

An aerial photograph of a volcanic landscape. In the background, a large mountain peak is covered in snow under a blue sky with scattered white clouds. The foreground and middle ground show a rugged, grey volcanic terrain with various erosion features, including a prominent circular crater in the lower center. The overall scene illustrates geological processes in a volcanic environment.

Constructive and Destructive Geologic Processes

Constructive vs. Destructive

Processes that build up the earth's crust and create landforms

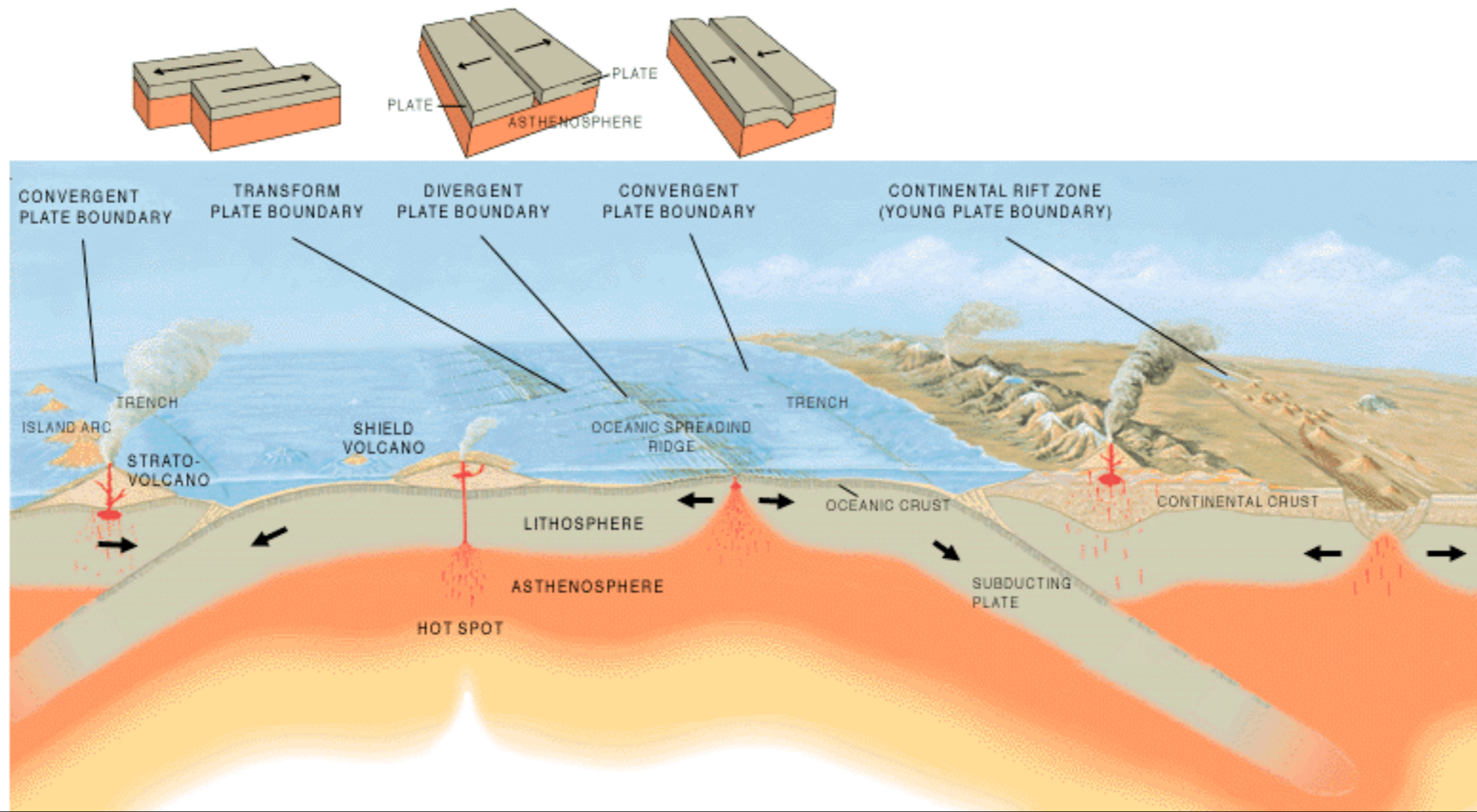
1. Volcanism
2. Seafloor Spreading
3. Deposition, lithification
4. Deformation (Folding)
5. Faulting

