
Mountain Building – 3 styles

Convergent boundary – oceanic-continental



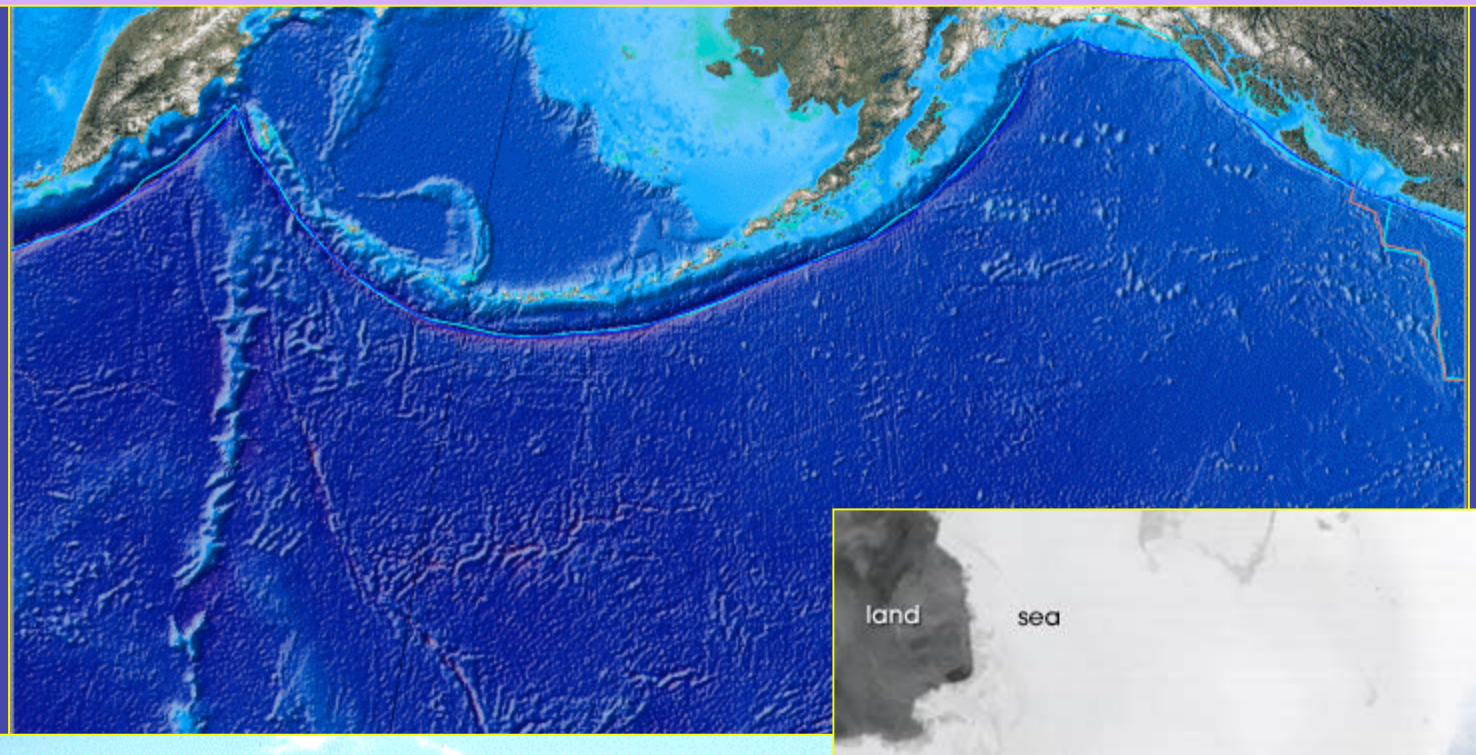
Typical Example –
Andes mountain range

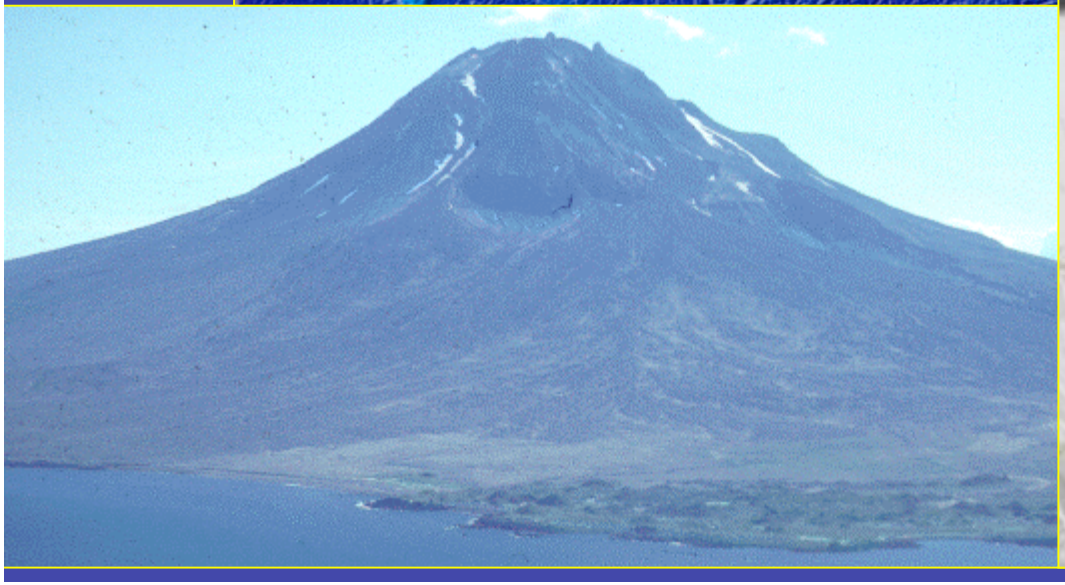
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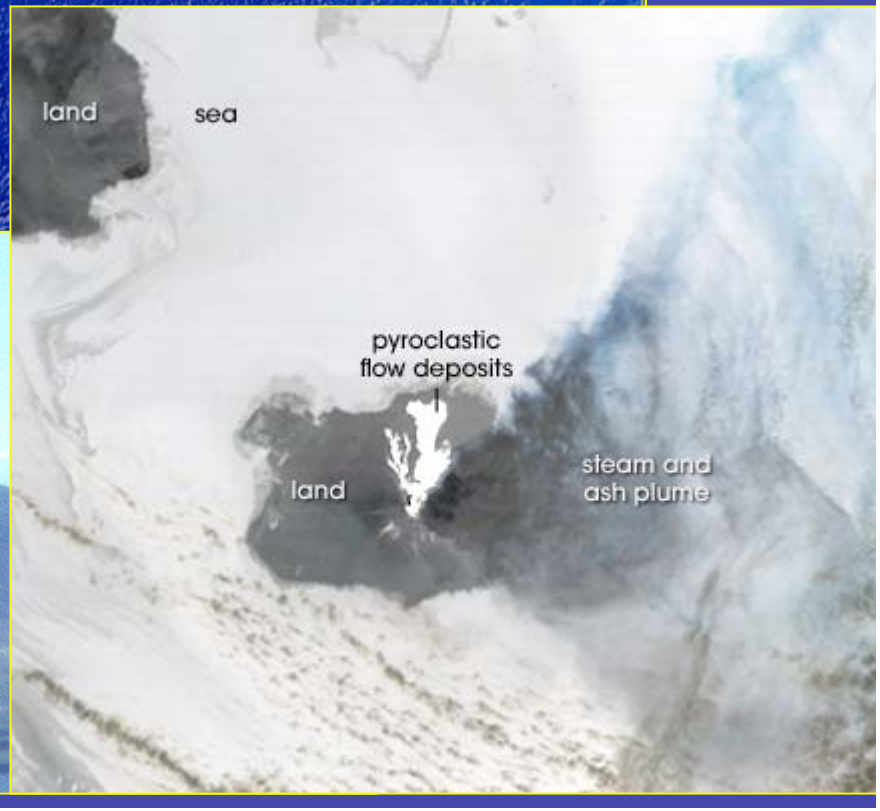




