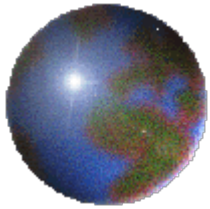


Introduction to Physical Geology

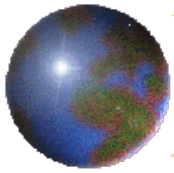


Chapter 12 Part I Geologic Structures

By Dr. Jia Hui

School of Earth Sciences and Engineering

Xi'an Shiyou University



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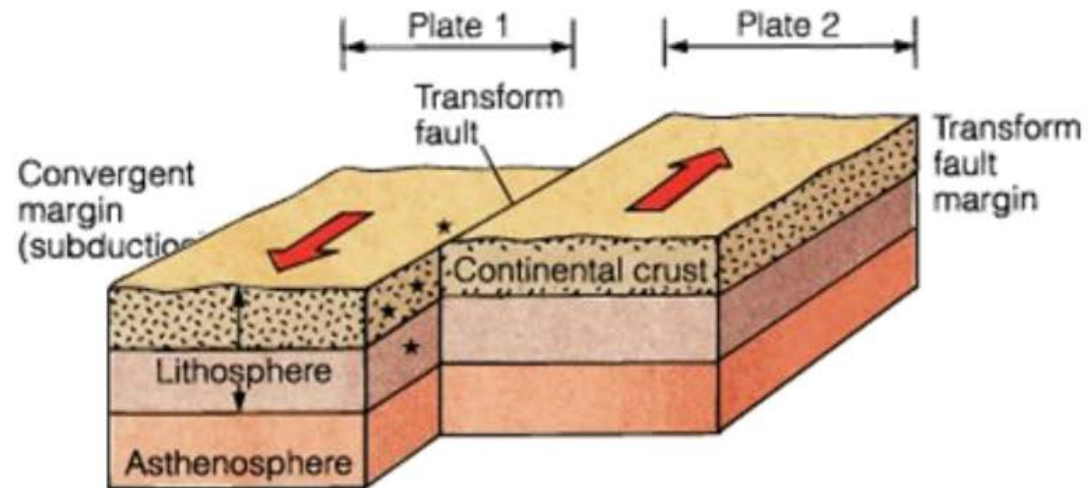
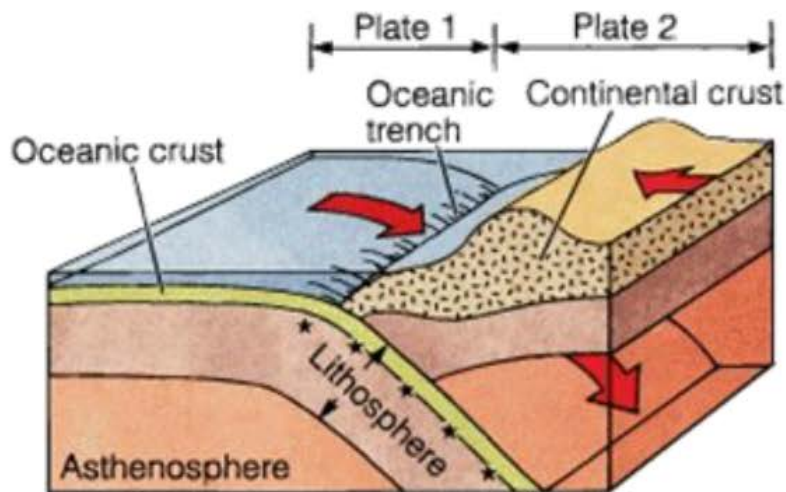
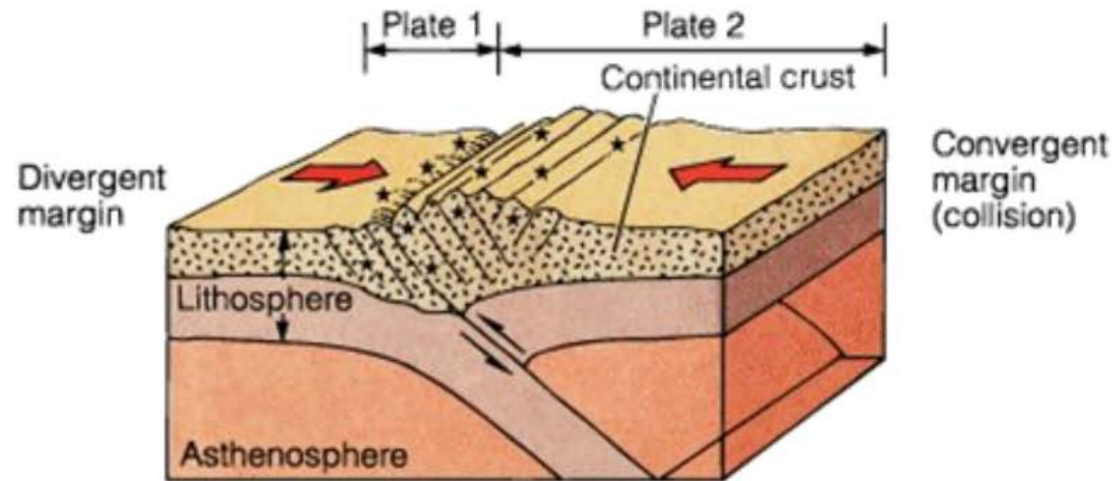
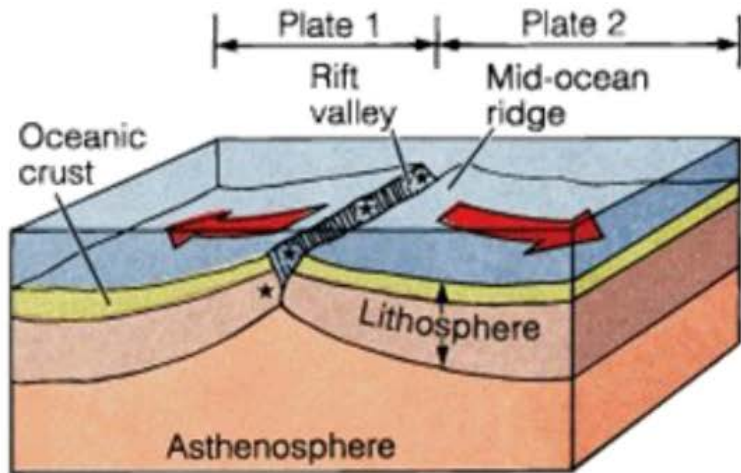
B) Faults (Dip-Slip Faults & Strike-Slip Faults)



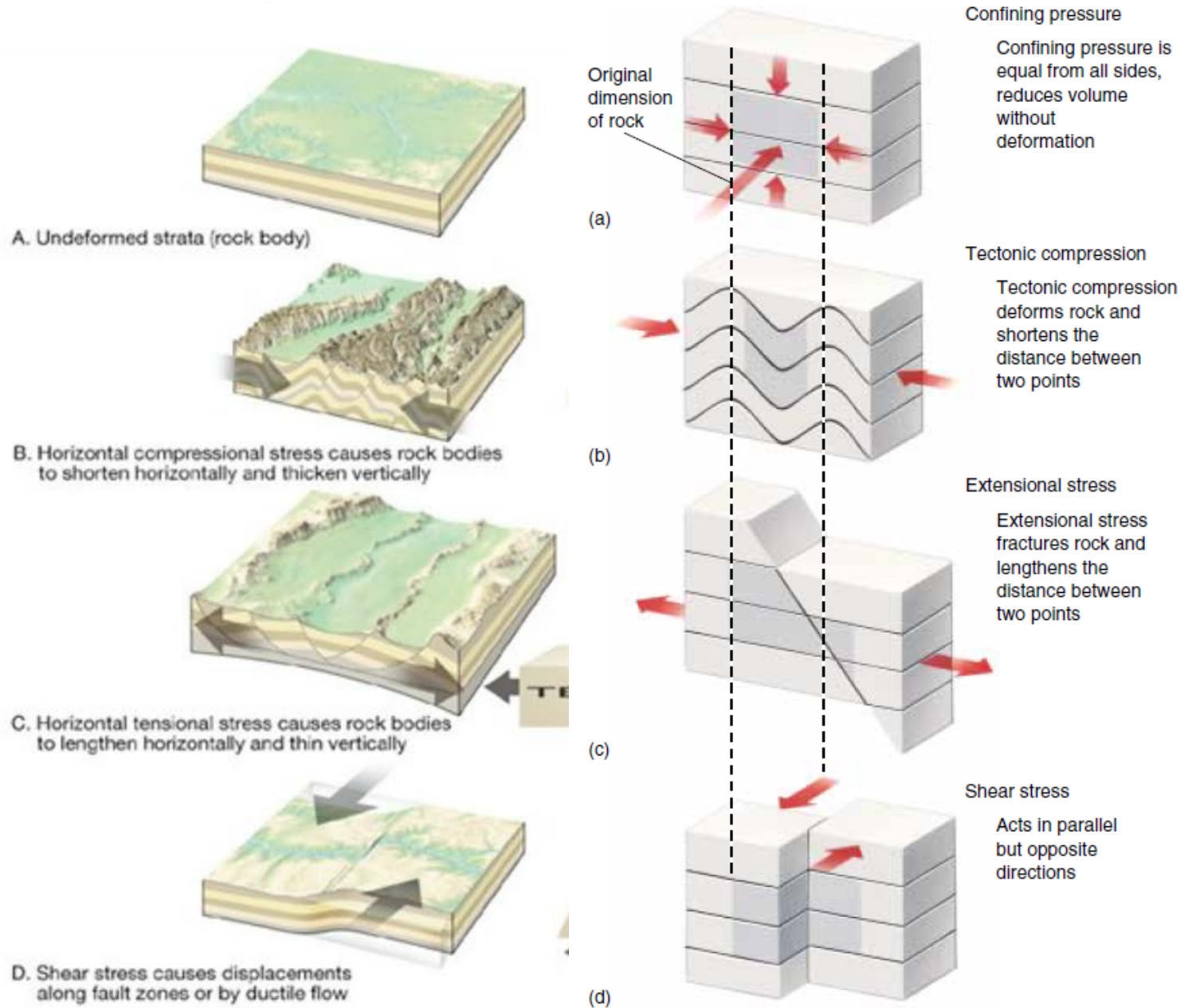
12.5 Conclusions

Stress is a force exerted against an object.

