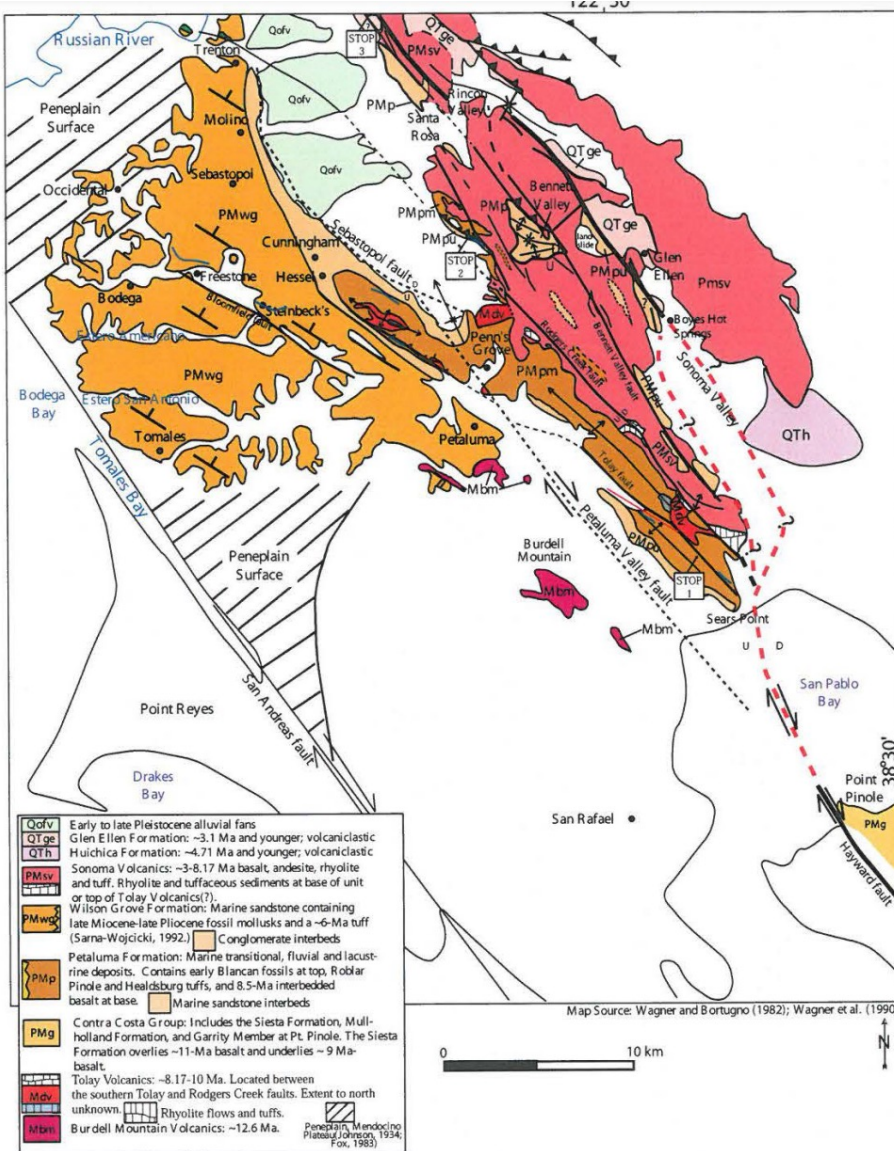
- SAF 12-15km deep & 1200km long
- SAF avg. rate of motion is ~2-5cm/yr
- SAF displaced ~315km





# West County Cover Rocks

- Covering the Franciscan Complex = Dark Purple + Darker Greens = ancient oceanic rocks
- Yellow/orange = ocean & river sediments
- Pink/Salmon = Sonoma Volcanics