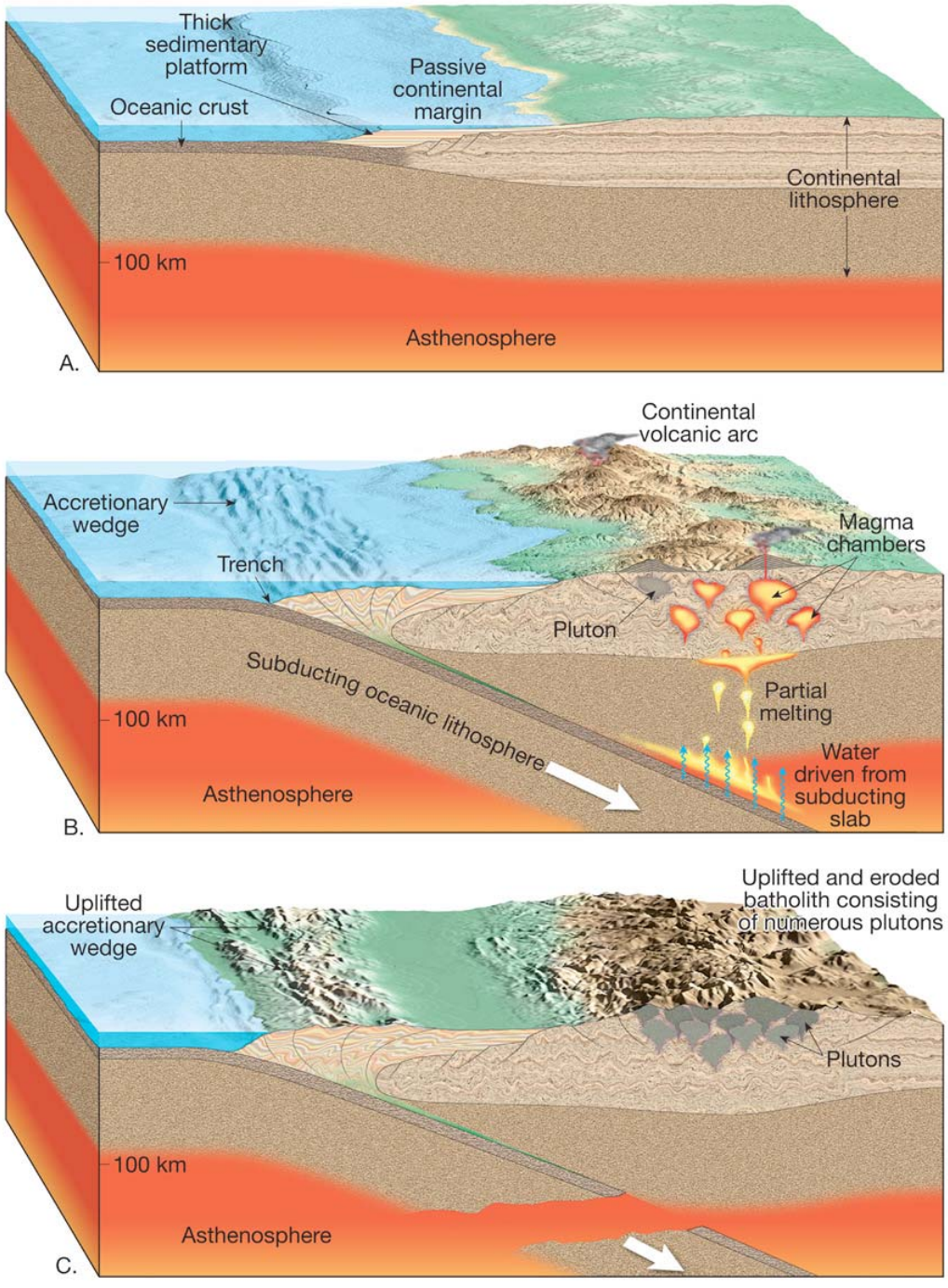
Convergent boundary – oceanic-oceanic





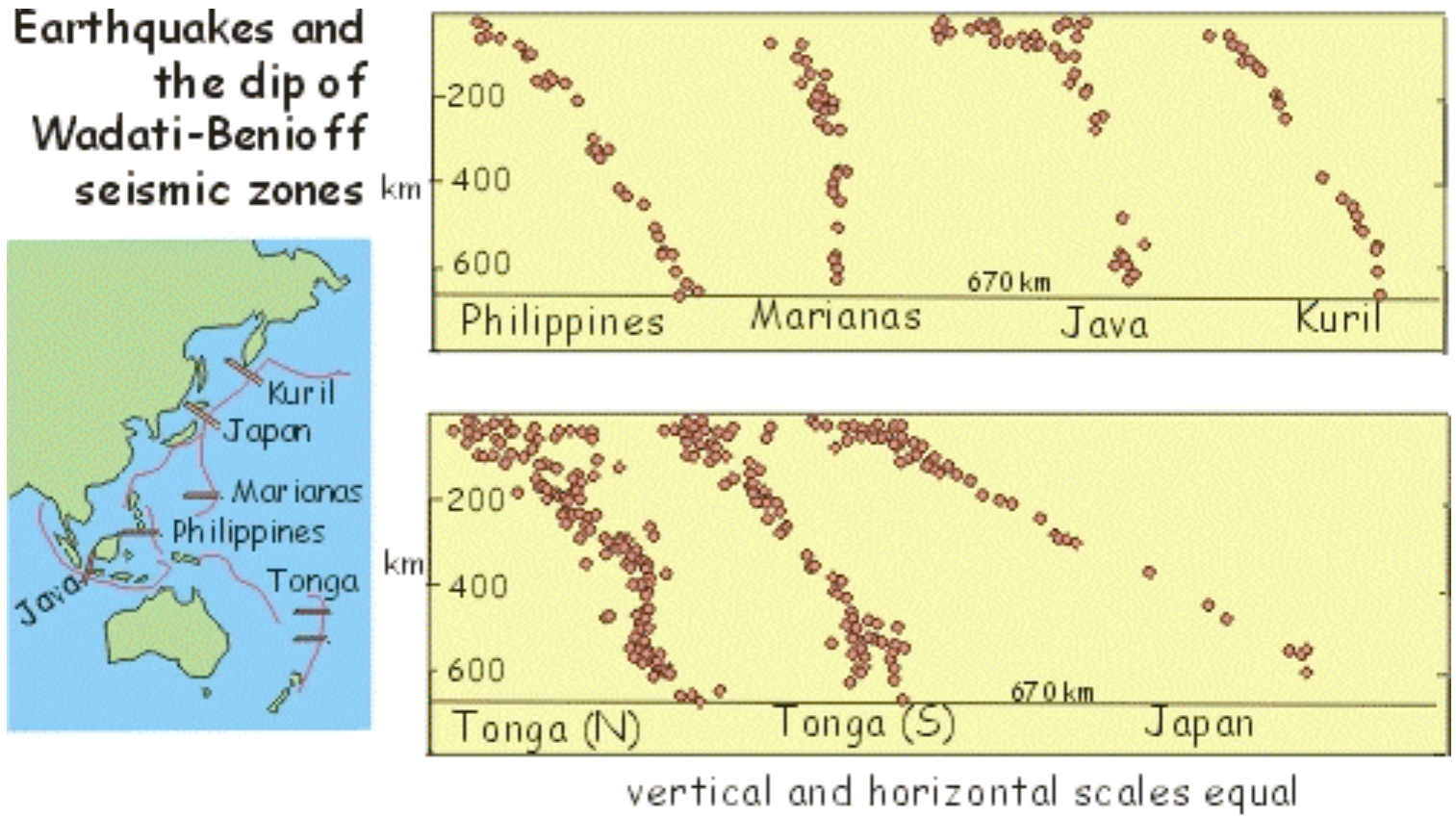


Accretionary Wedge
(derivative structure)

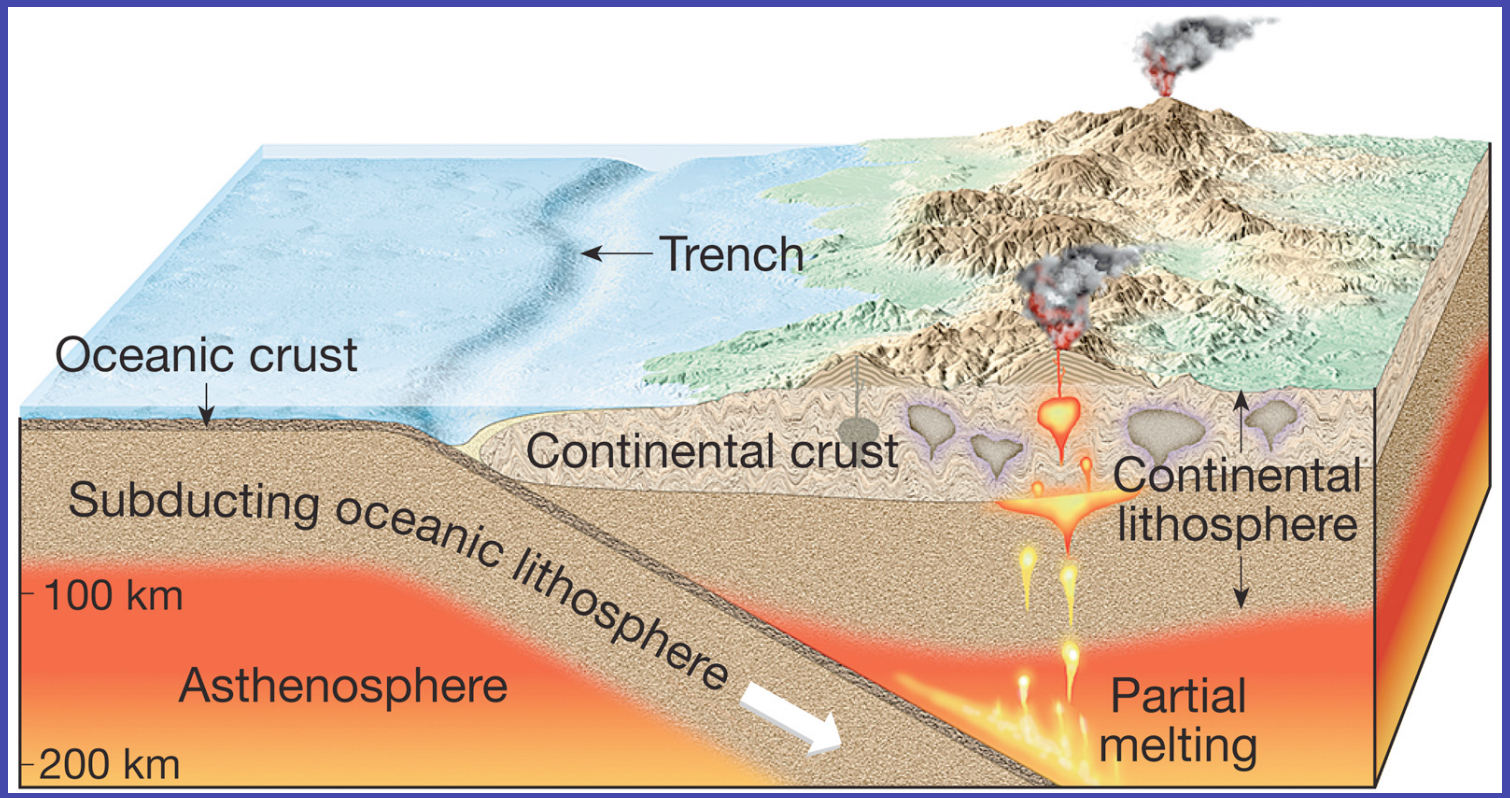


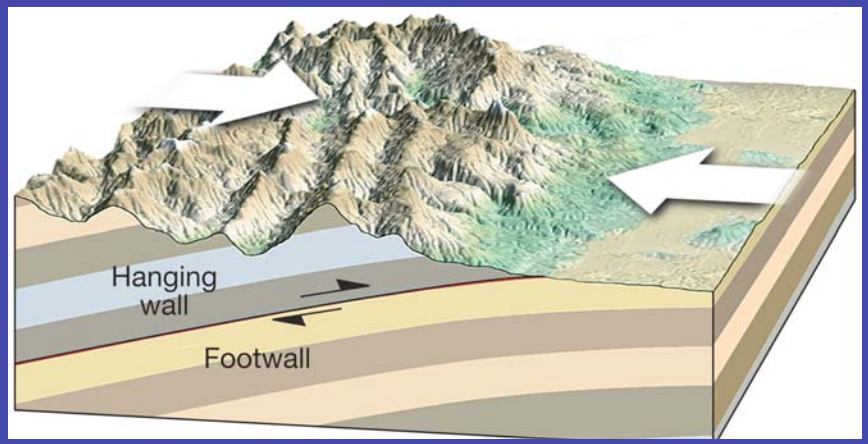


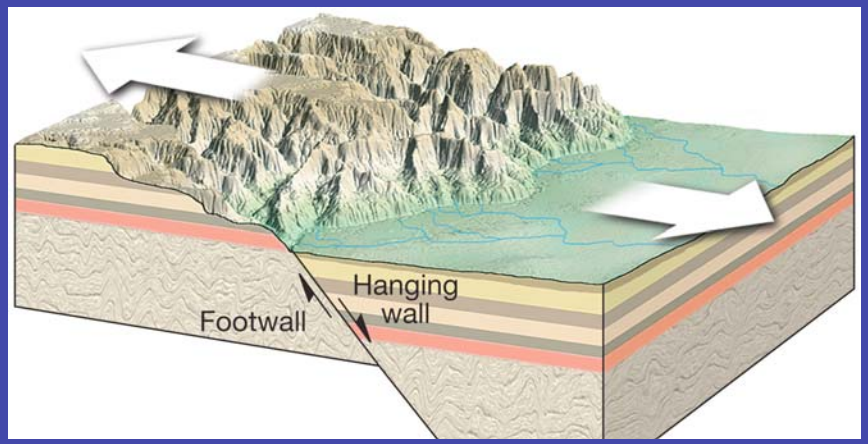
What causes subduction earthquakes?