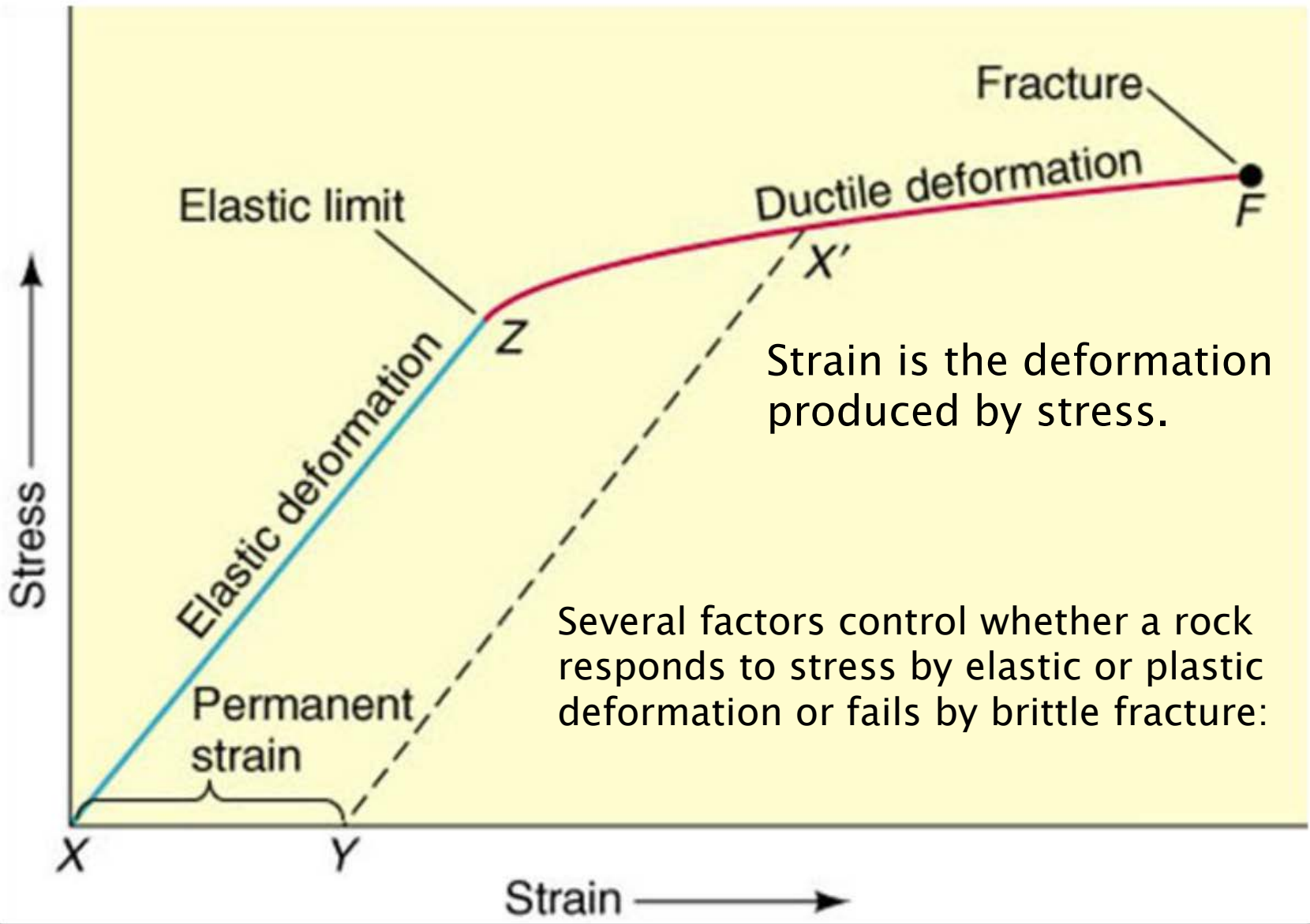
Tectonic Settings



Types of Stress

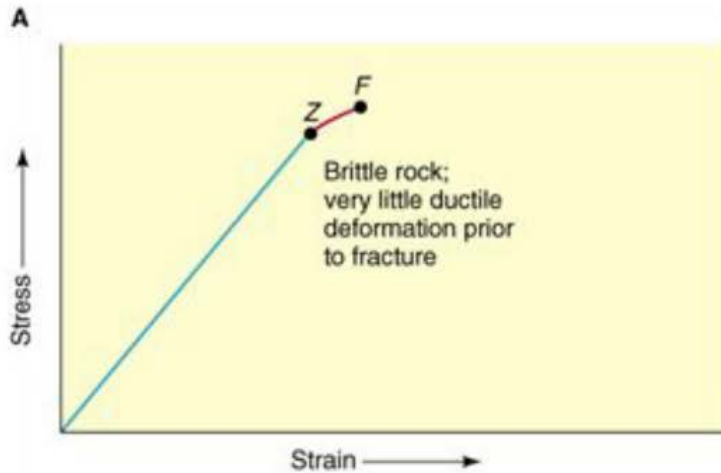


Stress and Strain

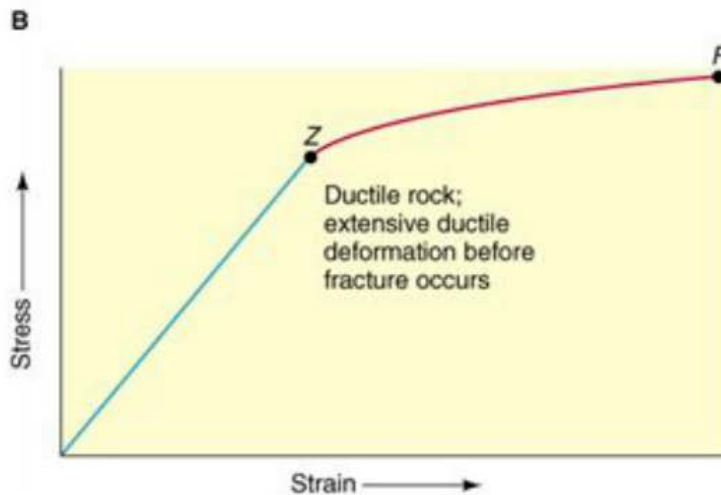


Stress and Strain

Types of Deformation



• Brittle

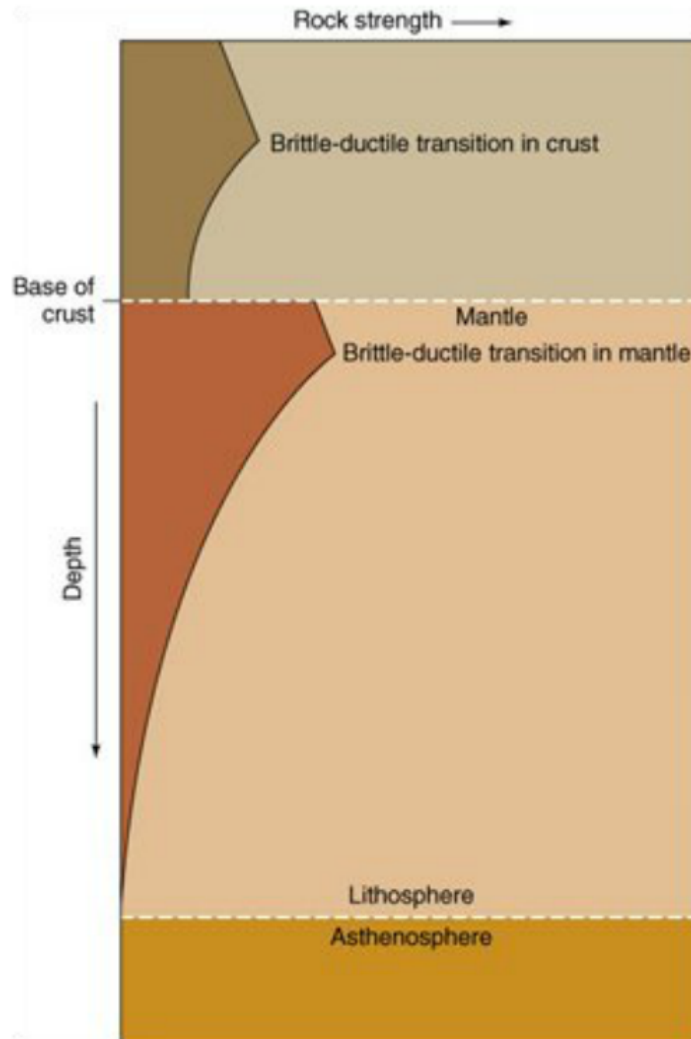


• Ductile (Plastic)