Processes that break down the earth's crust and destroy landforms

1. Volcanism
2. Weathering
3. Erosion
4. Earthquakes
5. Subduction

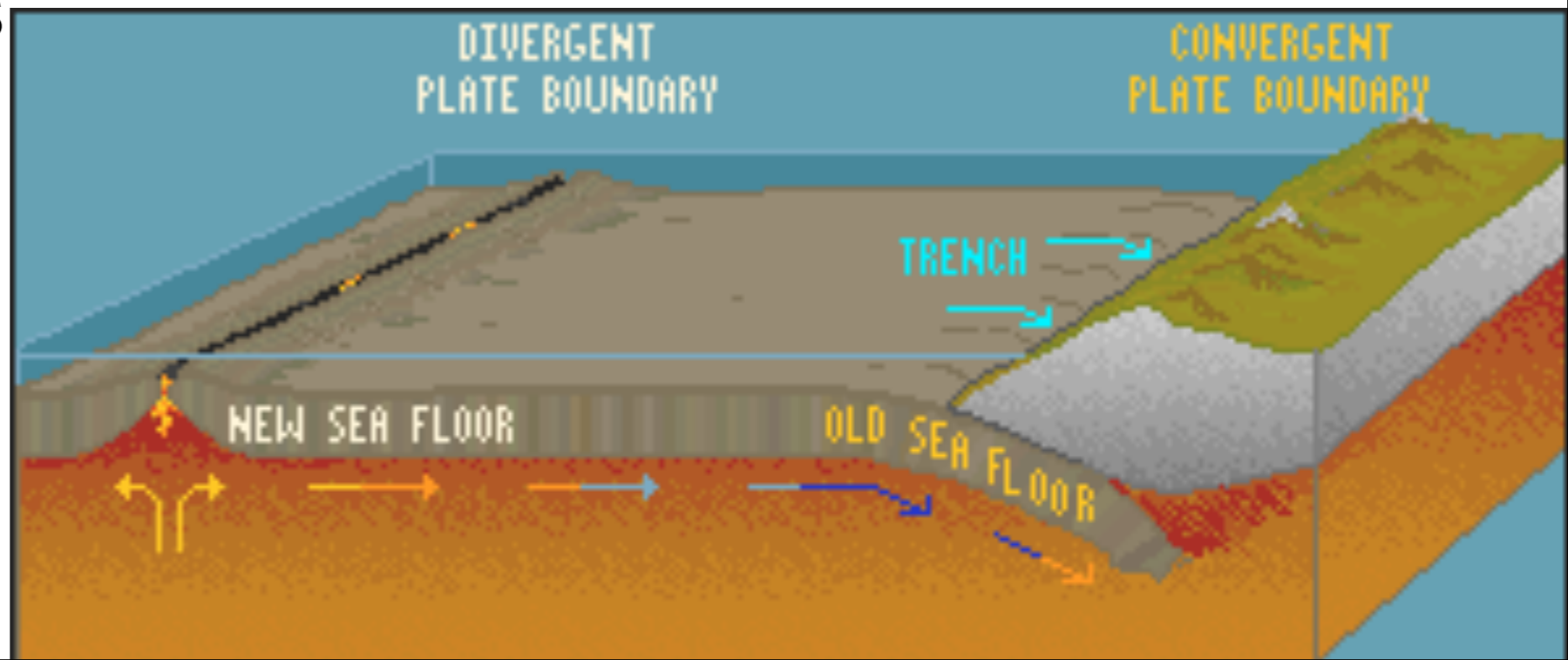
Many of these processes are explained by plate tectonics

Volcanism, earthquakes, folding, faulting, and seafloor spreading are all explained by the movement of the plates (plate tectonics).