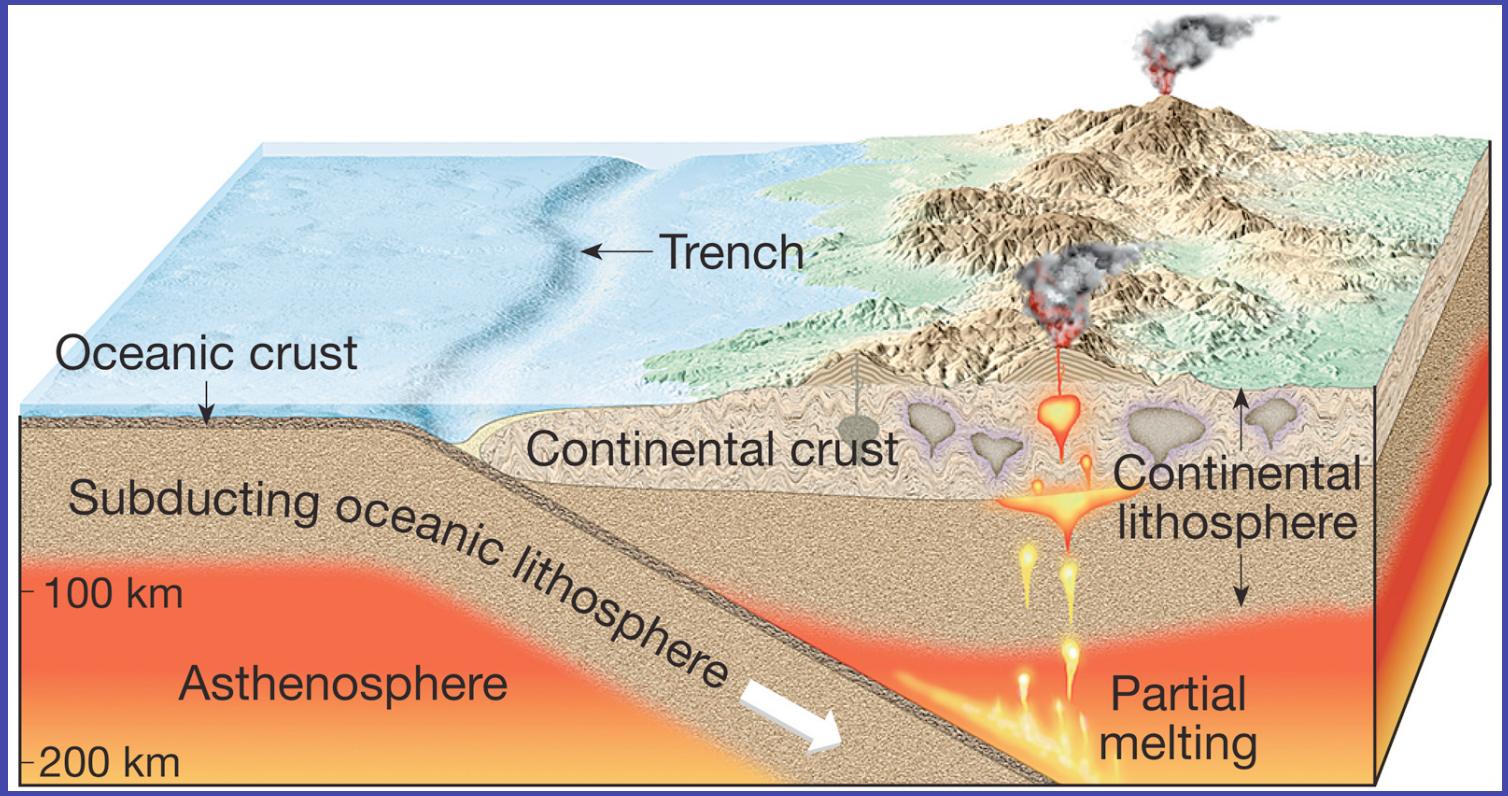
What kind of fault does a subduction zone represent?

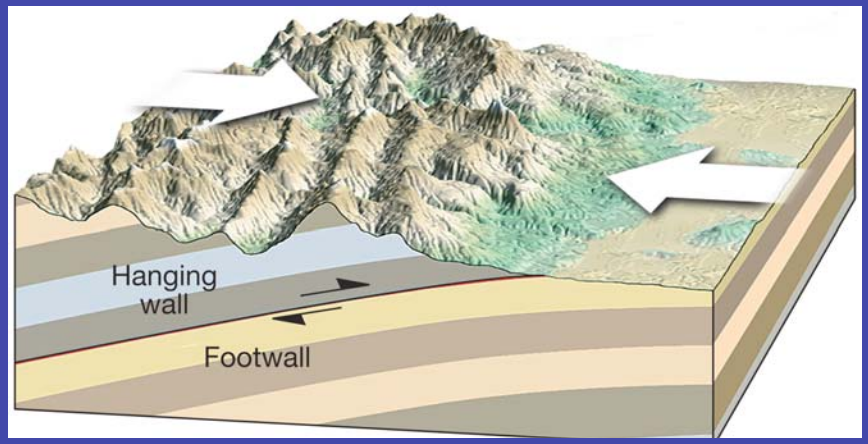






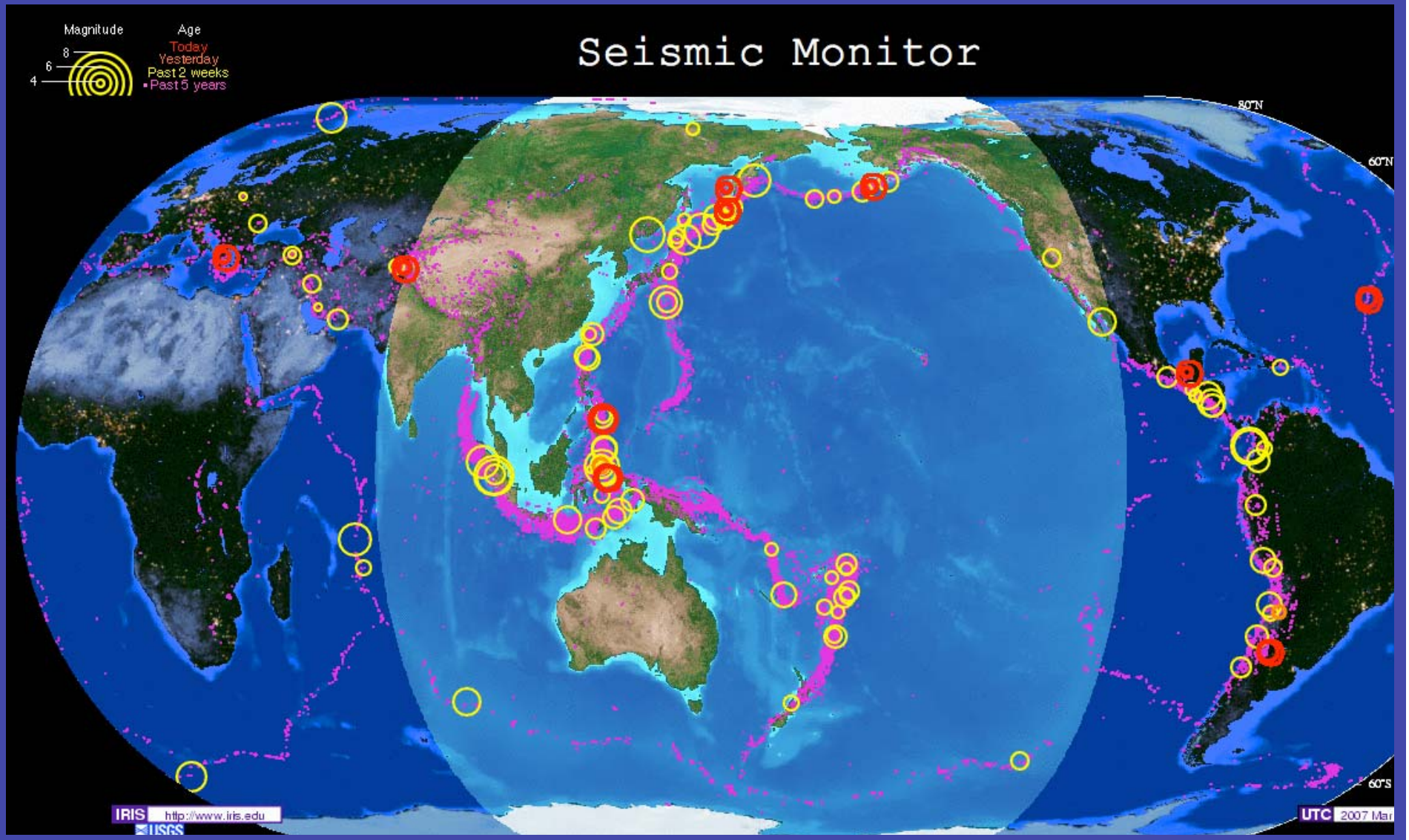
What kind of fault does a subduction zone represent?





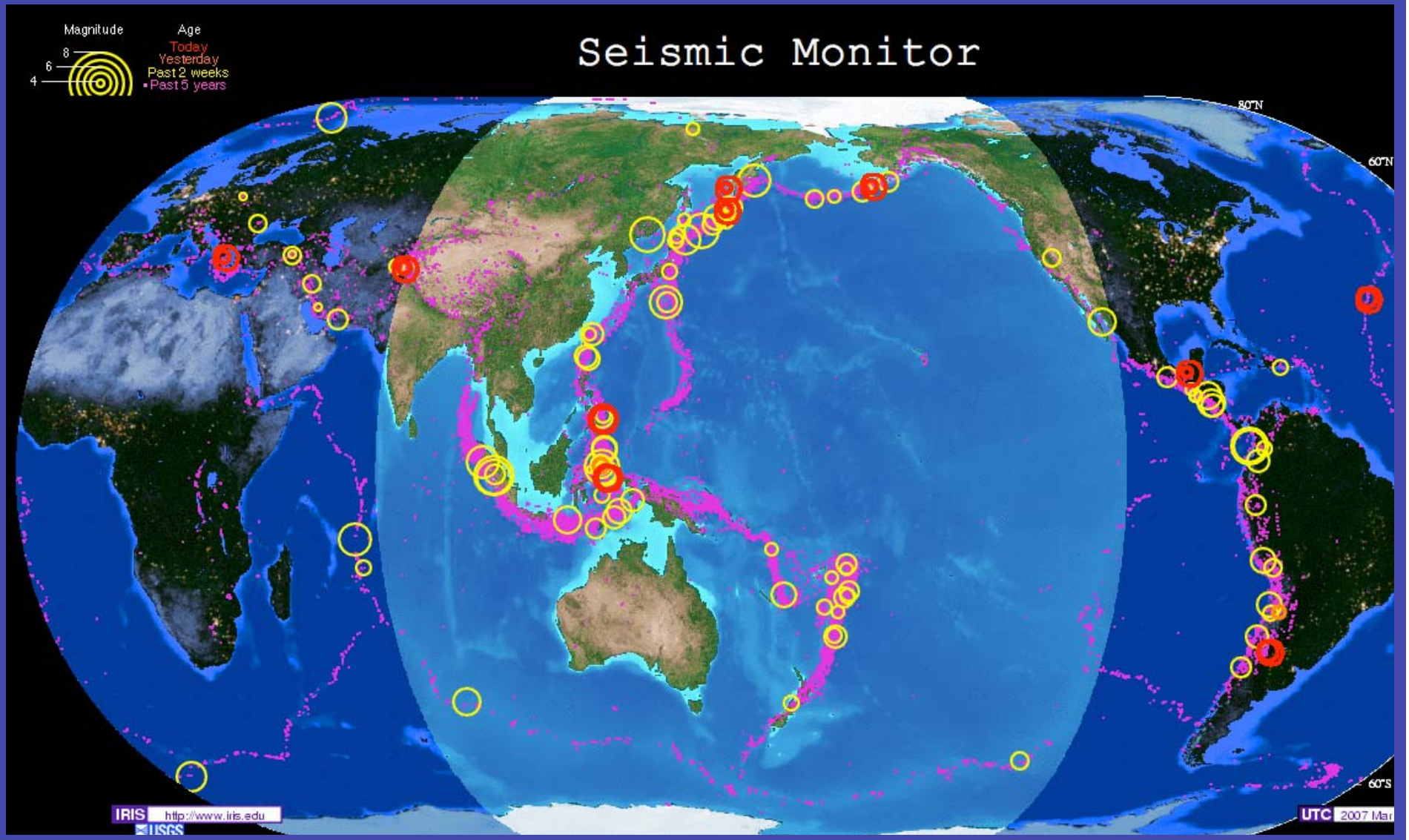
A subduction zone is a low-angle thrust fault

Which earthquakes are associated with volcanic mountain ranges?