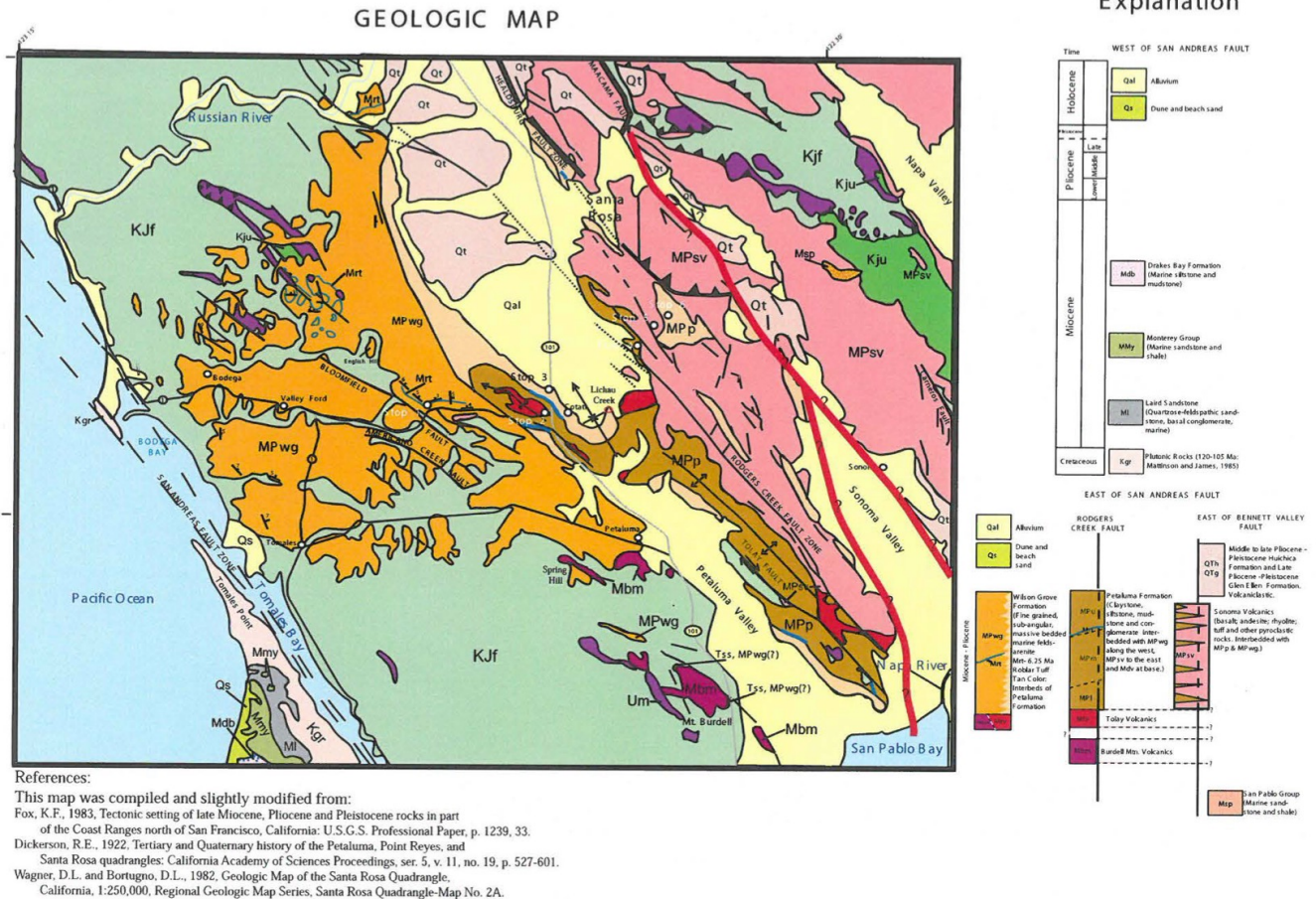




# Cover is Deposited Unconformably Atop the Franciscan Basement

Each color = a rock with a unique origin story

- Alluvium + alluvial fans
- Wilson Grove Formation = shallow marine sandstone
- Petaluma Formation = transition marine to lakes & estuaries
- Sonoma Volcanics, Burdell Mtn., Tolay Volcanics
- Unconformity = Franciscan uplifted for 30+Ma = upper ~4-5km
- Franciscan Complex contains metamorphics