Constructive Geologic Processes: Seafloor Spreading

- Seafloor Spreading- adds new Crust to the ocean floor
- Magma rises from convection currents, cools.
- Cooling magma expands, pushes crust farther apart
- Process repeats



Constructive Geologic Processes: Volcanism

- Volcanoes release lava that solidifies and creates new features on Earth's surface.
(creates new Crust)



"Hot Spot"

Constructive Geologic Processes: Folding (deformation)

- Pressure builds from compressional forces on rock layers and causes them to fold
- Syncline- Downward curve in rock layer
- Anticline- Upward curve
- Monocline- Single drop or rise in rock layer





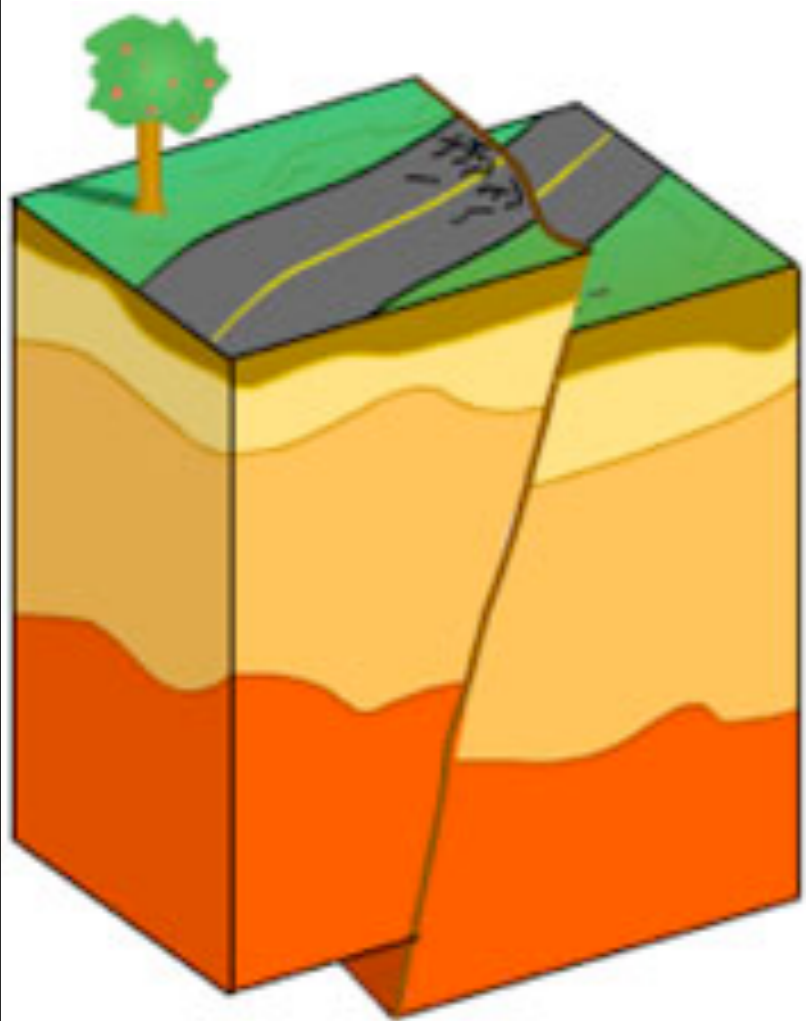
Can you identify synclines and anticlines in these mountains?



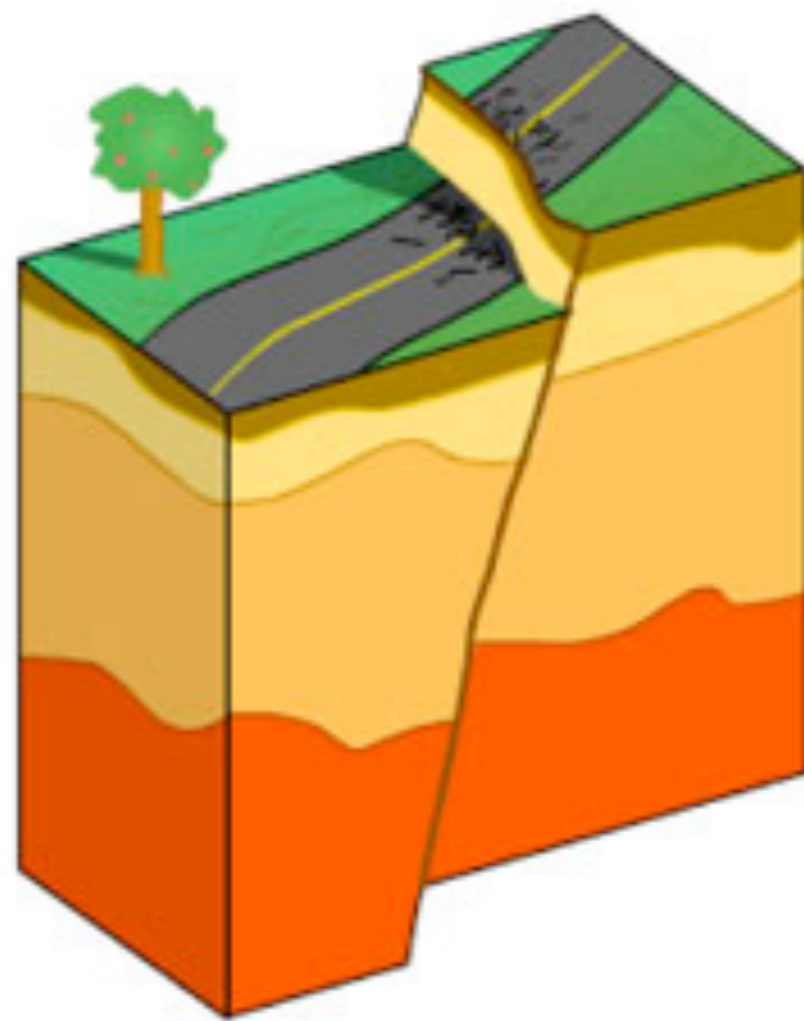
Can you identify synclines and anticlines in these mountains?