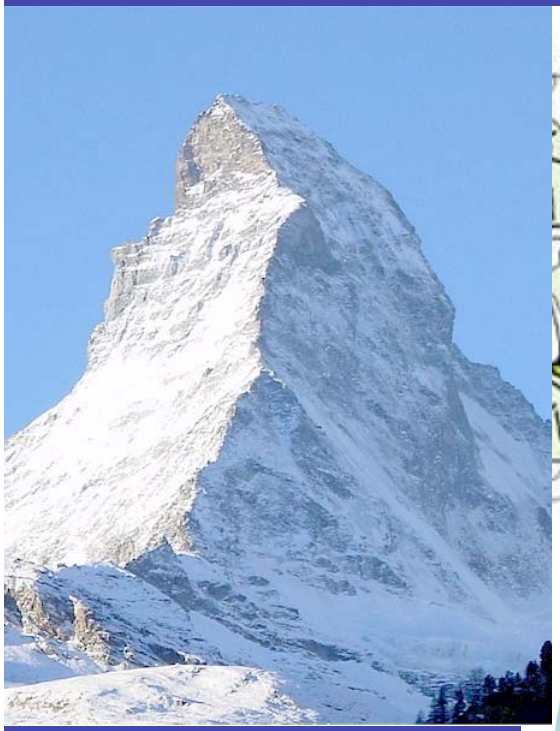


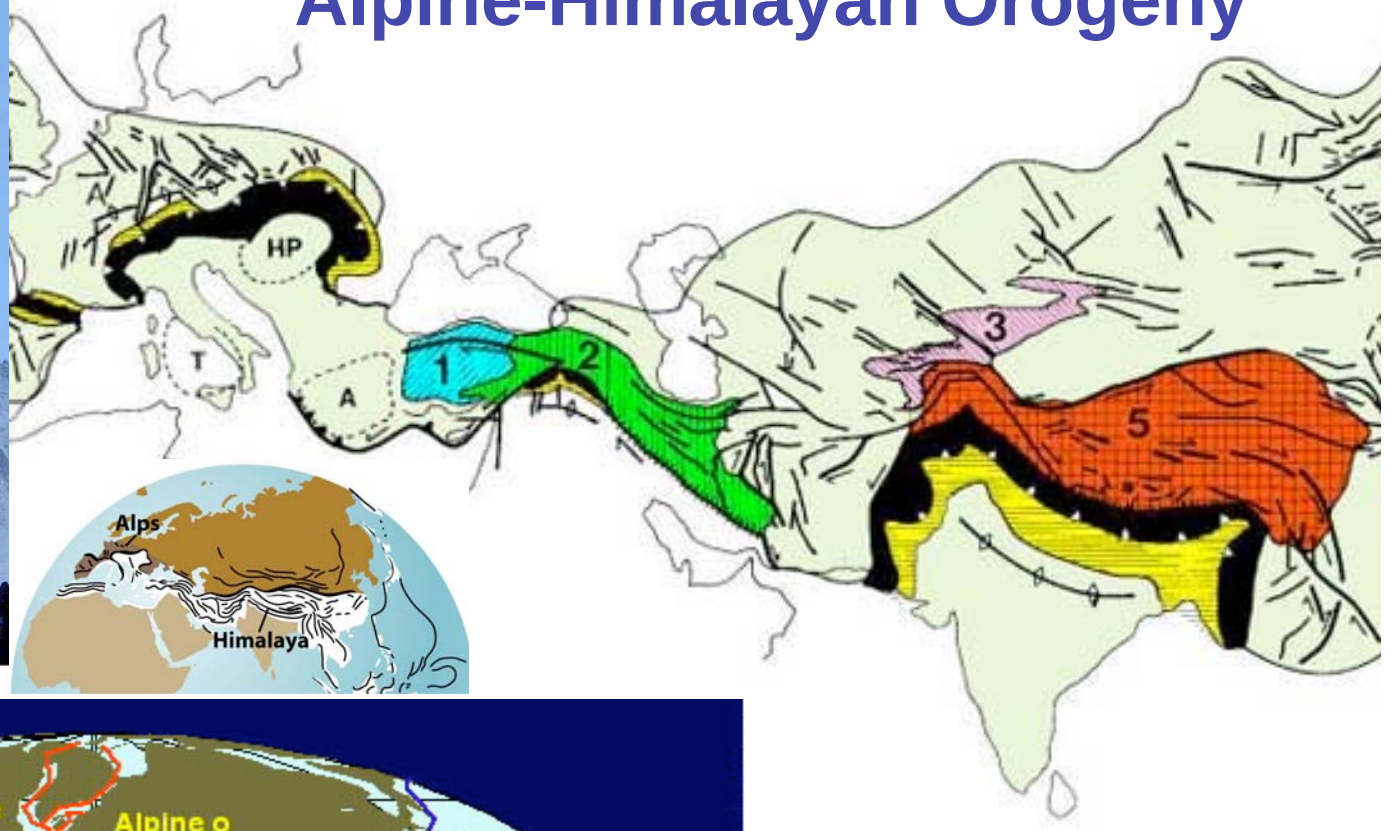

Mountain Building – 3 styles
1) Convergent (volcanic)
2) ?
3) ?

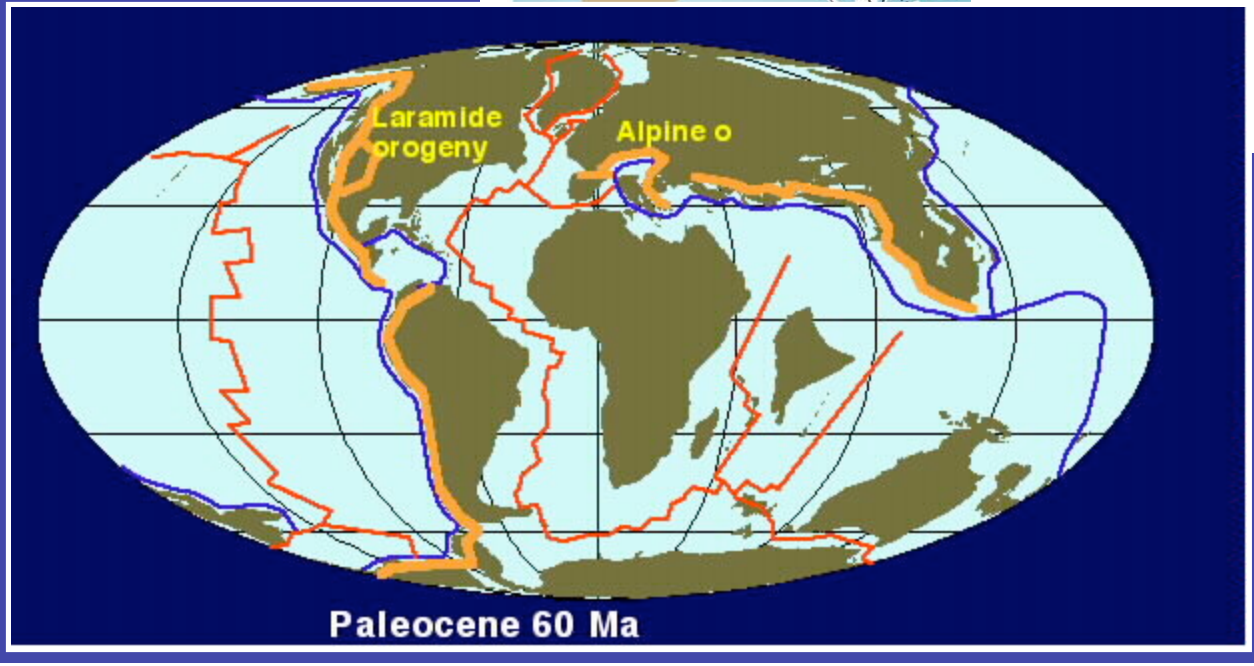
What do earthquakes tell you about continent-continent convergence?



Alpine-Himalayan Orogeny







Atlas, Pyrenees, Alps, Dinaric Alps, Hellenides, Balkan, Taurus, Caucasus, Alborz, Zagros, Hindu Kush, Pamir, Karakoram, Himalayas