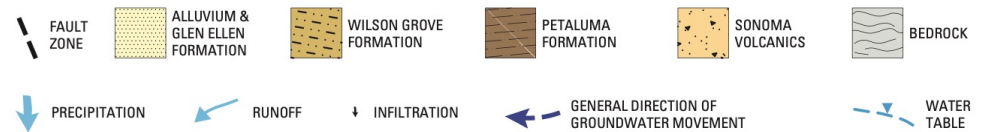
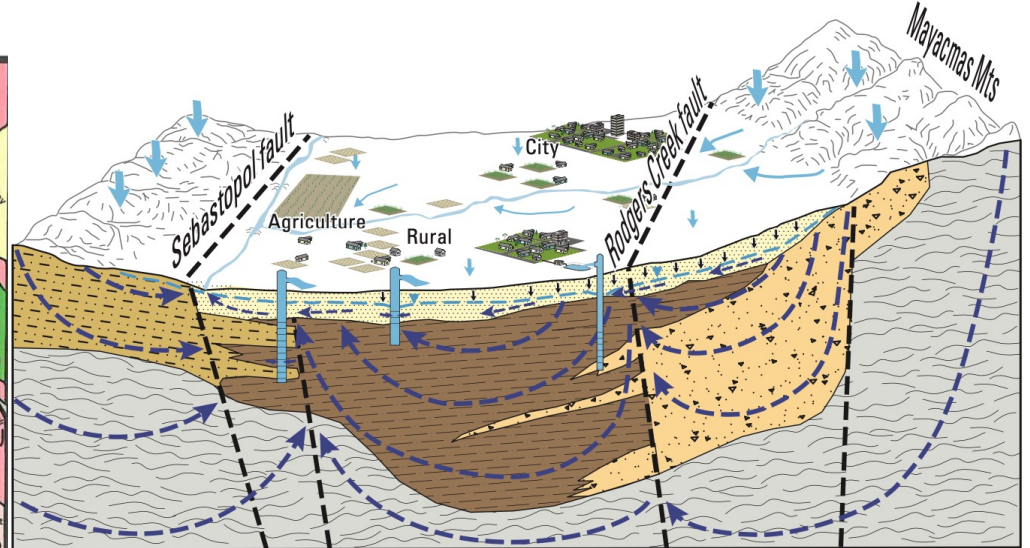
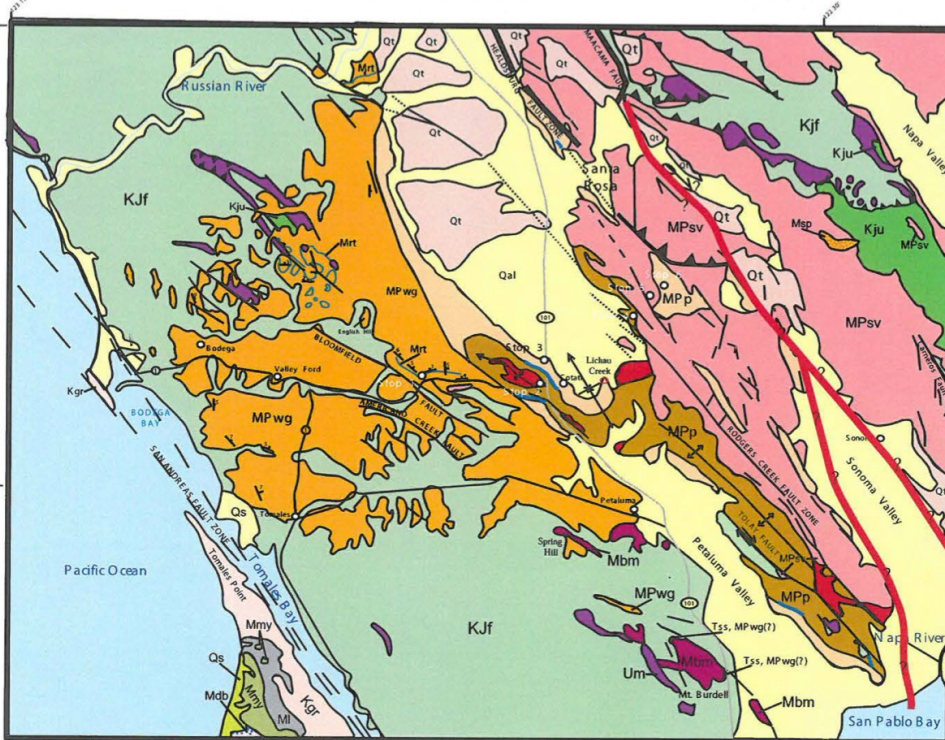