Constructive Geologic Processes: Faulting

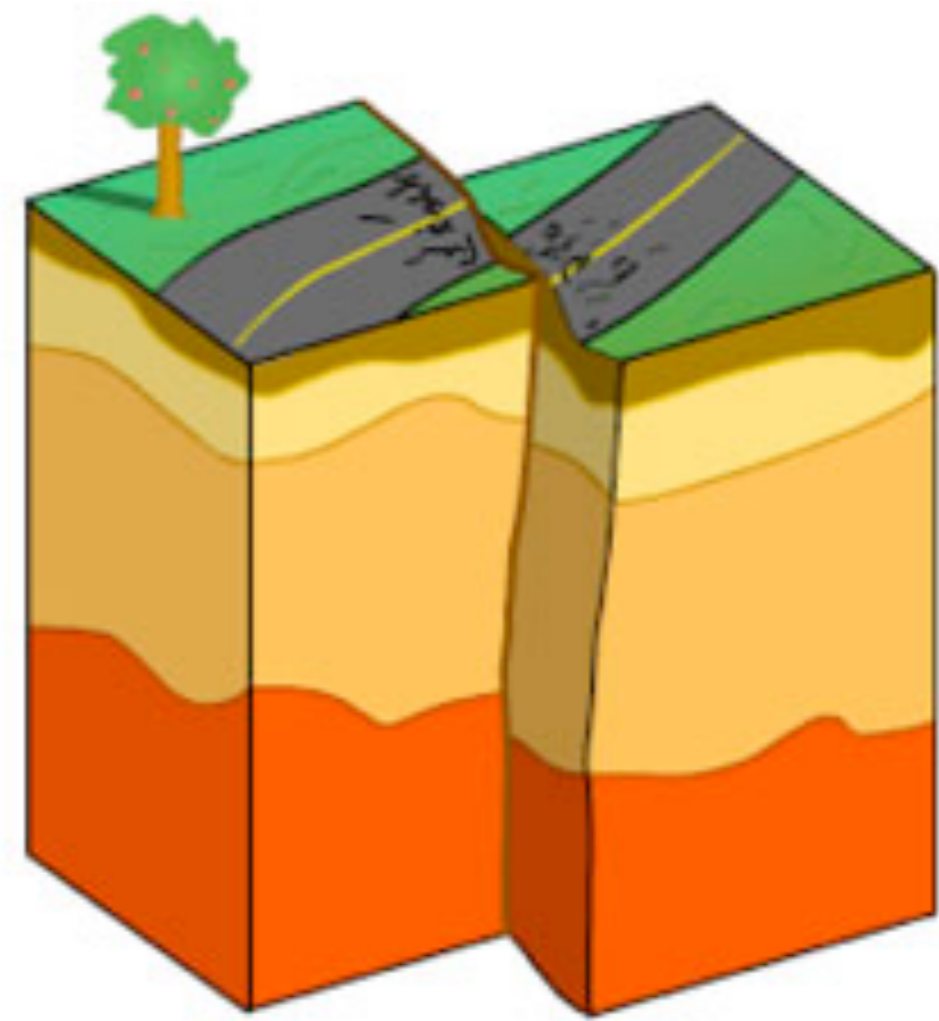
- When pressure or stress builds enough, rock layers buckle and break, forming fractures in the rock
- Reverse (Thrust) Fault- Compressional forces cause rocks to fracture and one to buckle above the other.
- Normal Fault- Tensional forces cause rocks to fracture, and one block drops below another
- Strike-slip (transform) fault- Shear forces cause rocks to stress and feature in a parallel direction