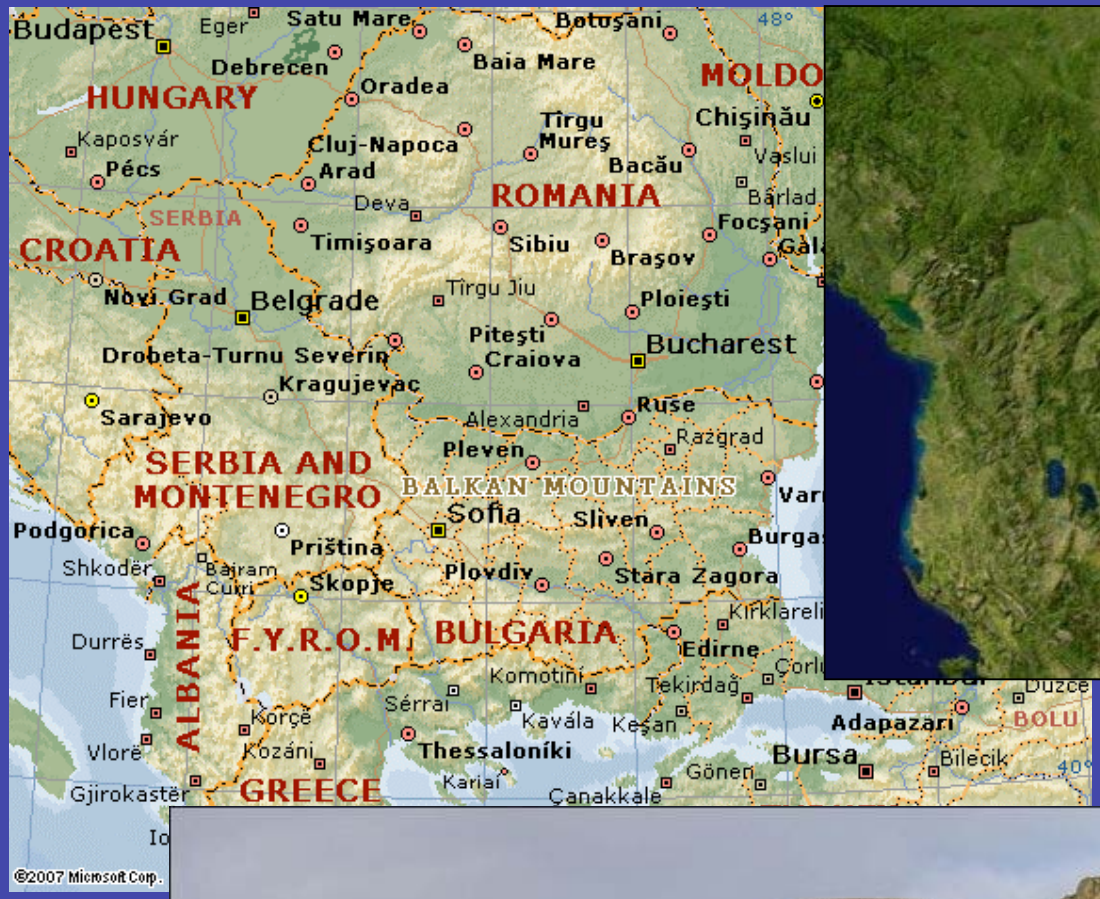
Atlas Mountains - 3 orogenies





Pyrenees Eocene culmination







Balkan Mountains







Alborz, northern Iran
Upper Devonian to Oligocene

Mt. Damavand

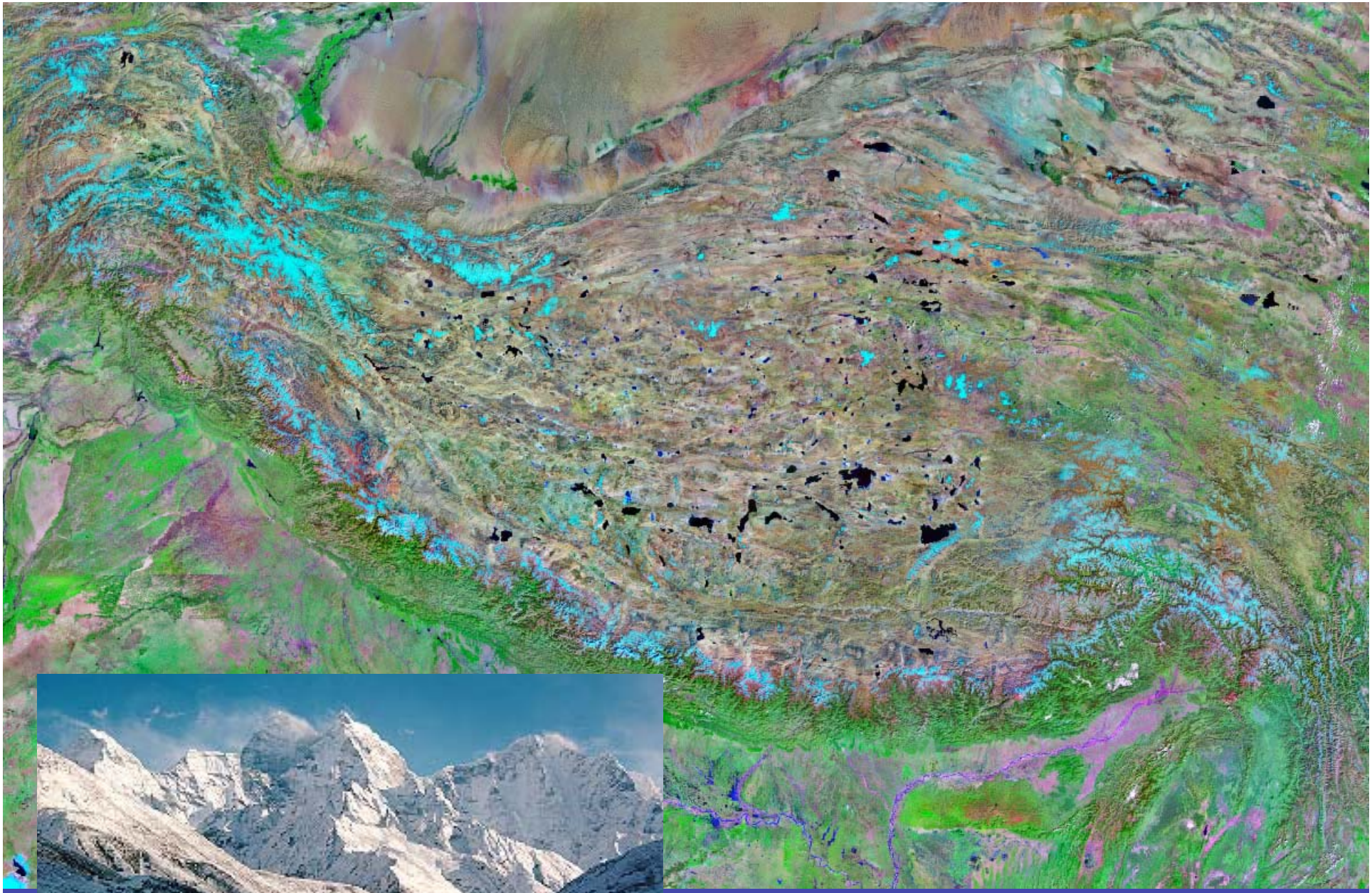




Karakoram – Pakistan, China, India





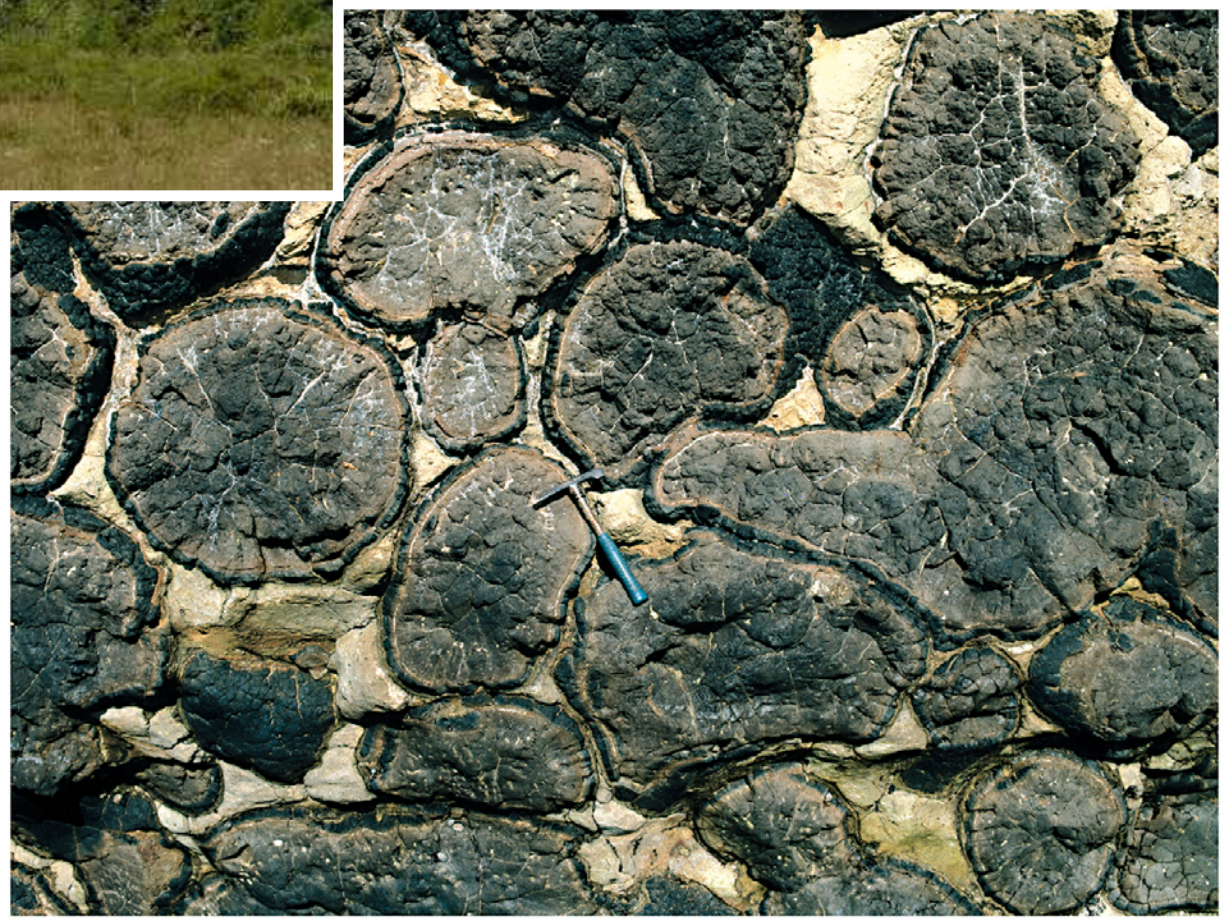


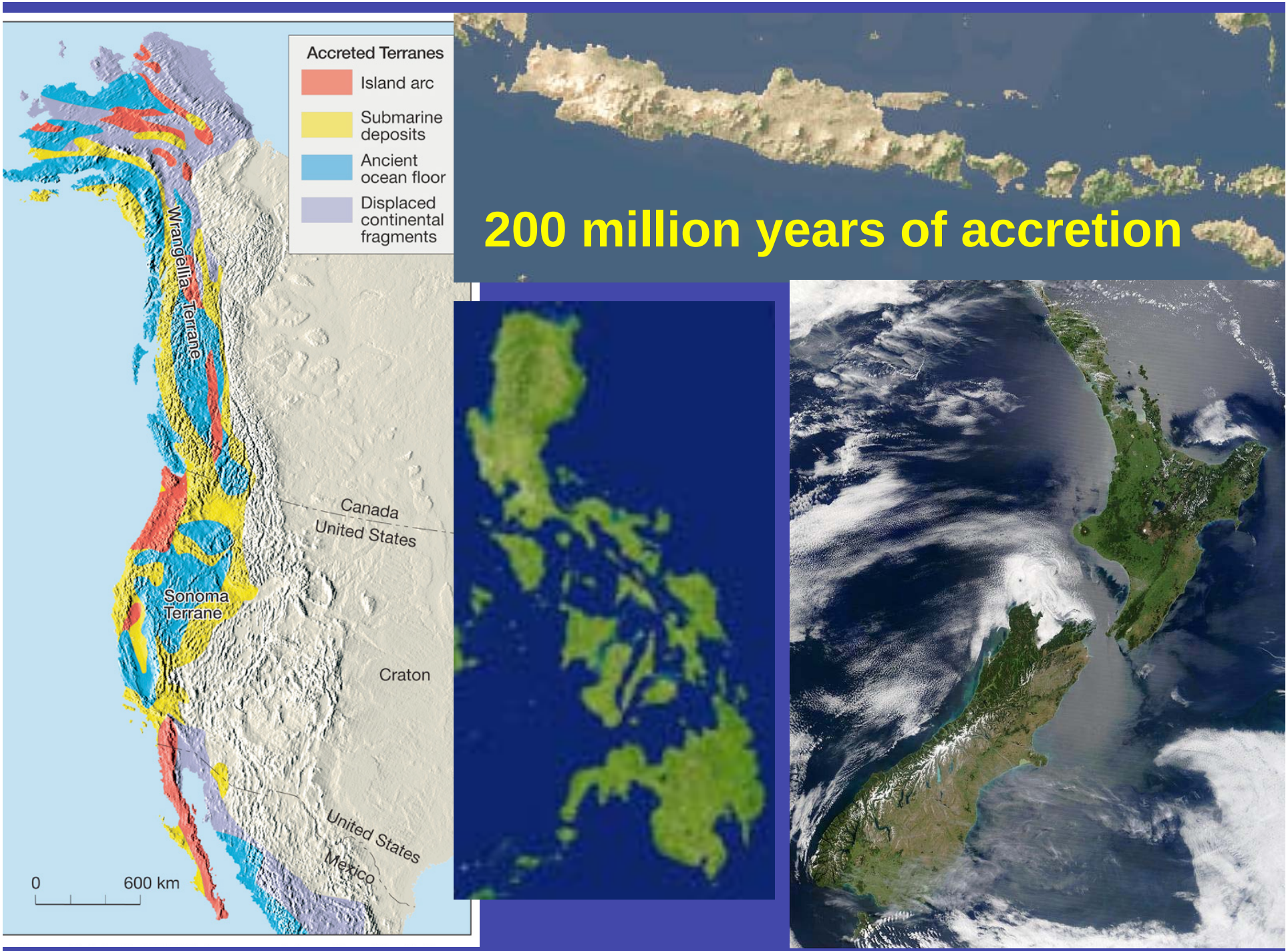
Himalayan Orogeny

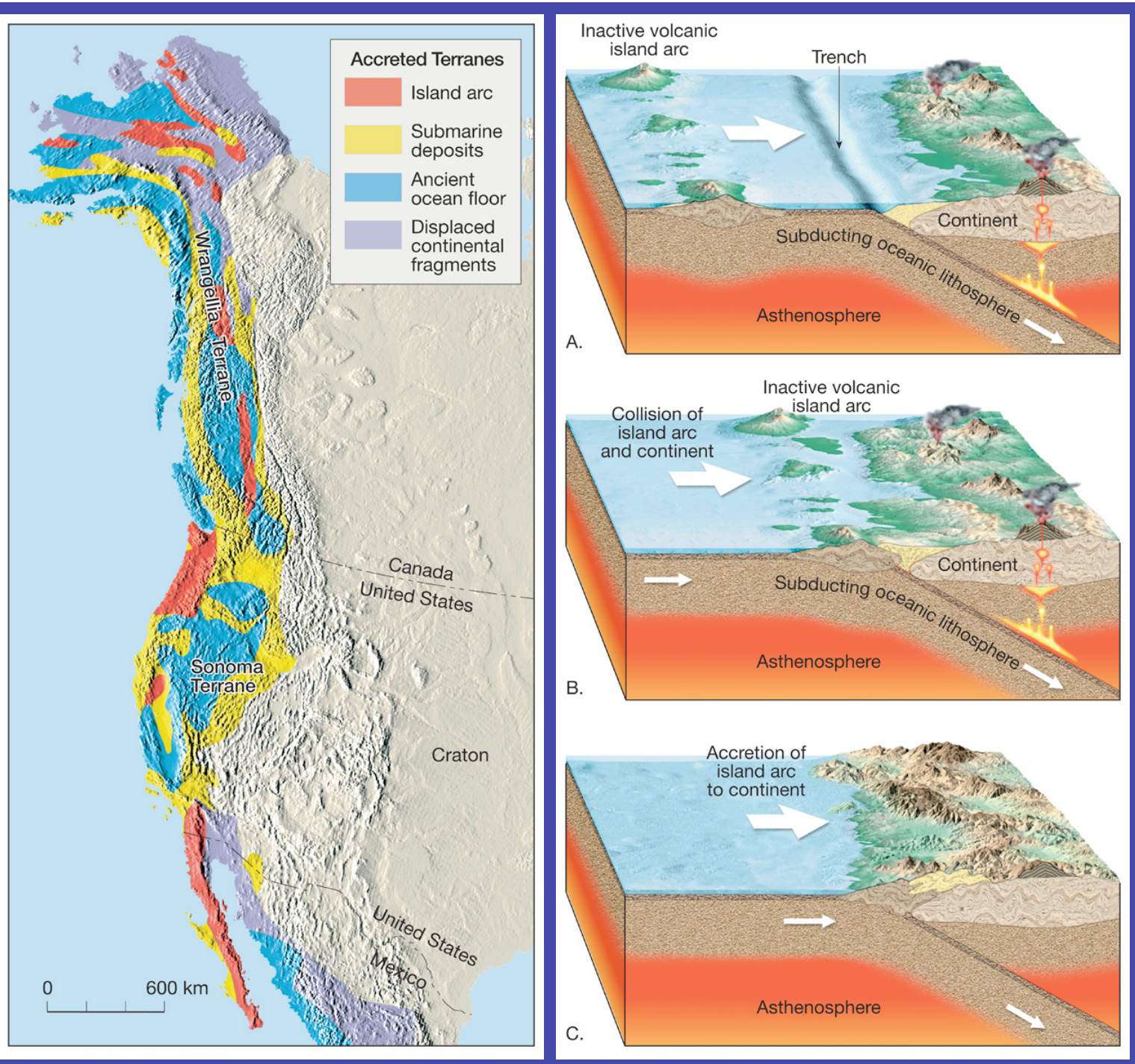


Mary's Peak, Oregon

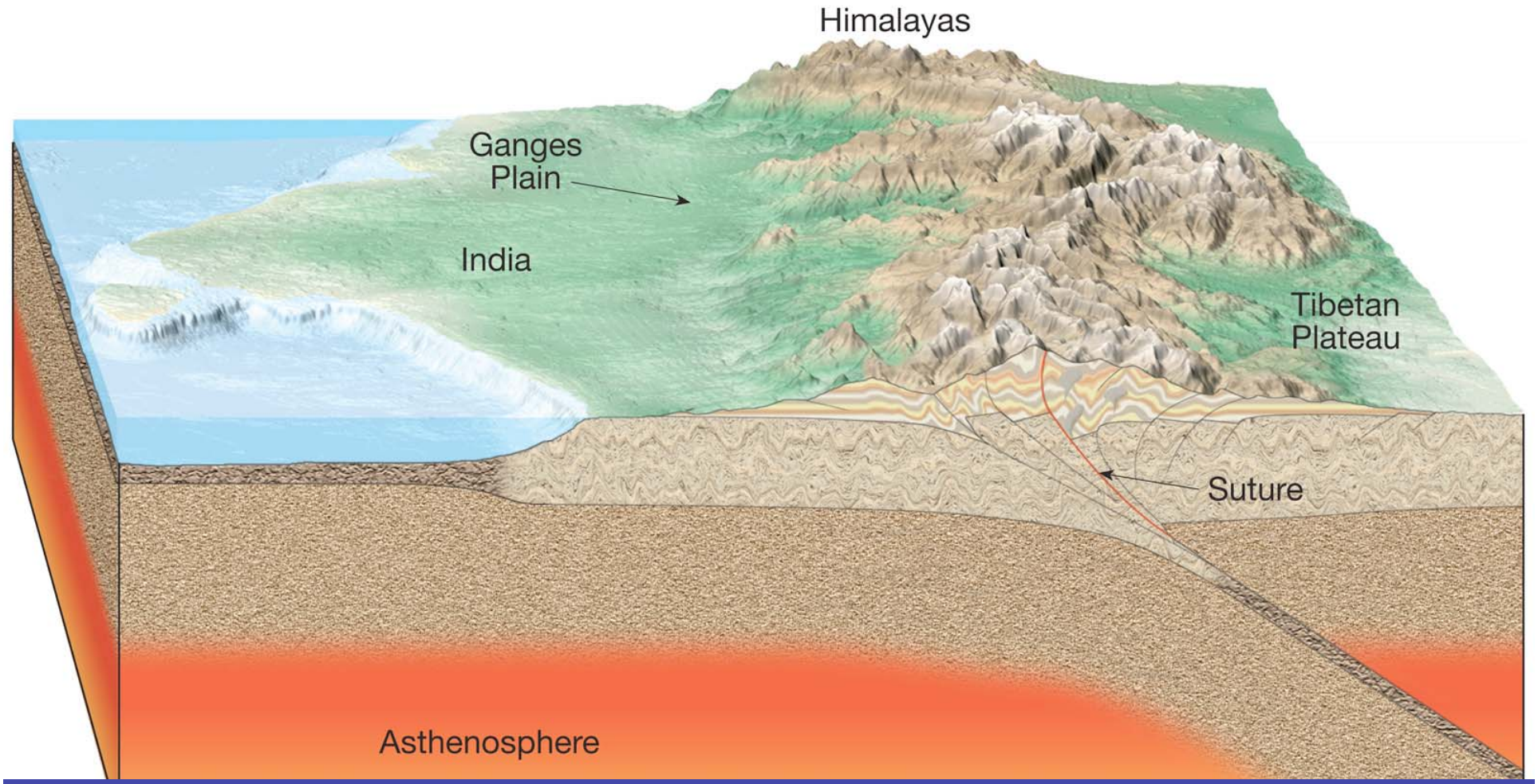
What is this texture?



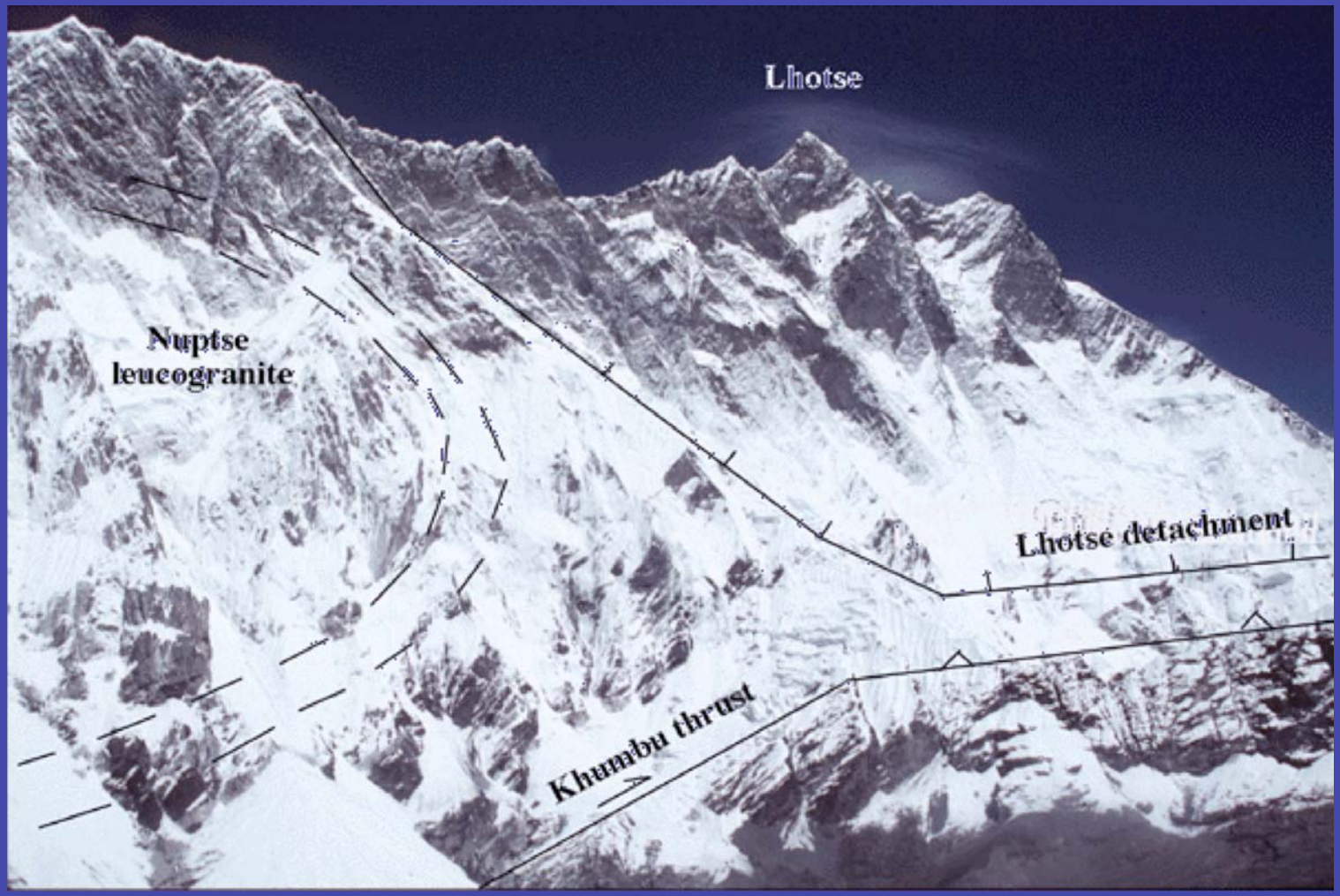

Accreted Terranes
Island arc
Submarine deposits
Ancient ocean floor
Displaced continental fragments
Wrangellia Terrane
Canada
United States
Sonoma Terrane
Craton
United States
Mexico
0
600 km
200 million years of accretion


Accreted Terranes
Island arc
Submarine deposits
Ancient ocean floor
Displaced continental fragments
Wrangellia Terrane
Sonoma Terrane
Canada
United States
Craton
United States
Mexico
0
600 km
Inactive volcanic island arc
Trench
Continent
Subducting oceanic lithosphere
Asthenosphere
A.
Collision of island arc and continent
Inactive volcanic island arc
Continent
Subducting oceanic lithosphere
Asthenosphere
B.
Accretion of island arc to continent
Asthenosphere
C.

What kinds of crustal deformation would you expect in a continental collision zone?