## Marine → Terrestrial Fault-Scape

- ~15Ma    ↑ faulting = ↑ elevation, emergence, & erosion
- ~10-2Ma    Shallow marine with emerging "islands" & shifting shorelines
- ~6-0Ma    River valleys incise into the rocks

GEOLOGIC MAP



Conceptual diagram of the groundwater system, Santa Rosa Plain watershed, Sonoma County, California.

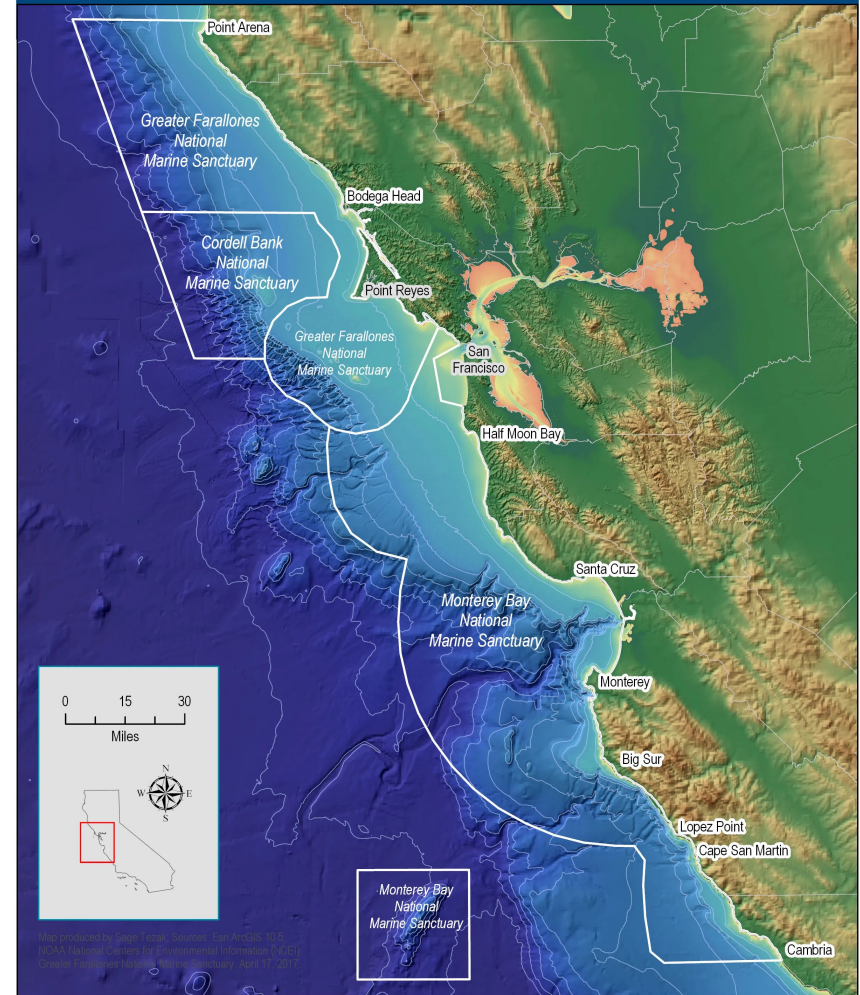


# The Coastal Range & Russian River

Uplifted oceanic bedrock covered with shallow marine + river sediments as coastlines shift & faults form mountains