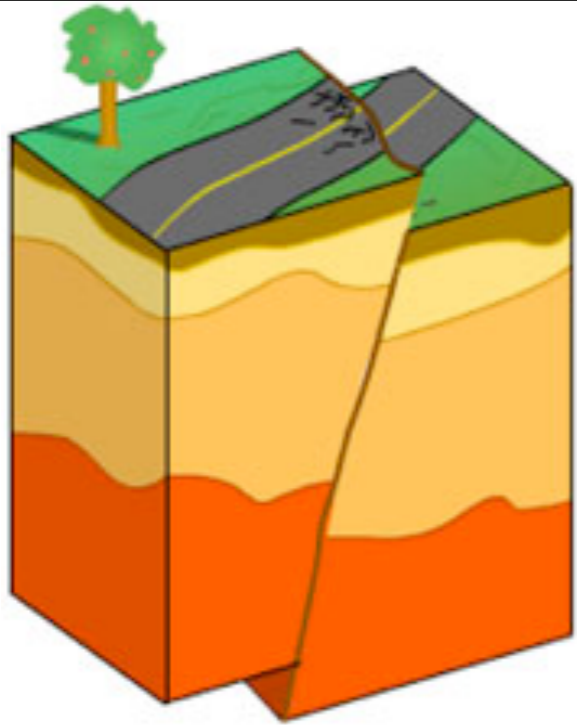
Reverse fault



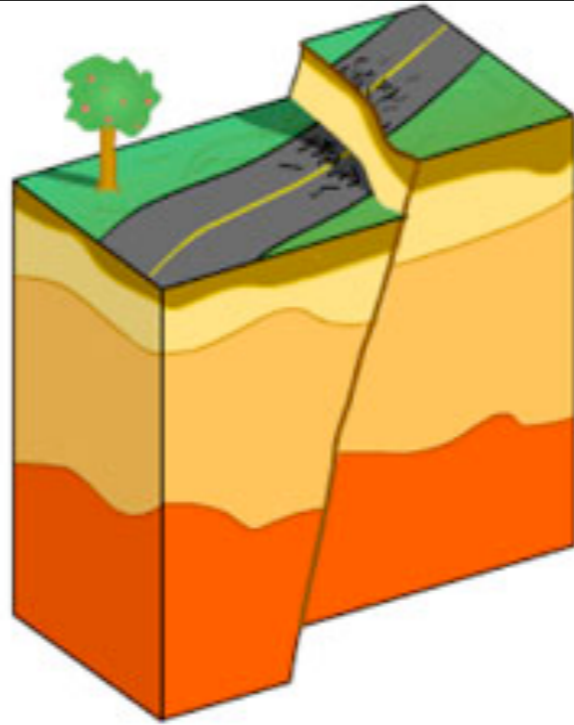
Normal fault



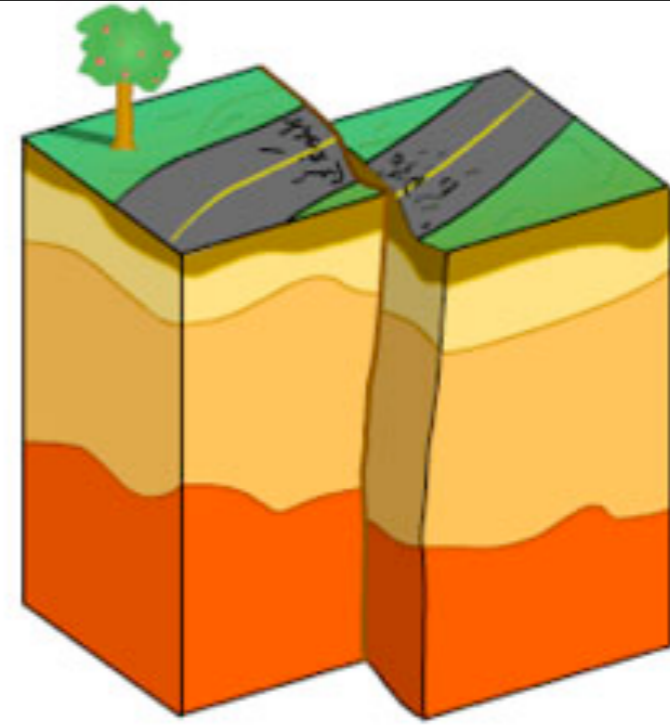
Strike-slip fault