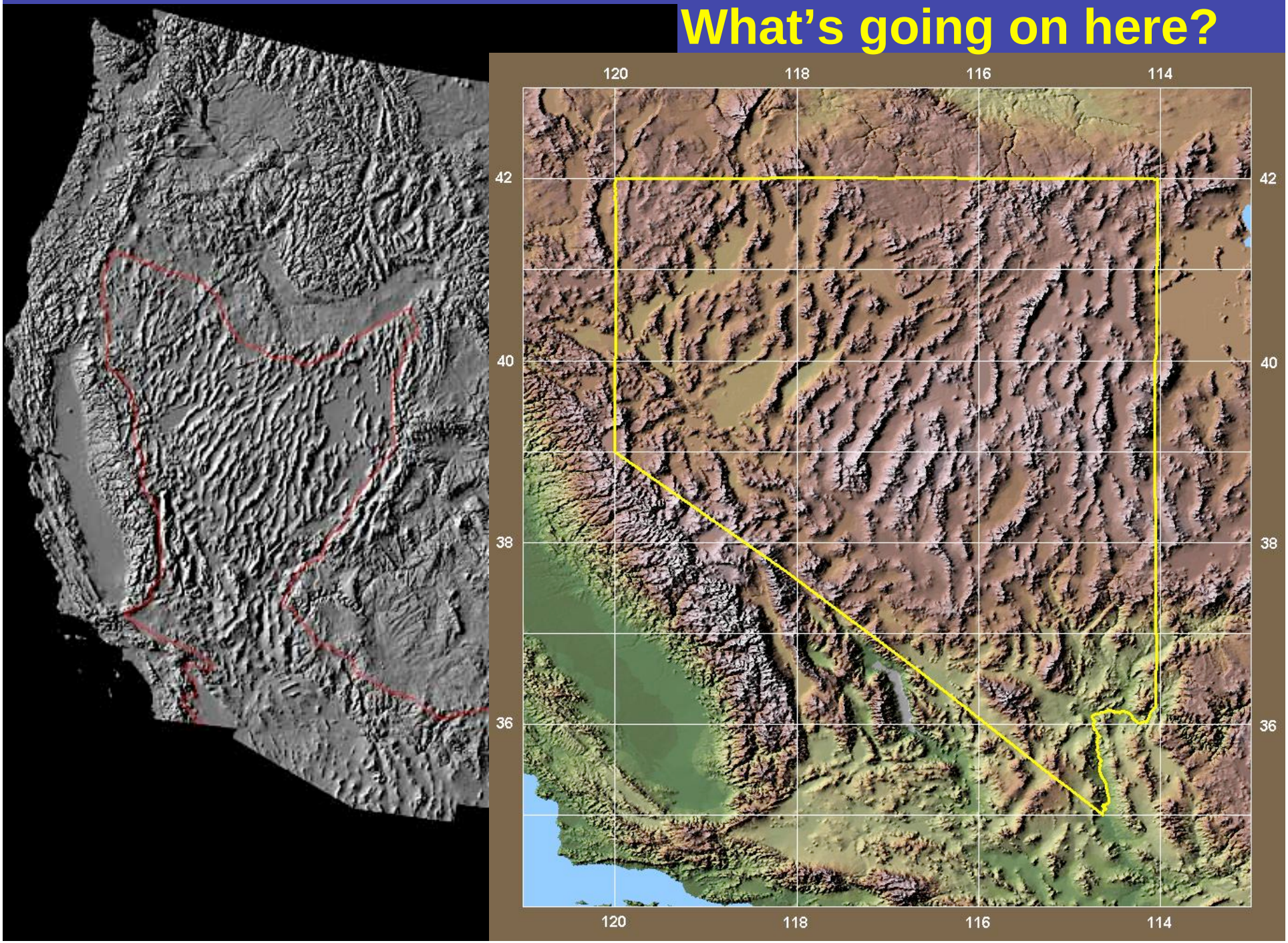


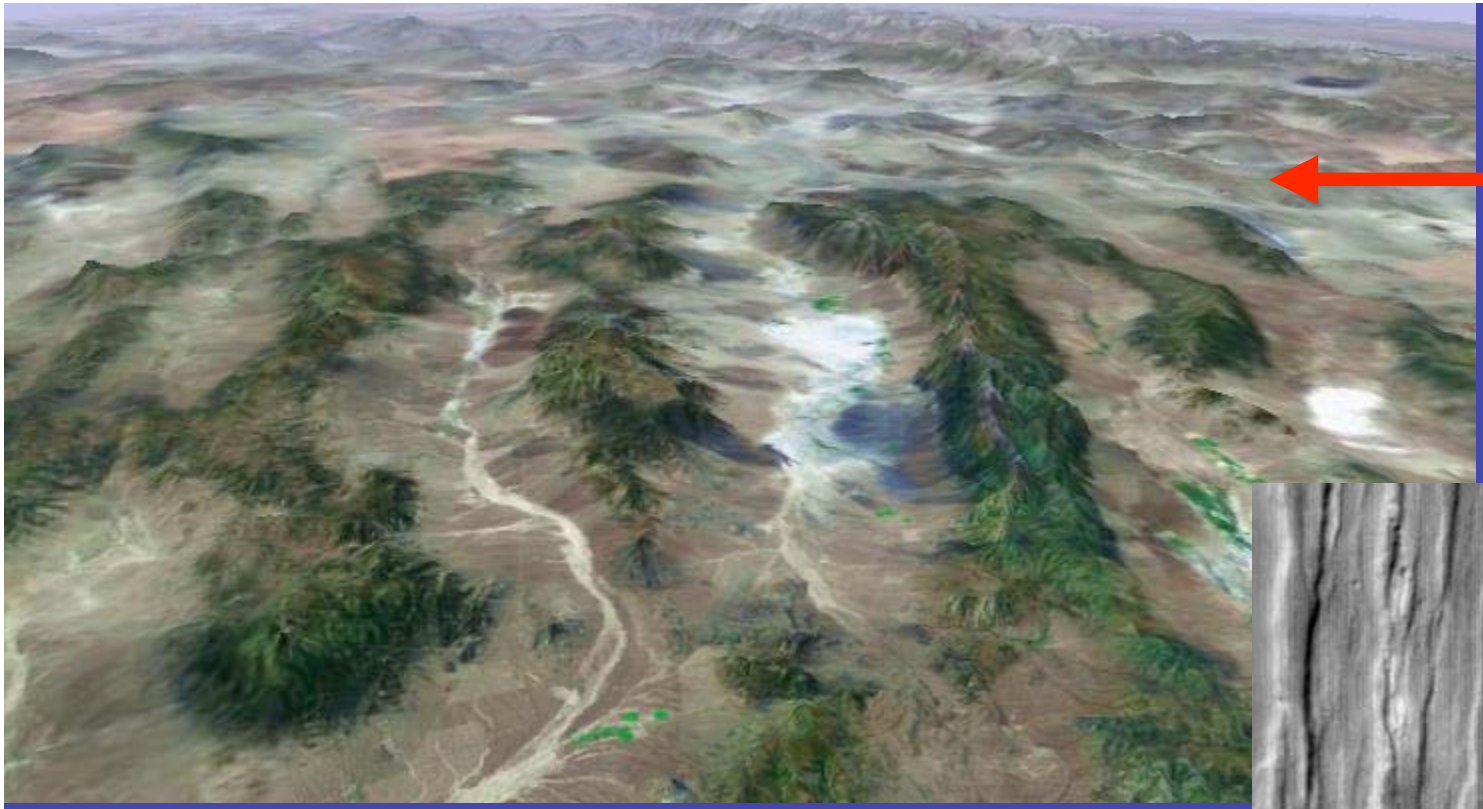
South face of Nuptse and Lhotse, Khumbu Himalaya, Nepal




Mountain Building – 3 styles
1) Convergent (volcanic)
2) Convergent (continental collision)
3) ?

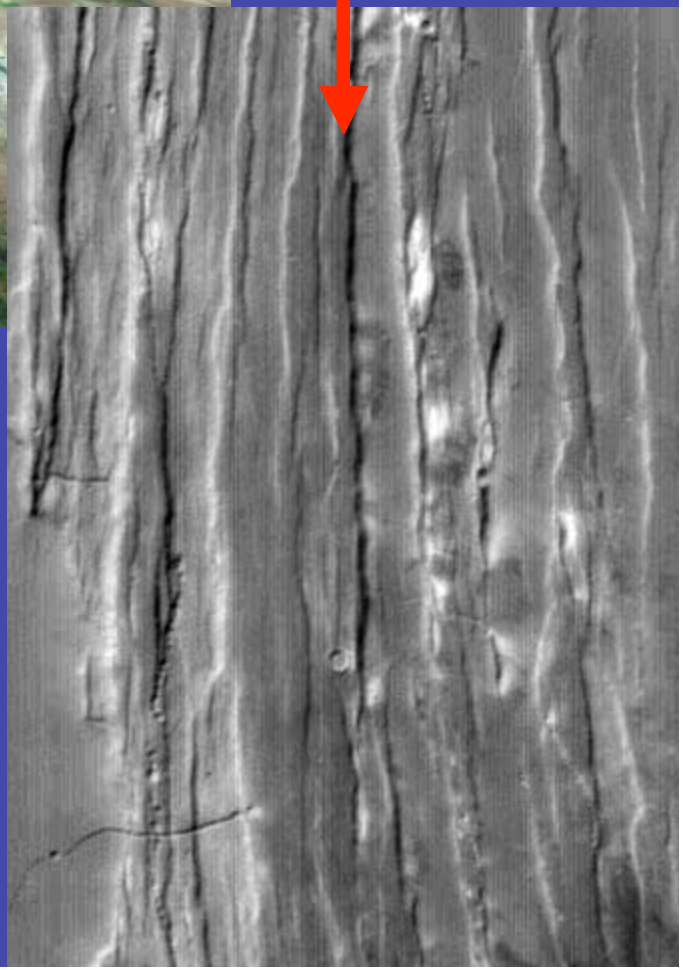
What's going on here?