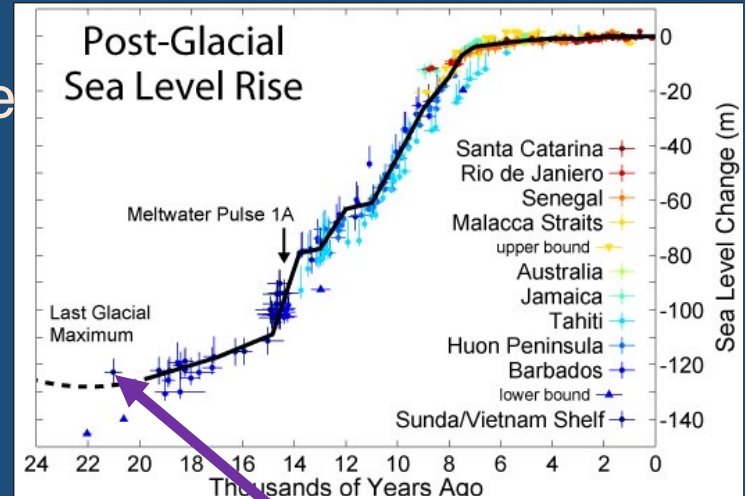
## Greater Farallones, Cordell Bank & Monterey Bay National Marine Sanctuaries



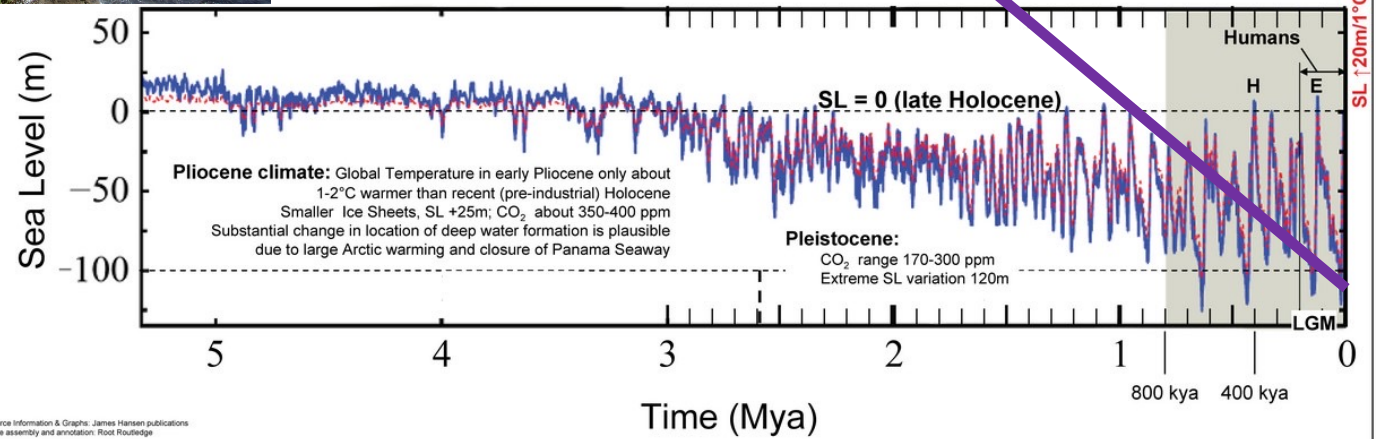


# Sea Level & Emergence

Emergence:  
 shorelines, marine  
 terraces & cliffs  
 ~2.58-0Ma  
 Ice Age  
 ~0.02Ma  
 Interglacial