Reverse fault



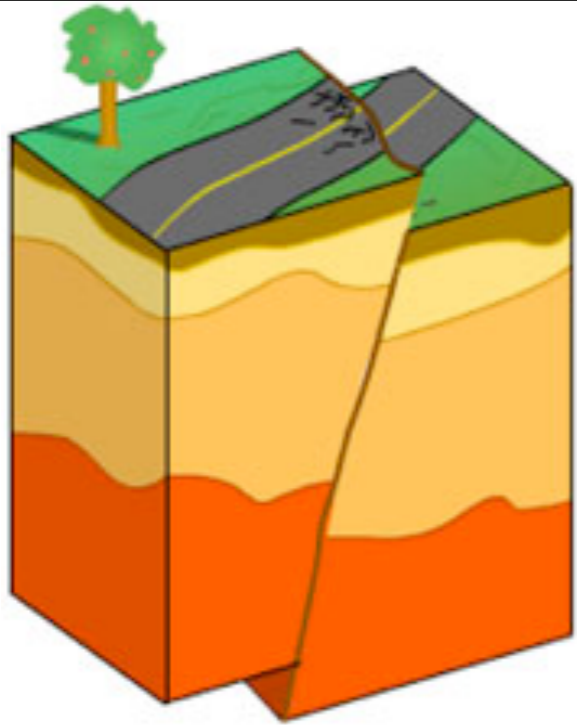
Normal fault



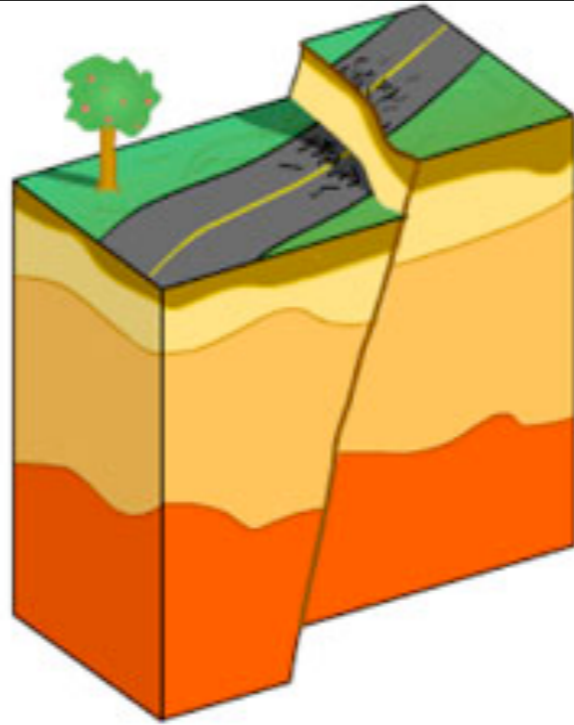
Strike-slip fault

What type of fault is shown in the pictures below?

