

Chapter 14: Volcanoes, Earthquakes, and Tectonic Landforms

Landforms and Geomorphology

Landforms: the Earth's topography and terrain

Relief:

Geomorphology:

Degradation and Aggradation

Punctuated Equilibrium: The process by which change typically occurs on Earth. Most of the time, geologic (and biologic) processes occur slowly. Occasionally, the processes occur very quickly, resulting in abrupt change.

>Earthquakes and volcanism

Igneous Processes and Landforms

Two most common types of igneous rocks:

Rock Type	Composition	Mode of Occurrence	Volcano Type
Granite	Felsic	Plutonic	Composite
Basalt	Mafic	Volcanic	Shield

Volcanic rocks form on the surface from lava.

Plutonic rocks form beneath the surface from magma.

Volcanic Terminology

1) Lava Flows (most common with Shield Volcanoes, with _____ composition):

a) Pahoehoe

b) Aa

2) Pyroclastic Material (most common with Composite Cone Volcanism):

a) Tephra

b) Bombs

Types of Volcanoes, the Details

1) Shield: the largest

a) Erupt basaltic lava

b) Very hot: 1200 C minimum

c) Erupt lots of very fluid lava (flows)

d) lavas are typically dark in color once they turn to rock

- 2) Composite Cone: the most violent
 - a) Erupt felsic ash
 - b) Cooler: 600 C
 - c) Erupt mostly ash with some lava, explosive
 - d) ashes are typically light or gray in color
- 3) Plug Dome: similar to Composite Cones
 - a) Often classified as a Composite Cone: felsic
 - b) Tend to get stuck: magma is very viscous
- 4) Cinder Cone: small isolated source of magma
 - a) typically mafic (basalt)
 - b) typically gassy
 - c) smallest cone

Effects of Volcanism

1) Calderas

2) Tsunamis

Distribution of Volcanism

1) Plate Boundaries:

a) Compositions:

1) Convergent

2) Divergent

b) Volcanoe Type

1) Convergent

2) Divergent

2) Hot Spots

3) Without the Volcanoe

a) Fissures

b) Flood Basalts

Plutonic Igneous Rocks: or Igneous Intrusive Rocks

Classified by Size:

Largest---→

Batholith:

Laccolith:

Stock:

Dike:

Sill:

Volcanic Necks

Structural Geology

The “attitude” of rocks:

Strike

Dip

Folding and Faulting

Stress:

- 1) Compressive
- 2) Extensional or Tensional

Folding occurs when the rock behaves in a ductile fashion (typically far below the surface).

1) Anticlines:

2) Synclines:

3) Excessive Stress Folds:

- a) Asymmetrical
- b) Overturned
- c) Recumbent

Faulting occurs when rocks behave in a brittle fashion (typically near the surface).

1) Dip Slip Faults

a) Normal (or detachment)

b) Reverse (or reverse)

2) Strike-slip

a) Left and Right Lateral

Horst and Graben Topography

Earthquakes

Focus vs. Epicenter

Earthquake Magnitude: Richter and Moment Magnitude

Earthquake Intensity: Mercalli

Earthquake Hazards:

1) Where do they occur?

2) Why are some so deadly compared to others?