## Sea Level (albedo proxy)

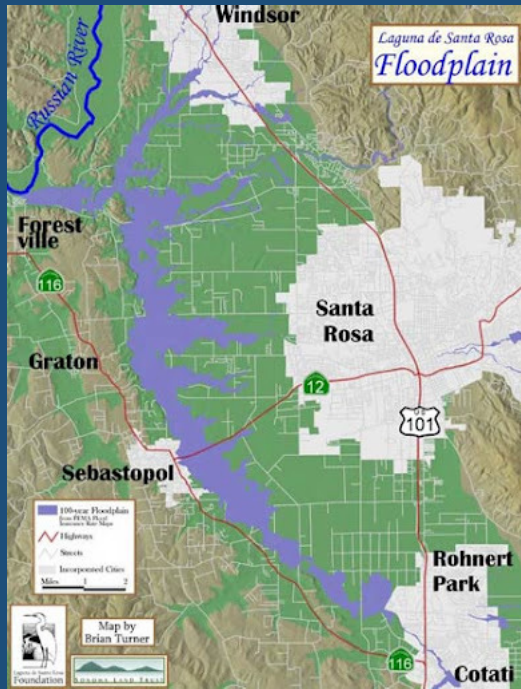
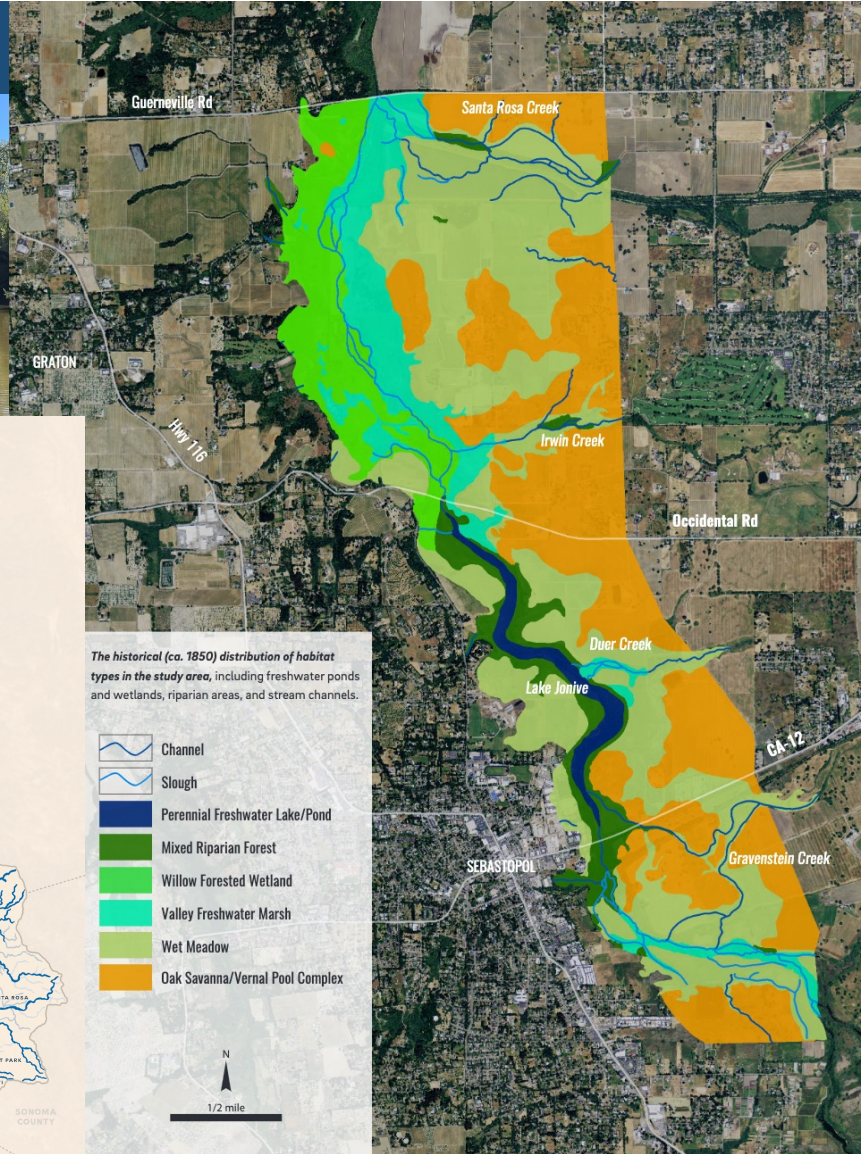


Source Information & Graphs: James Hansen publications  
 Slide assembly and annotation: Root Routledge



# Laguna de Santa Rosa

- Russian River Watershed
- **Historical:** permanent bodies of standing water (Ballard Lake, Lake Sebring, & Lake Jonive)
- **Modern:** lakes & wetlands drained or filled → partial restoration





# West Sonoma County is an Evolving Landscape





# Appreciating Earth with Nicole Myers

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- Geology walks, talks & education
- Sign up for AE newsletters!