Stress and Strain

Types of Deformation - Controlling Factors

- Temperature
- Pressure
- Strain Rate
- Rock Type

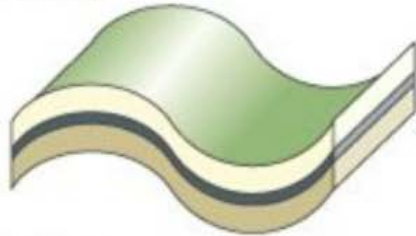


Tectonics, Stress and Strain

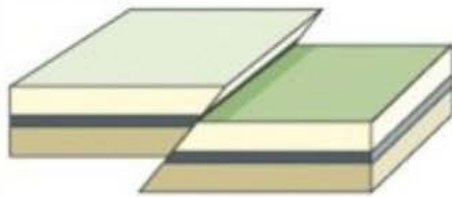
COMPRESSIVE FORCES



Folding



Faulting

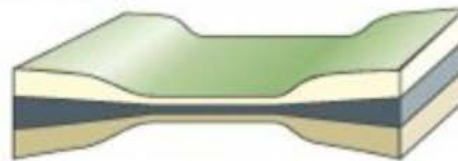


Convergent
Plate
Boundary

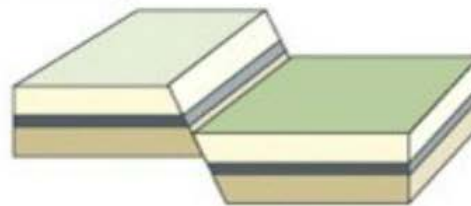
TENSIONAL FORCES



Stretching and thinning



Faulting

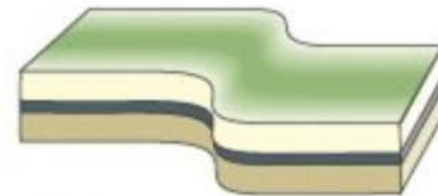


Divergent
Plate
Boundary

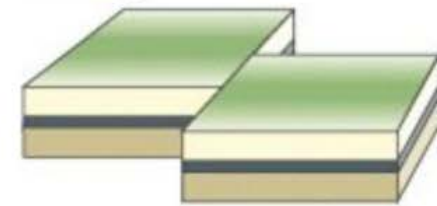
SHEARING FORCES



Shearing



Faulting

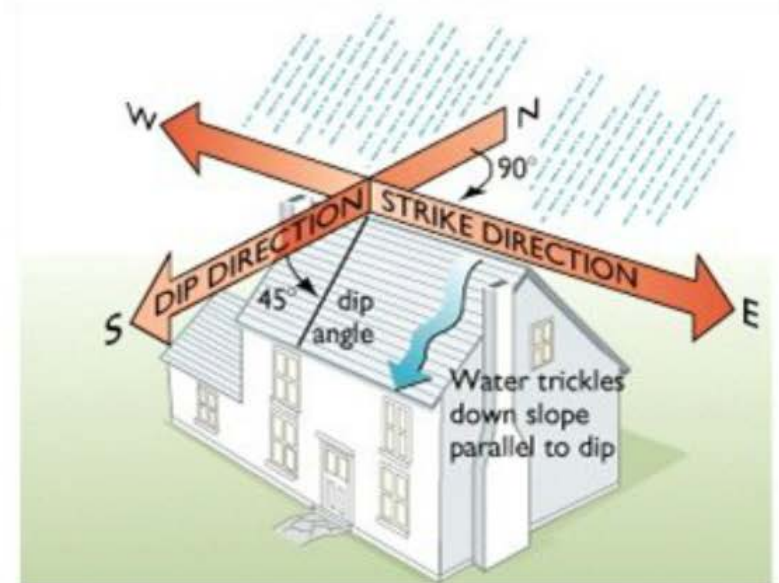
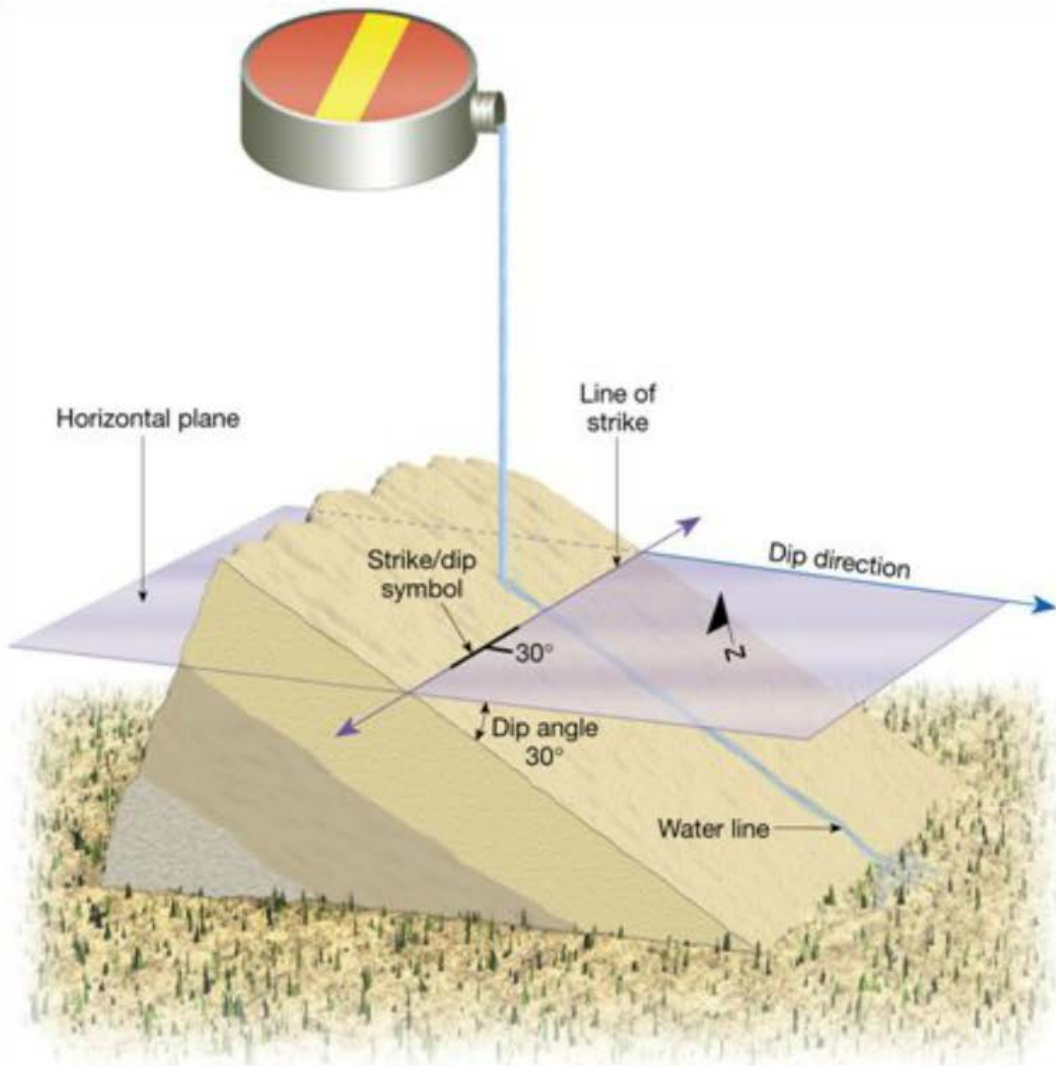