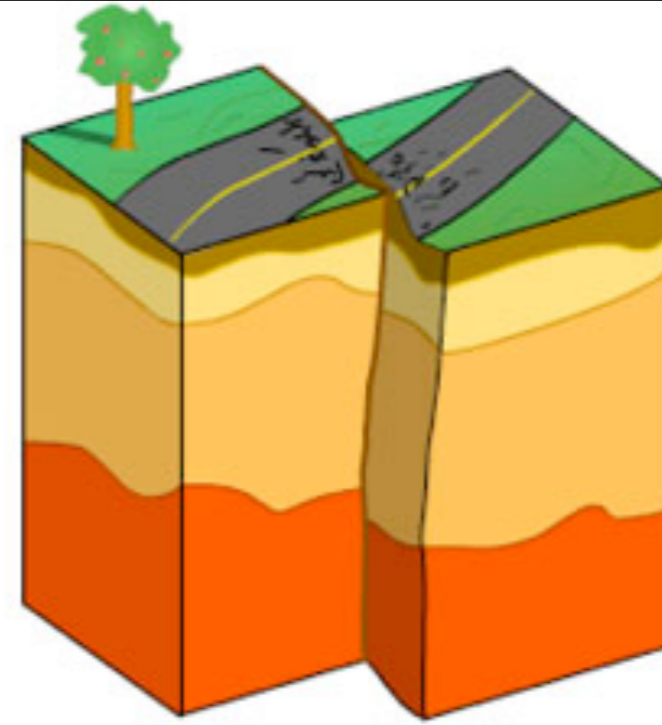




Reverse fault



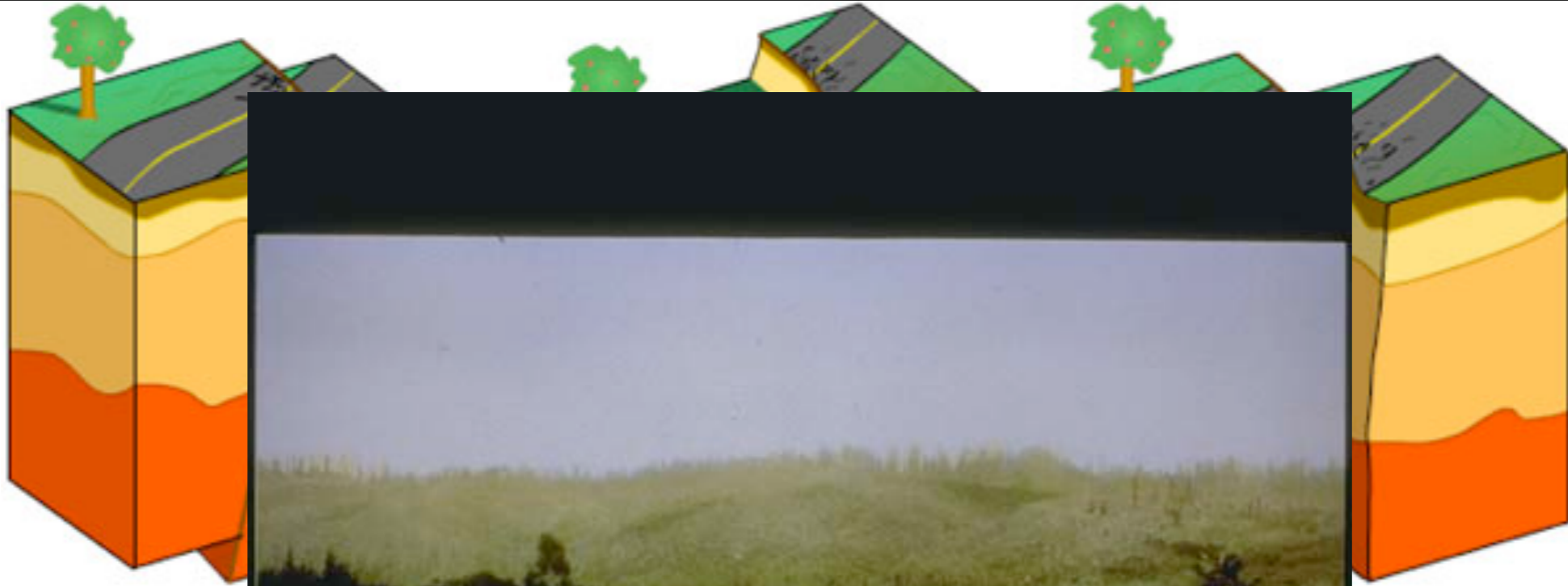
Normal fault



Strike-slip fault

What type of fault is shown in the pictures below?





Reverse

W

fault



Constructive Geologic Processes: Deposition and Lithification

- When weathered material is undisturbed, it eventually settles in layers. It will compact, cement, and become rock layers (sedimentary rocks, like sandstone and limestone)



- Rock may also form from magma cooling (igneous rock)

More Deposition...