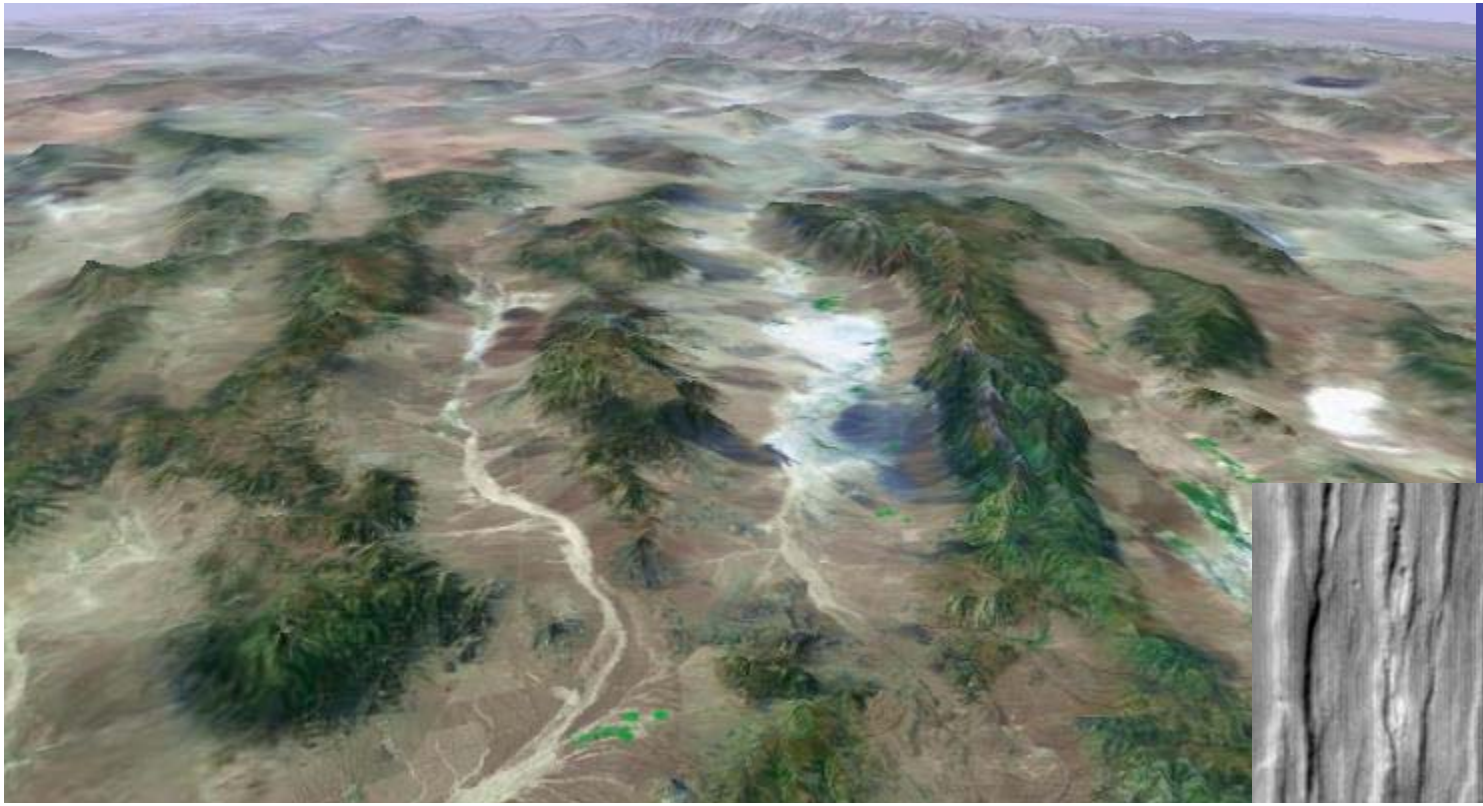
Nevada

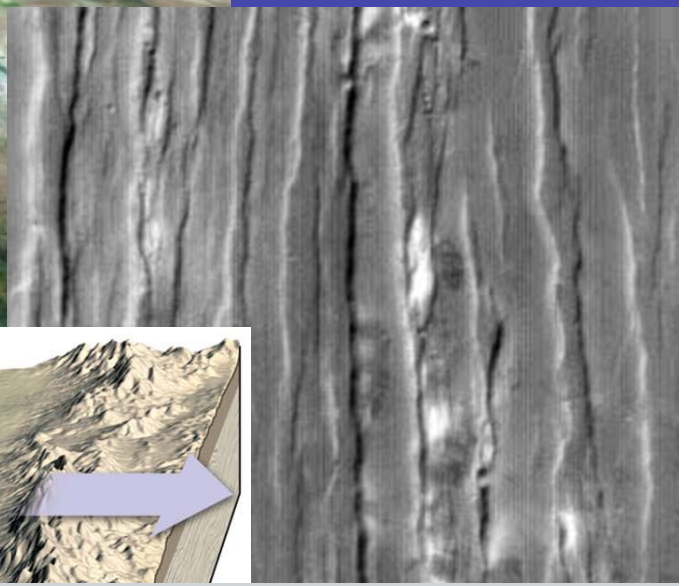
Mars

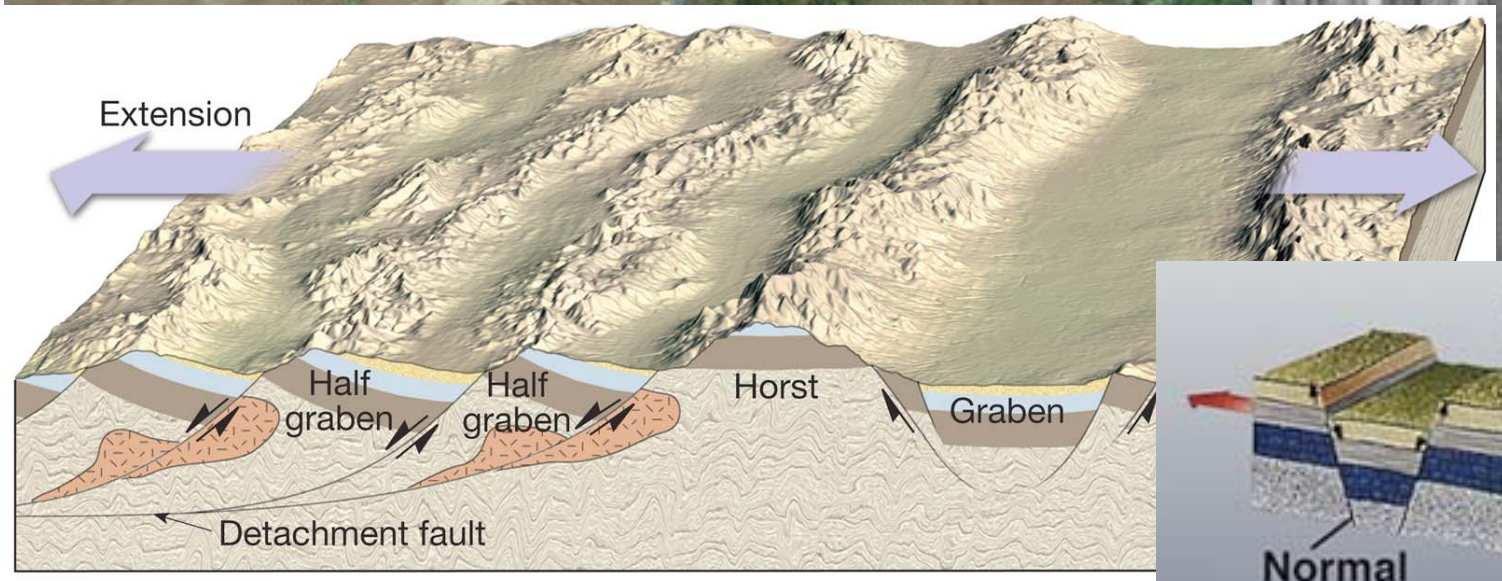


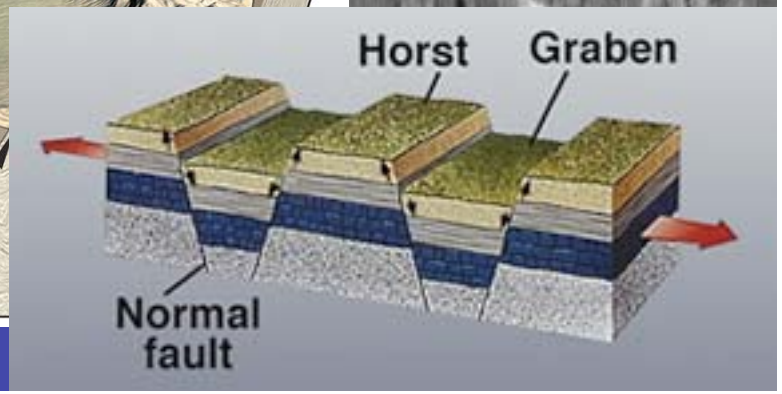
What kind of stress regime does this <u>basin and range</u> topography represent?

Extension produces normal faulting

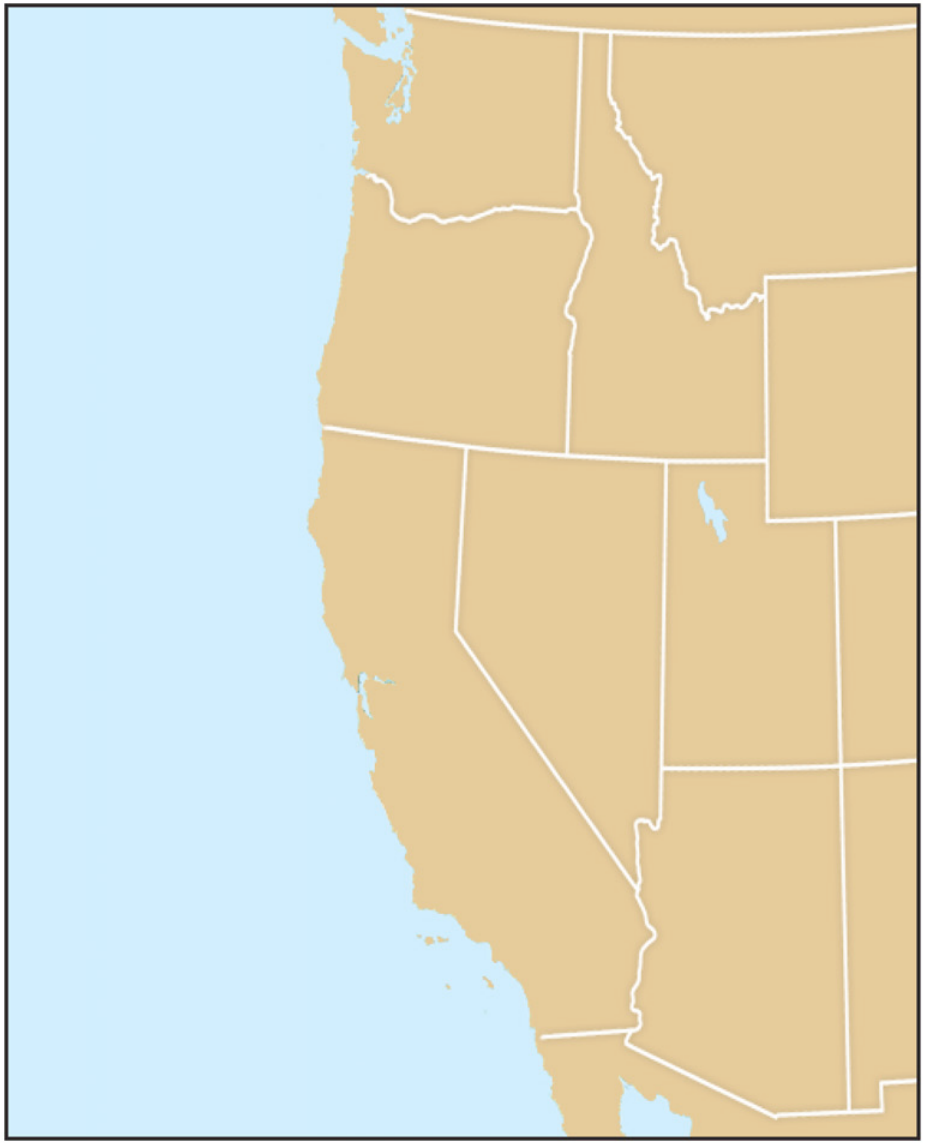


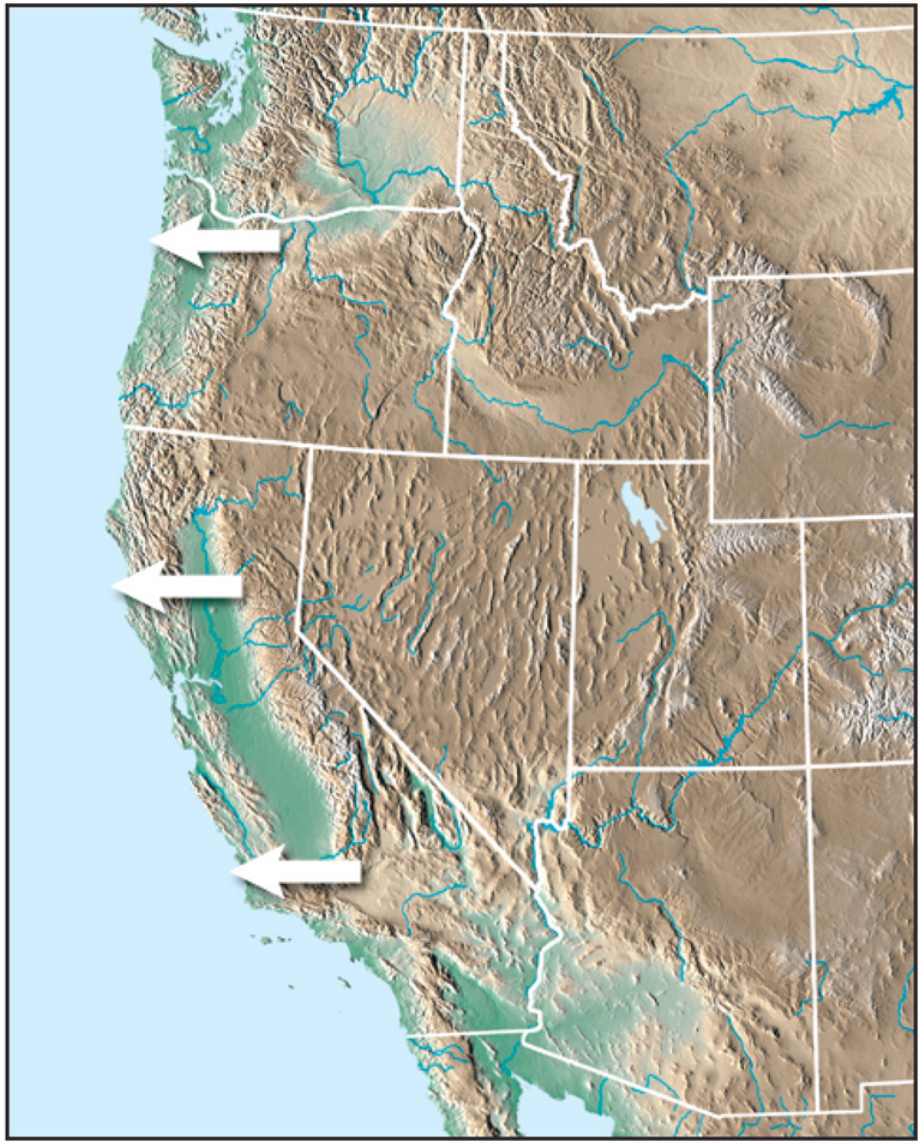






Extension caused by upwarping from mantle flow over last 20 million yrs.






Mountain Building – 3 styles
1) Convergent (volcanic)
2) Convergent (continental collision)
3) Fault block mountains (Basin & Range)