Transform
Plate
Boundary

Ductile

Brittle

Strike and Dip

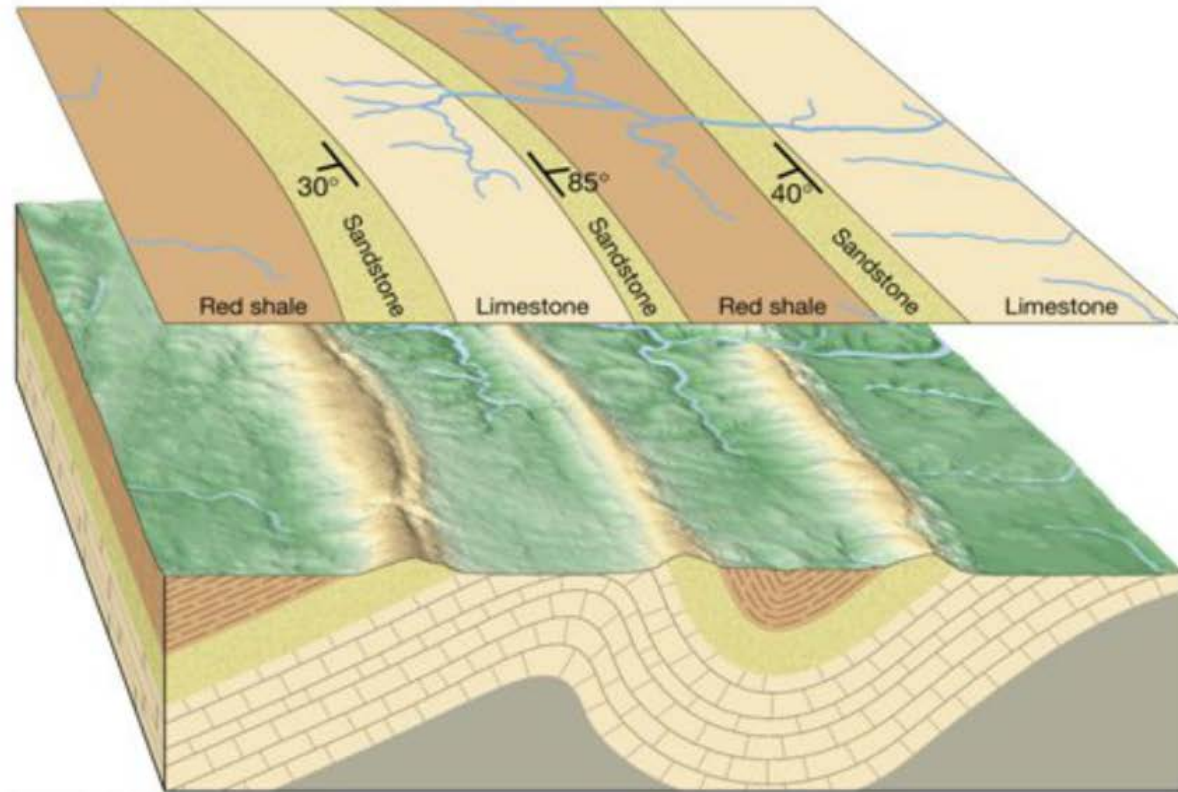


Strike and Dip



Geologic Mapping

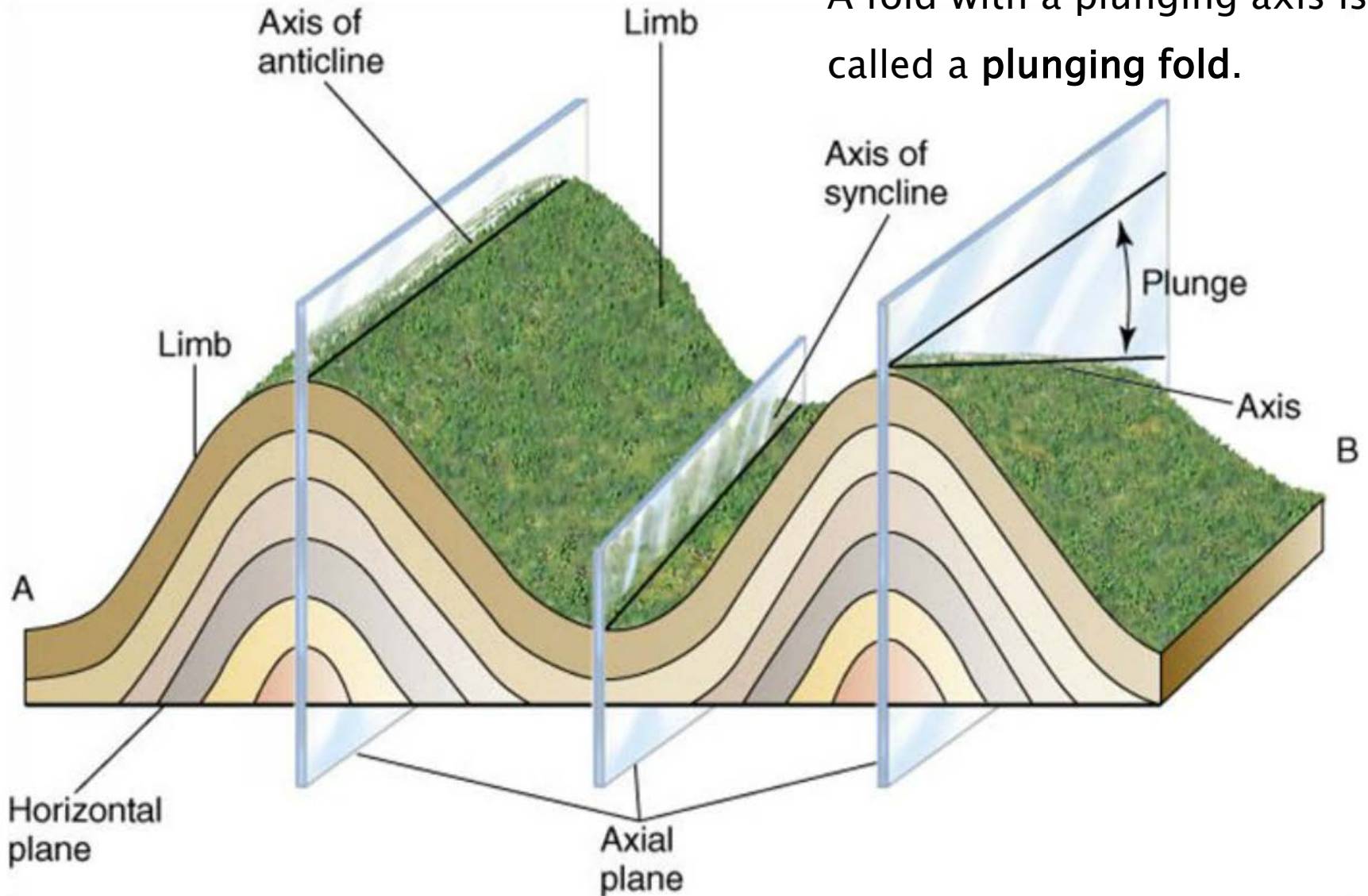
A. Map view



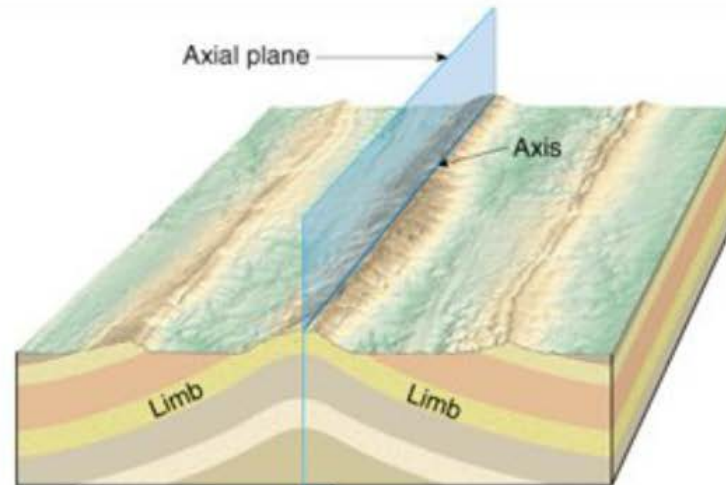
B. Block diagram

Folds

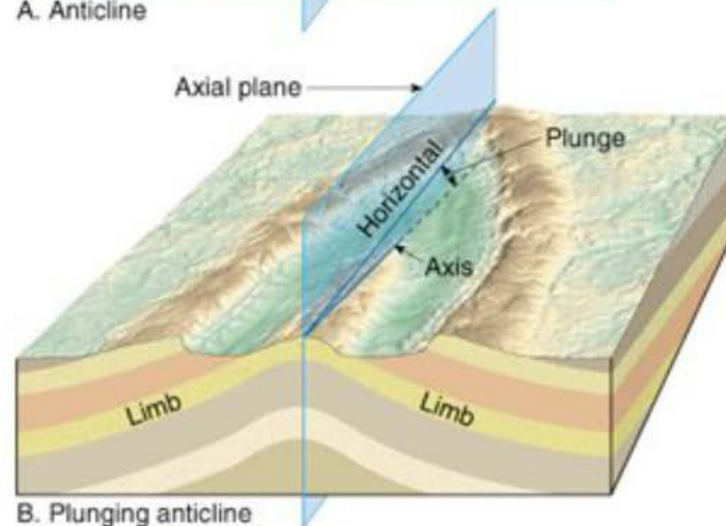
The axis is inclined or tipped at an angle called the **plunge**. A fold with a plunging axis is called a **plunging fold**.