Caves



Deltas



Sand Dunes



Glaciers

Destructive Geologic Processes: Volcanism

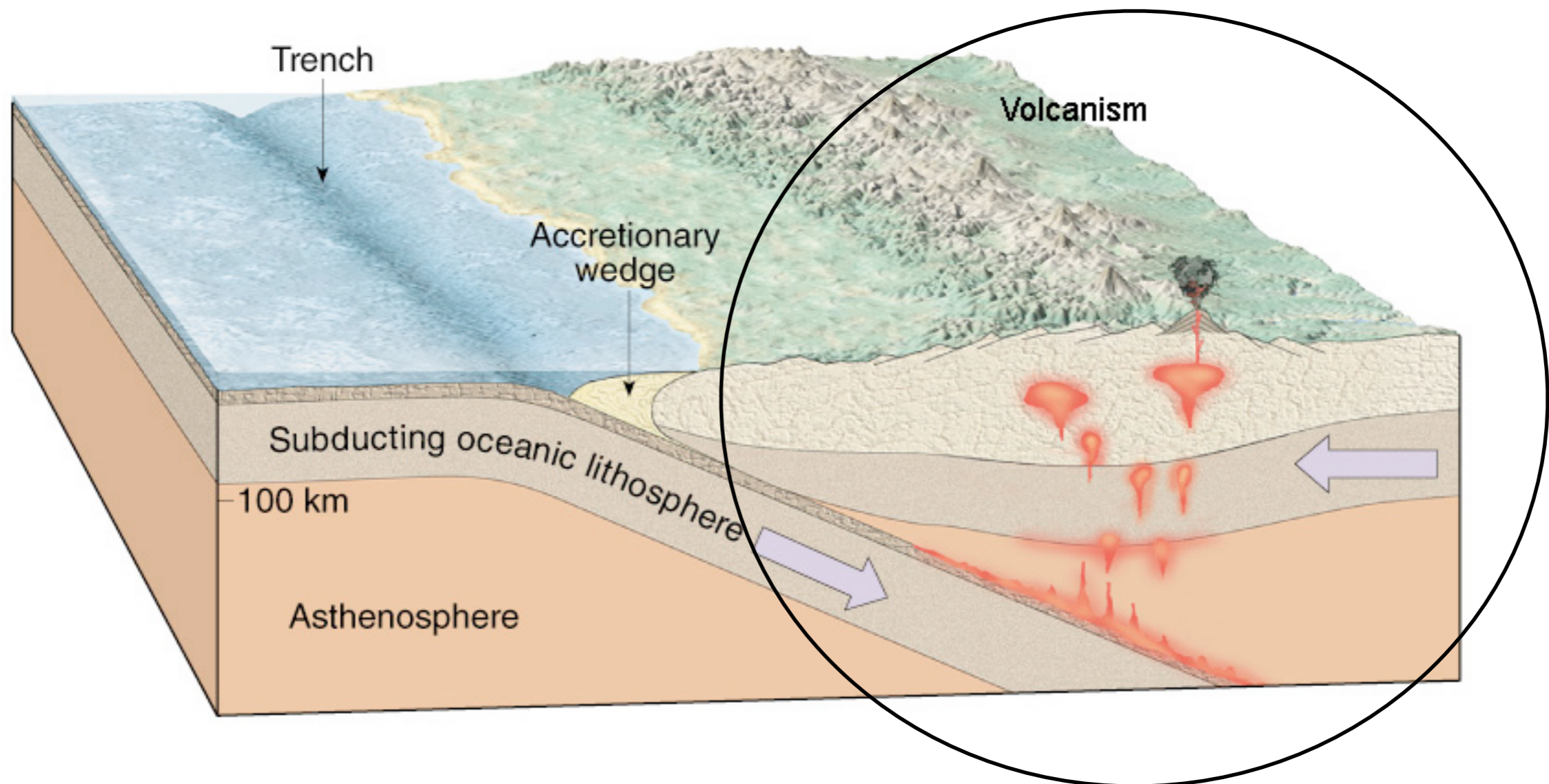
- Violent volcanic activity can blow rocks apart, melt geologic features, and destroy the earth's crust



Mount Saint Helens Blew in May of 1980. Here is the before and after picture. Blew almost 3 km³ of debris into the air.

Destructive Geologic Processes: Subduction

- Subducted plates melt in the Asthenosphere (upper Mantle) and crust is destroyed.



Destructive Geologic Processes: Earthquakes

- Earthquakes can shake apart geologic features and break rocks apart





Destructive Geologic Processes: Weathering

- Weathering: the breaking down of rock into smaller pieces by gravity, ice, water, heat, or chemical means (dissolution)
- Many types, will be dealt with later

Destructive Geologic Processes: Erosion

- Erosion- movement of weathered materials to new locations by means of ice, water, wind, or other natural means
- Many types, also dealt with later

Constructive and Destructive Geology

- Oftentimes, the constructive processes and destructive processes are interrelated.
- One may lead to the other, in a large cycle