Folds

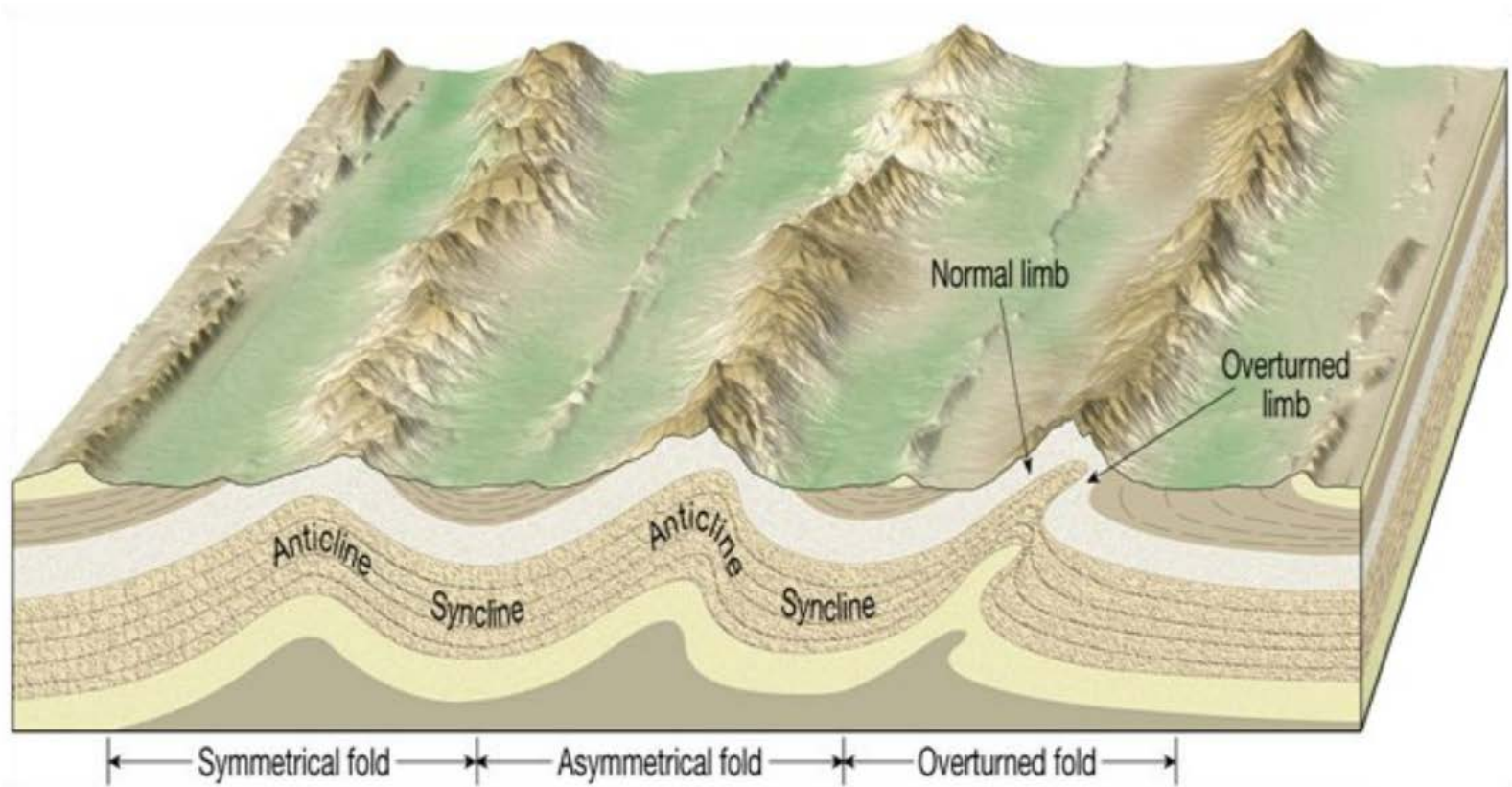


A. Anticline

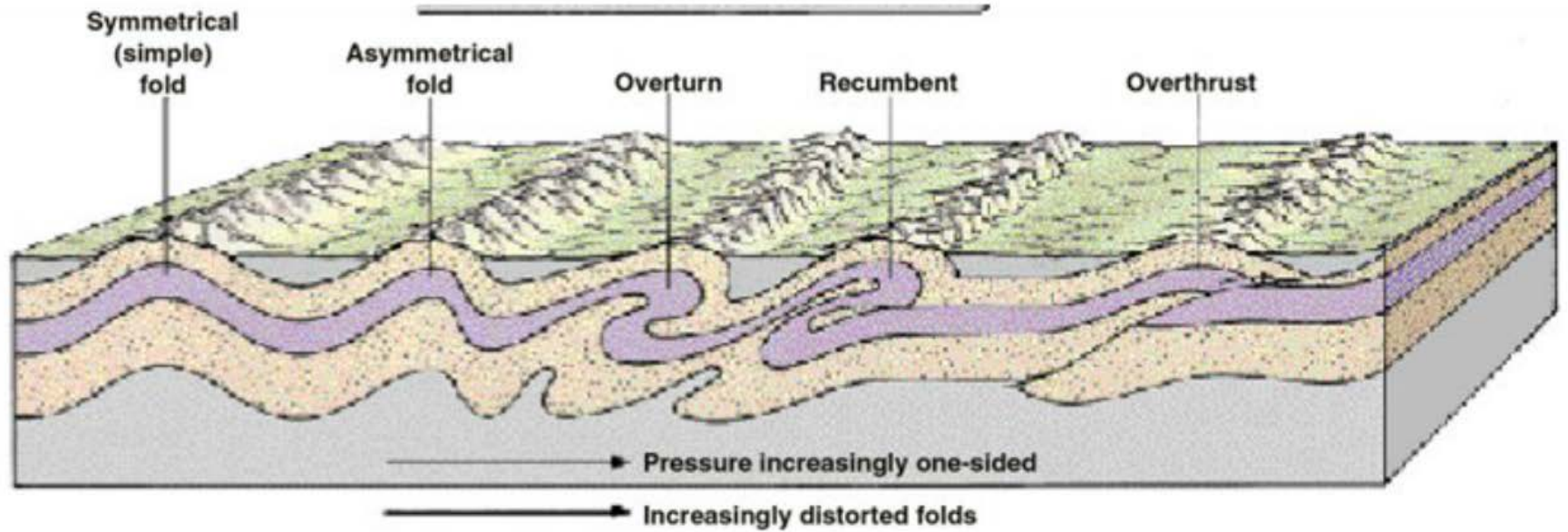


B. Plunging anticline

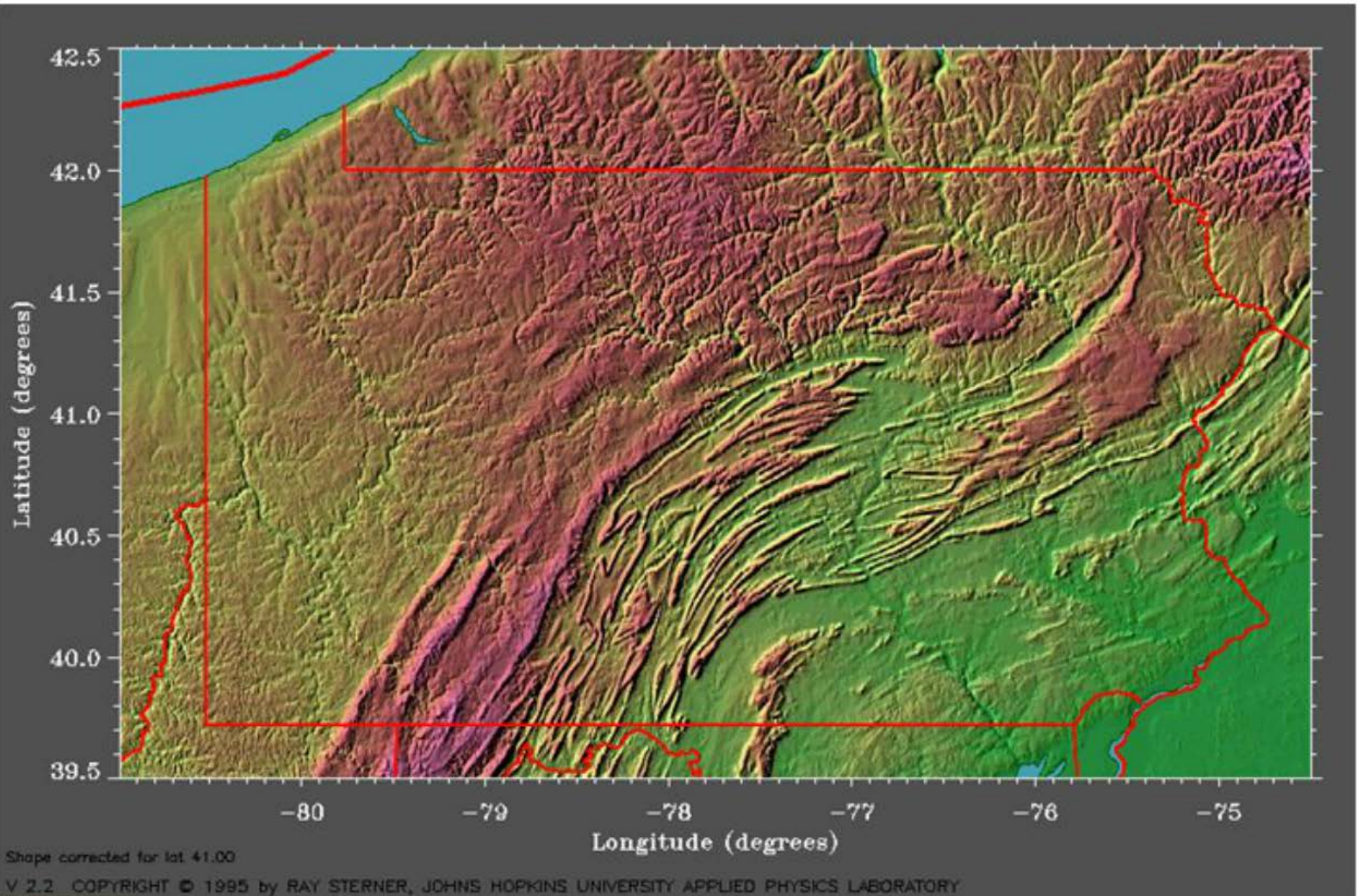
A Series of Folds



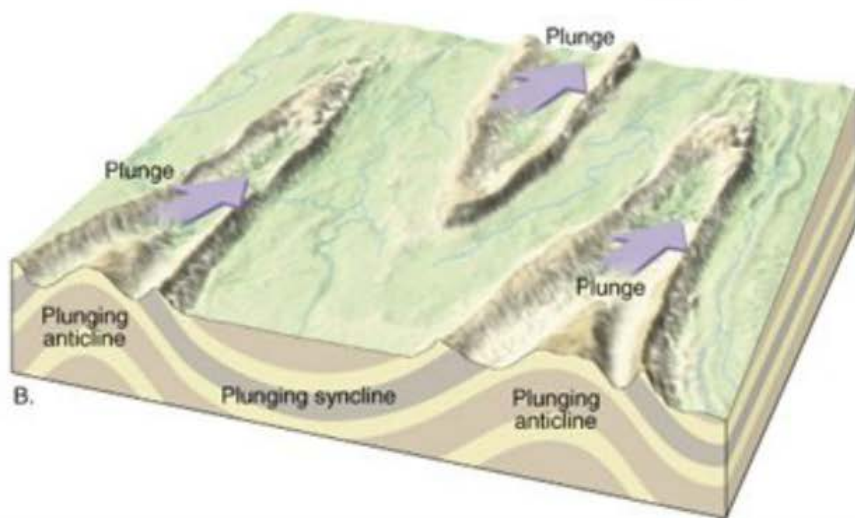
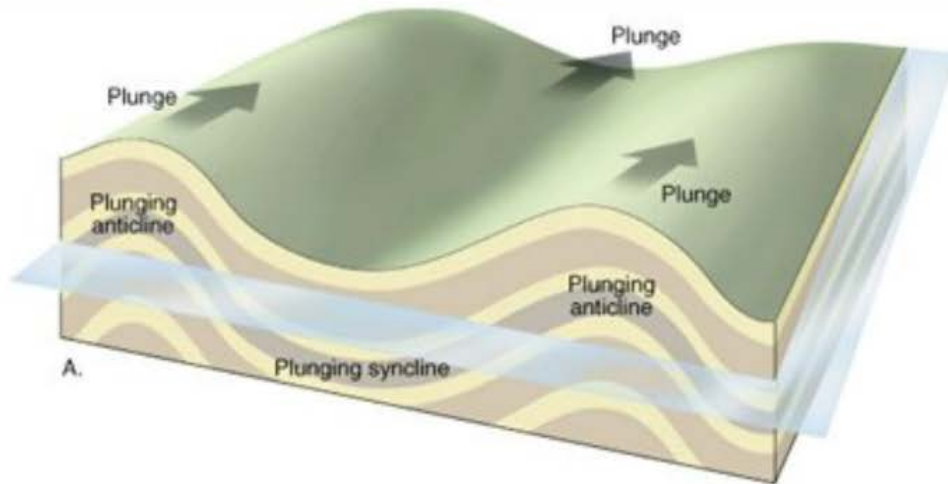
Folds



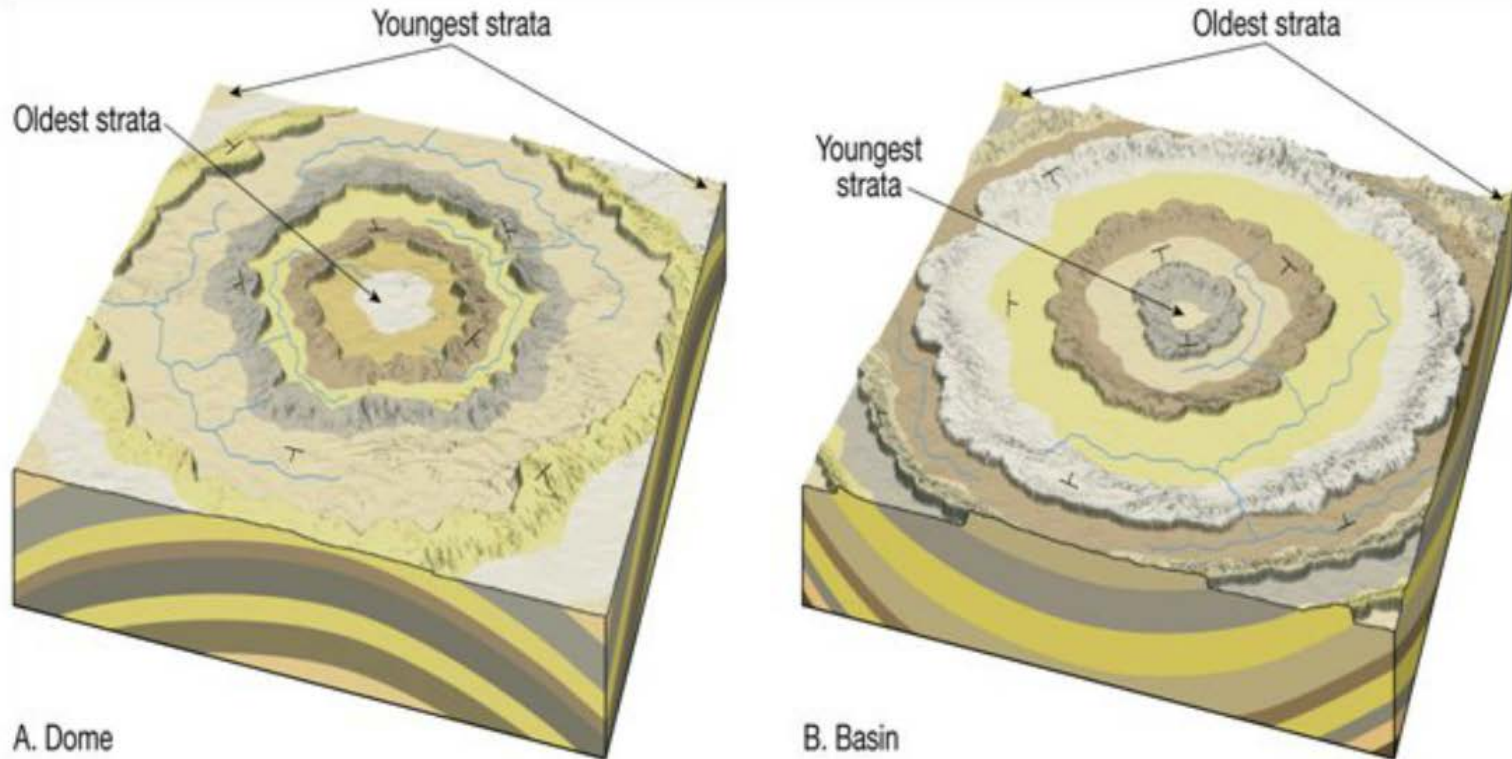
Folds



Plunging Folds



Domes and Basins



A circular or elliptical anticlinal structure is called a **dome**. Sedimentary layering dips away from the center of a dome in all directions.

A similarly shaped syncline is called a **basin**.

Structural Dome



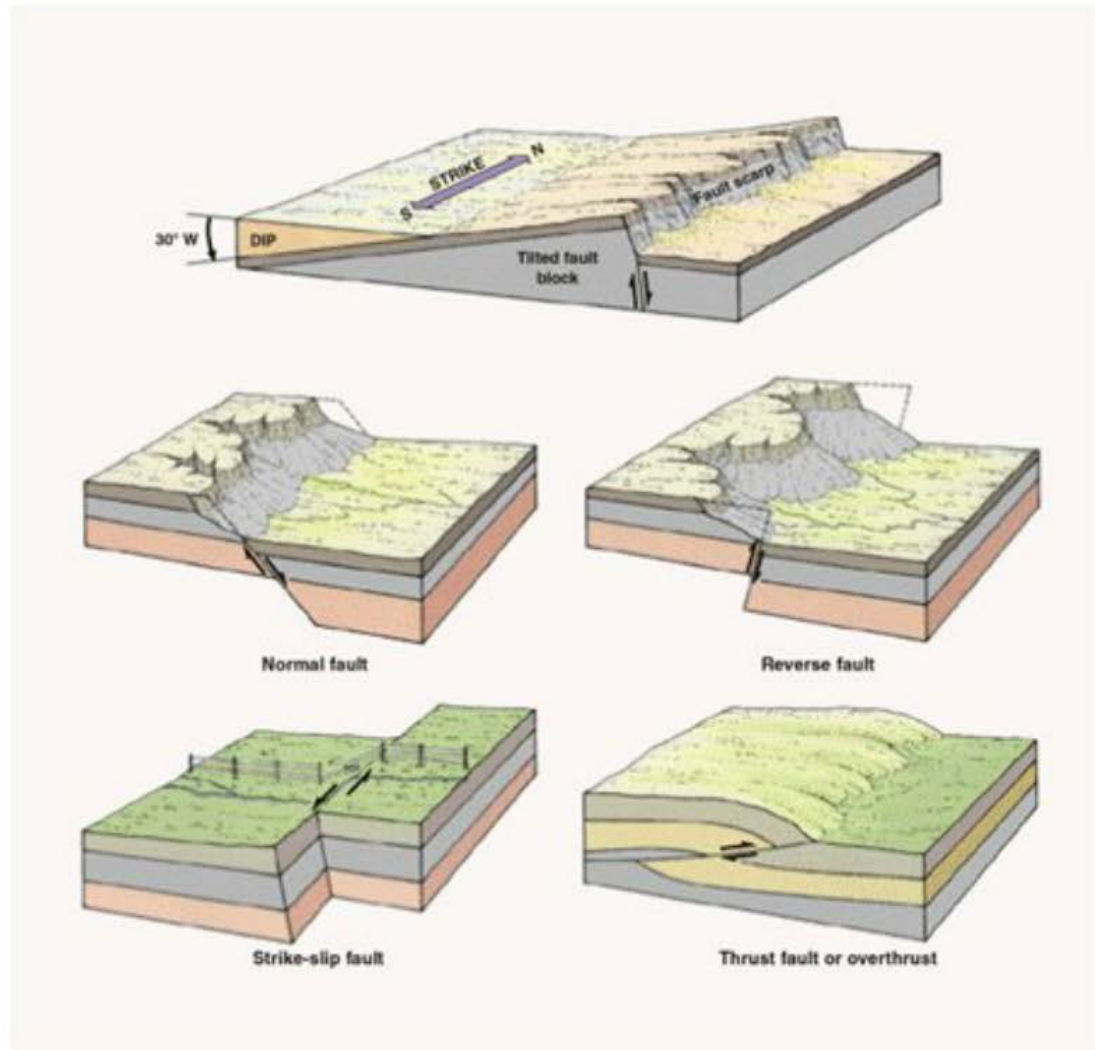
Sinclair Dome, Wyoming

Fractures

- Joints
- Faults

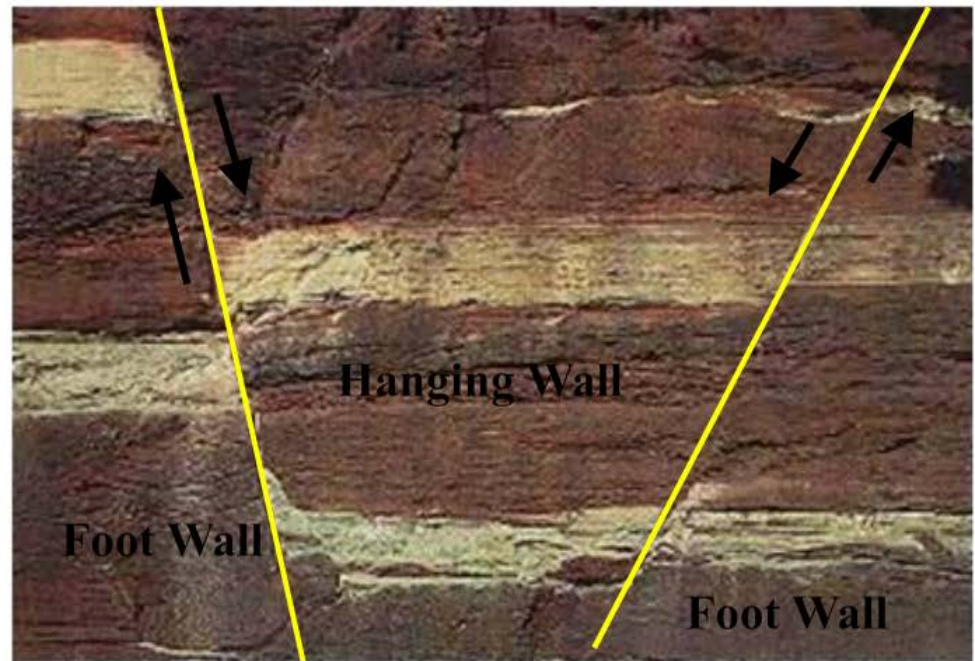
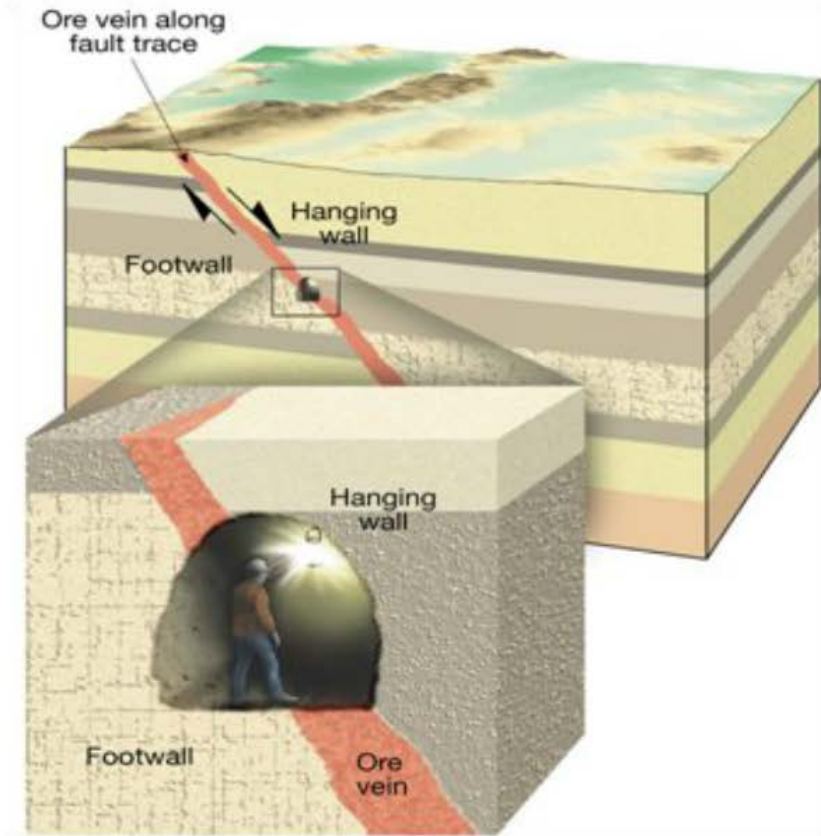
Fault Types

- Dip-Slip
 - Normal
 - Reverse
 - Thrust
- Strike-Slip

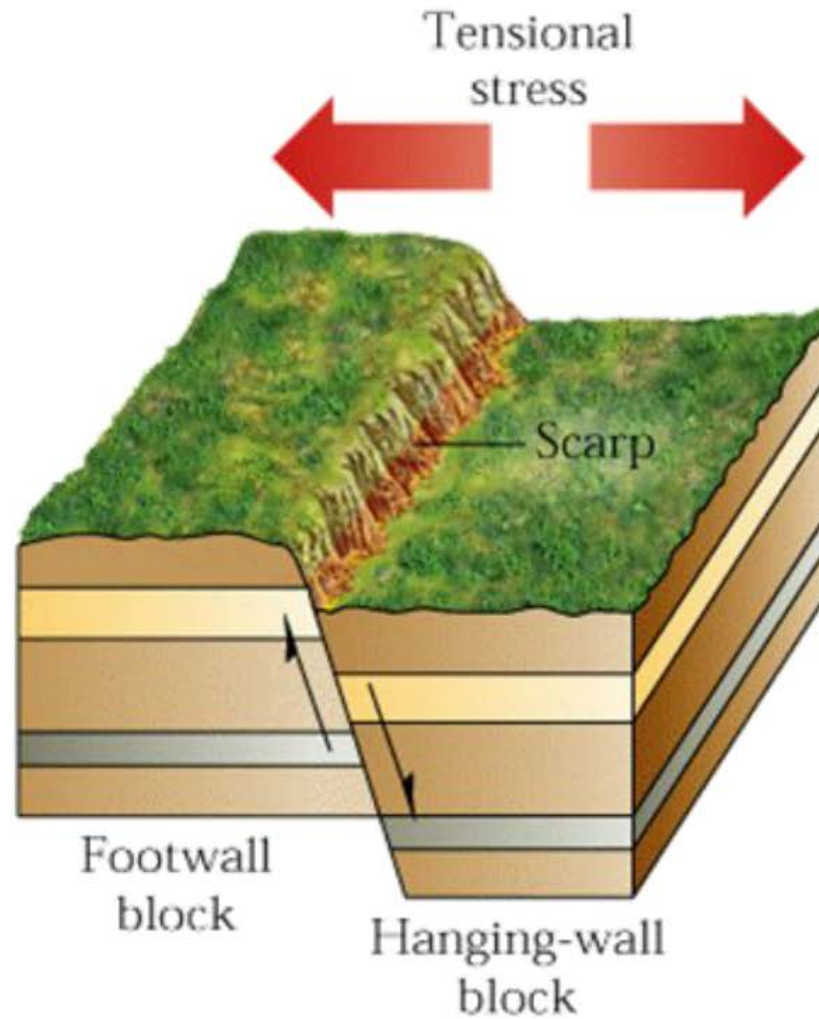


Faults

Hanging Walls and Foot Walls

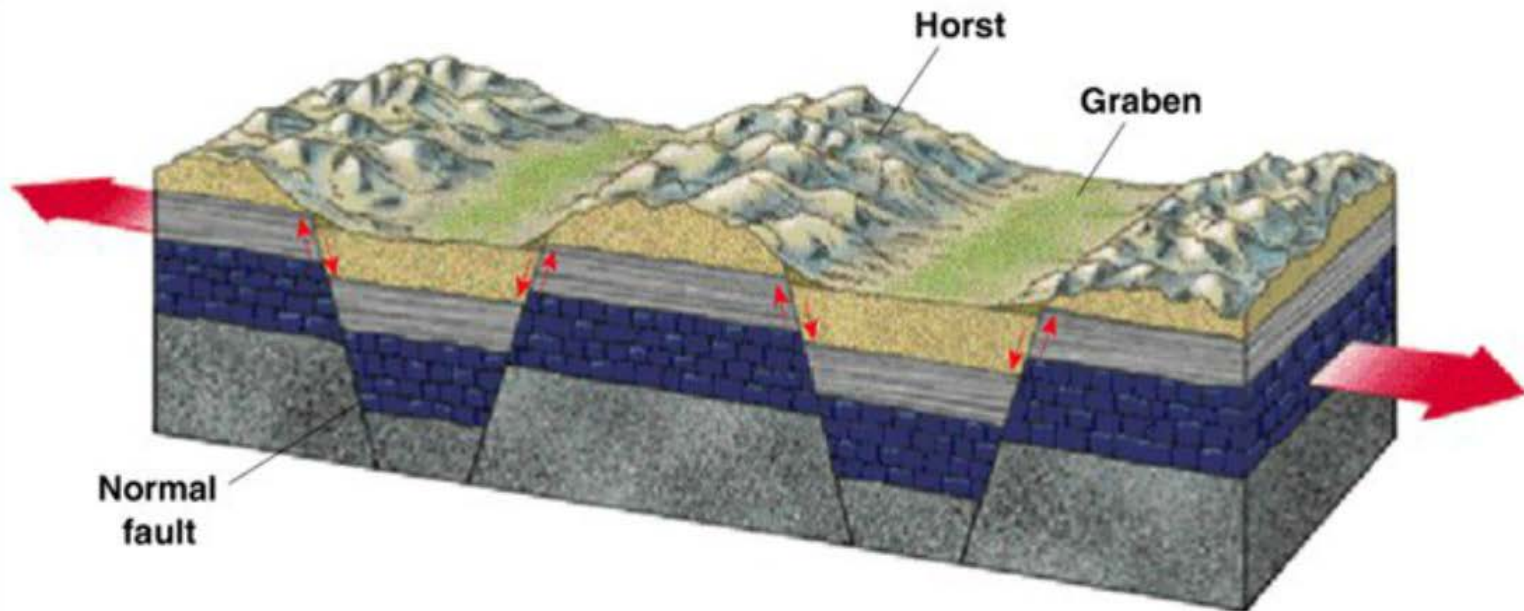


Faults Normal



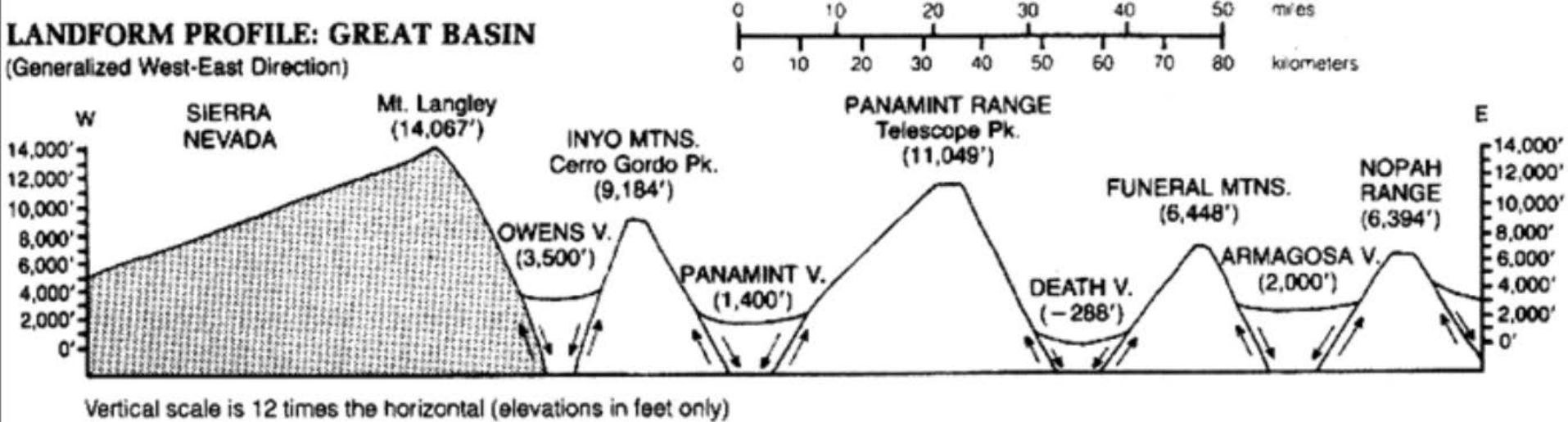
Faults

Normal - Horst and Graben



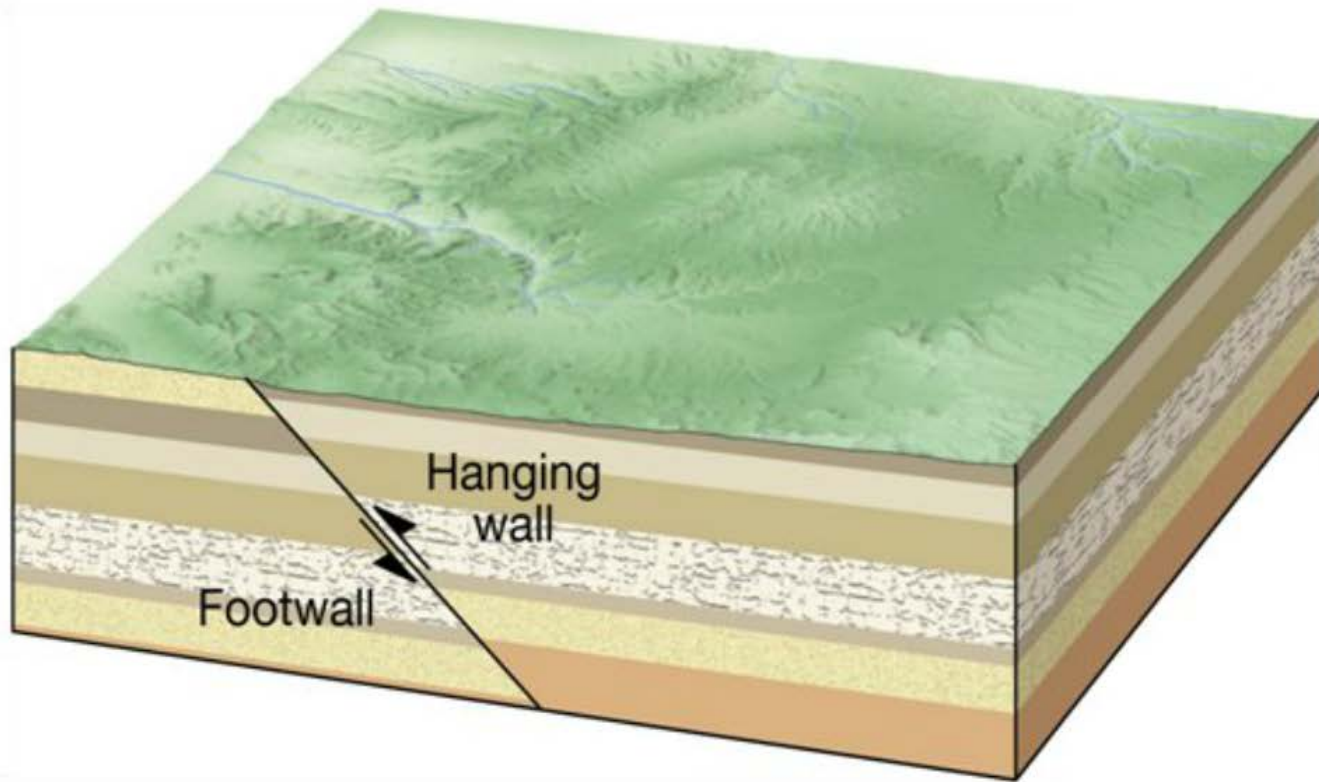
Faults

Normal - Horst and Graben

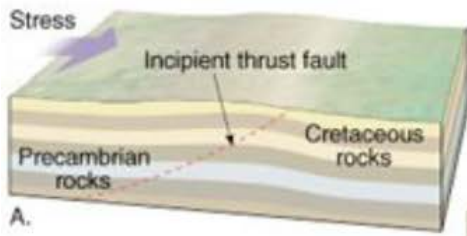


Faults

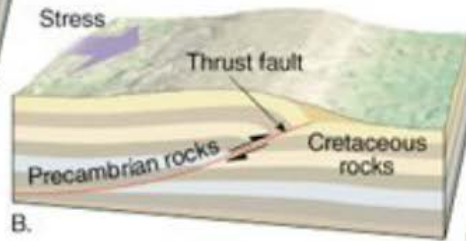
Reverse



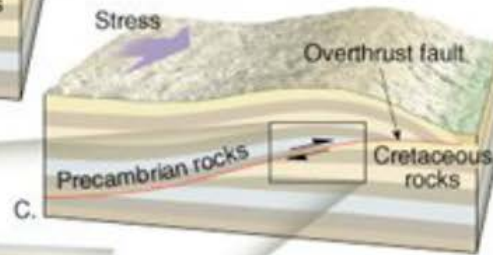
Faults Thrust



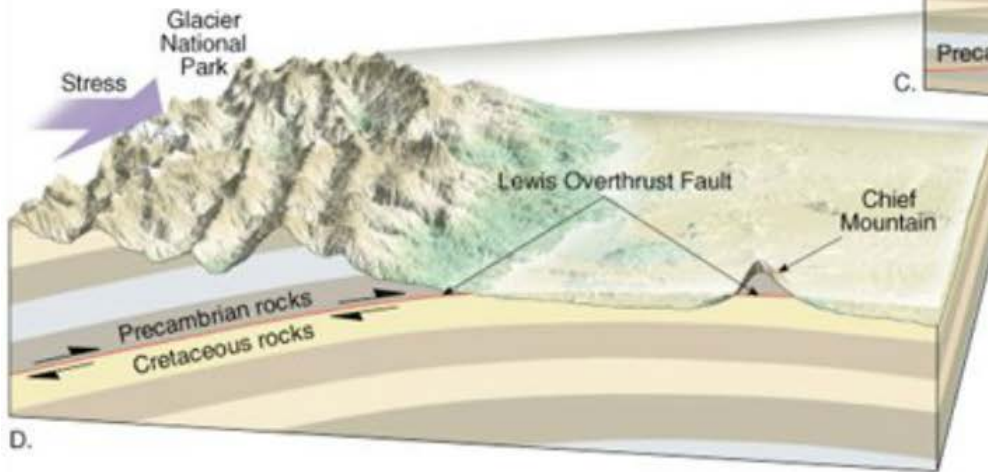
A.



B.



C.

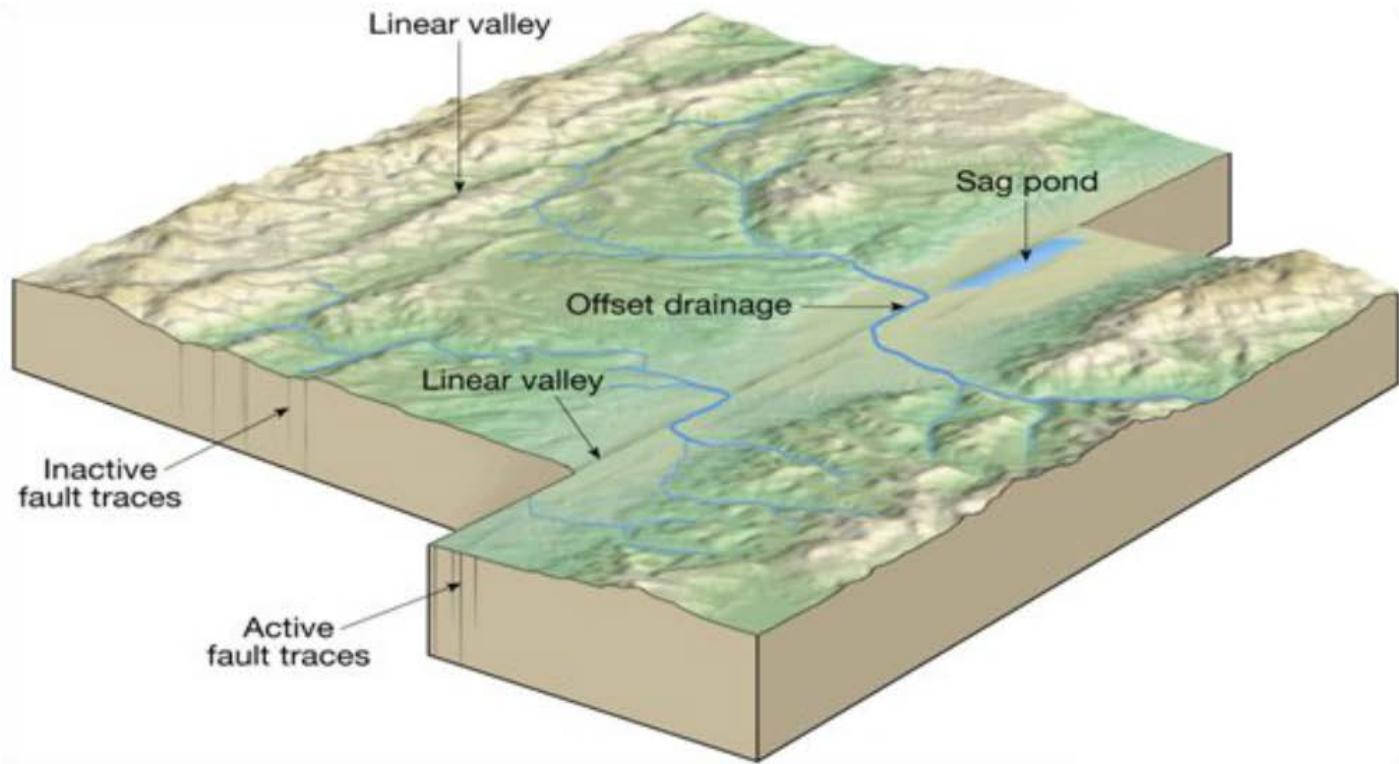


D.



Faults

Strike-Slip

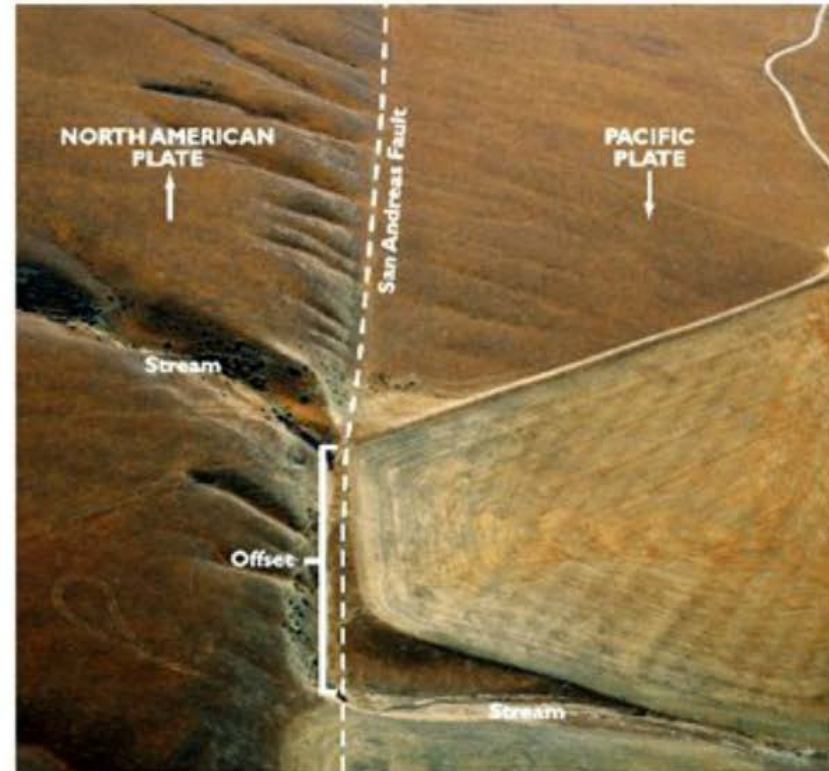
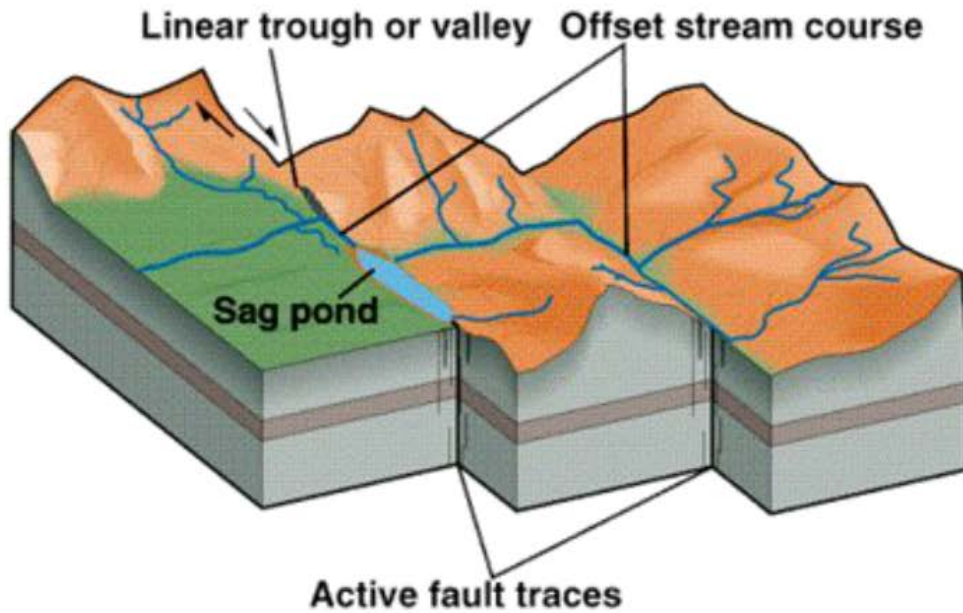


Faults

Strike-Slip

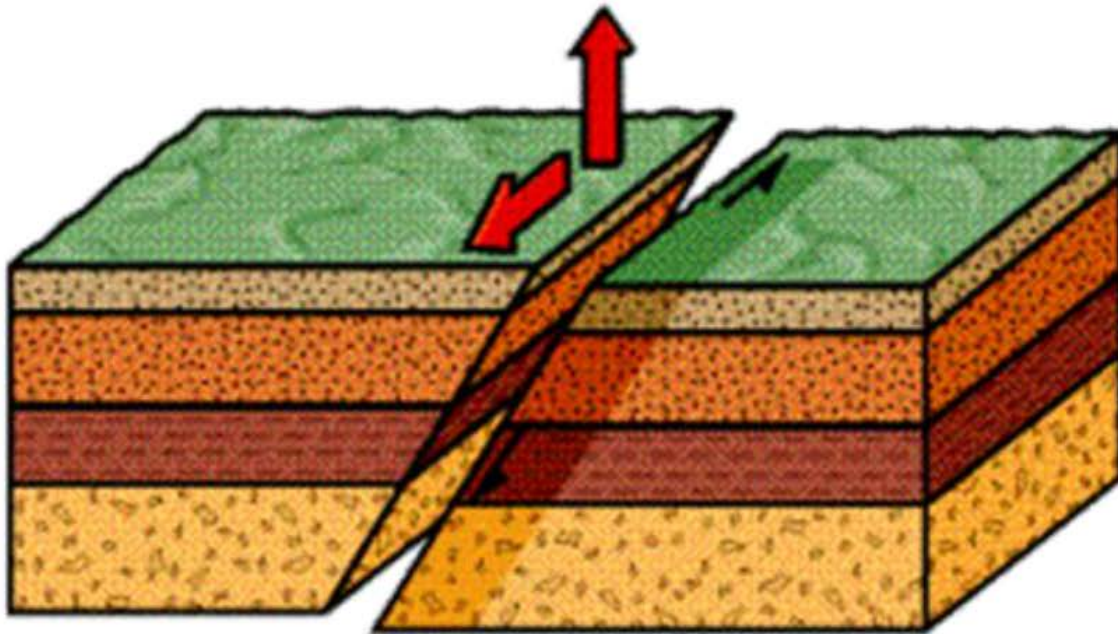
Plummer/McGeary/Carlson: *Physical Geology*, 8e. Copyright © 1999, McGraw-Hill Companies, Inc. All Rights Reserved.

Right-Lateral Strike-Slip Fault



Faults

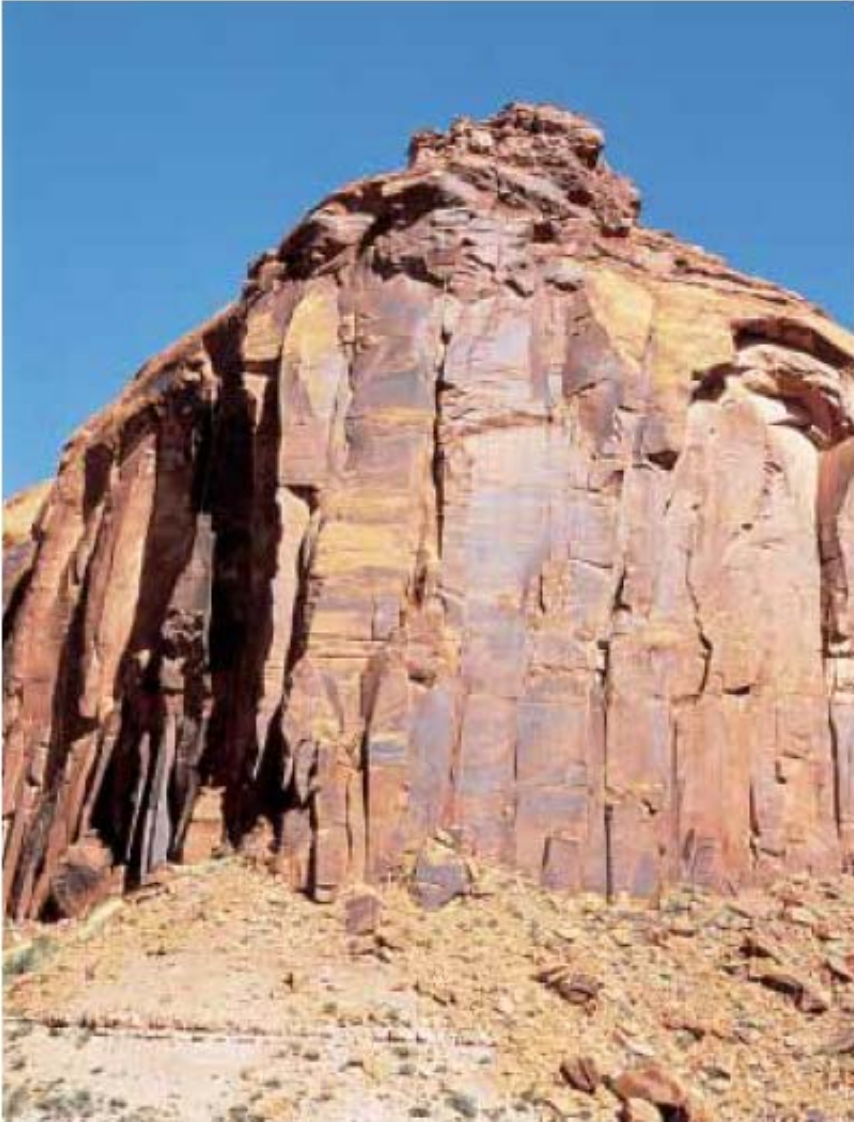
Oblique-Slip



Joints

- ❖ A joint: A fracture that occurs without movement of rock on either side of the break.
- ❖ Similar to a fault, except that in a joint rocks on either side of the fracture have not moved.

Joints



- Most rocks near the Earth's surface are jointed
- But become less abundant with depth