

VOLCANO NOTES

CHAPTER 10-1

Volcanoes- areas on earth's surface where magma and volcanic gases pass through a vent or fissure

1. Origin of magma:

- a. All magma is made of liquid minerals
- b. Can form by adding heat (from friction + Earth's hot interior)
- c. Can form by decompression melting – pressure is released as magma rises (pressure can force very hot liquid to act like a solid by restricting movement)
- d. Can form by adding water to rock—lowers its melting point

2. Types of volcanism:

- a. Divergent volcanism- plate pull apart and lava fills the void
 - i. If underwater, landform is an ocean ridge
 - ii. If on land, landform is a rift
- b. Convergent volcanism- plates subduct, melt, then volcanoes form
 - i. If underwater, volcanic island arcs form
 - ii. If on land, continental volcanic arcs form
- c. Intraplate volcanism – hotspot in earth melts a hole in a tectonic plate and makes a volcano
 - i. If underwater, an island forms
 - ii. If on land, a random volcano forms

CHAPTER 10-2

1. Factors affecting eruptions:

- a. Viscosity – high viscosity= thick lava and low viscosity = thin lava
 - i. Lava that is more viscous is more explosive and doesn't flow as far
 - ii. Lava that is less viscous is less explosive and flows a long way
- b. Dissolved gases
 - i. Basaltic lava allows gases to escape making quiet eruptions
 - ii. Granitic lava prevents gases from escaping so they build up and explode

2. Volcanic material:

a. Lava

- i. Pahoehoe- hotter, thinner, faster moving basaltic lava-hardens smooth
- ii. aa- cooler, thicker, slower moving basaltic lava-hardens sharp
- iii. Pillow lava- when lava erupts underwater forming rounded lumps

b. gases

- i. volcanoes can emit thousands of tons of gases each day
- ii. more gas = explosive, especially with thick lava
- iii. less gas = more quiet

c. pyroclastic materials- solid fragments ejected from a volcano (not lava) that appears as a dark cloud and races downhill at over 200 km/ hour and 700 degrees C

- i. dust- (less than .25mm) tiny glass shards that are microscopic and hundreds of degrees
- ii. Volcanic ash- (less than 2mm) gases in magma form bubbles, then the walls of the bubbles break into tiny, glasslike slivers
- iii. lapilli- (less than 64 millimeters) sand sized to tennis ball- lava bits that harden while in the air
- iv. volcanic blocks- larger than 64 mm (baseball-to house sized) solid rock blasted out
- v. volcanic bombs- larger than 64 mm (baseball-to house sized) lava blob that cools in the air

3. Volcano anatomy:

- a. fissure- the first crack magma breaks through
- b. vent- opening at the top of a volcano
- c. magma chamber- large blob of melted magma under the volcano
- d. conduit- main pipe through which magma exits

4. Types of volcanoes:

a. Shield-

- i. dome shaped volcano
- ii. built from layer upon layer of non-explosive eruptions
- iii. thin runny lava
- iv. EXAMPLE: Mauna Kea in Hawaii (the tallest mt in the world)

b. Cinder cone-

- i. steep volcano
- ii. built from pyroclastic explosive eruptions
- iii. thick lava and big chunky rocks exit and don't move far
- iv. relatively small
- v. example: Paricutin in Mexico

c. Composite / stratovolcanoes-

- i. forms from alternating explosive and non explosive eruptions
- ii. earth's most dangerous volcanoes
- iii. huge quantities of pyroclastic material
- iv. example: Mt. St. Helens in Washington

5. Other volcanic landforms:

- a. Crater- funnel shaped pit at the top of a volcano
- b. Caldera- large pit created when the magma chamber collapses
- c. Lava plateau- wide, flat, raised landform that results from repeated non explosive eruptions
- d. volcanic necks- rock formation made of core of volcano that is now eroded

6. volcanic hazards:
 - a. mudflows (lahars),
 - b. pyroclastic flows,
 - c. lava flows,
 - d. volcanic ash-
 - blocks sunlight & affects plant growth
 - blocks sunlight and cools climate
 - destroy food supplies,
 - ash creates breathing difficulties
 - e. volcanic gases- combine with water to make acid rain
 - f. Tsunamis (if under water)

CHAPTER 10-3

1. Plutons -magma body that hardens underground (from Pluto God of the underworld)
 - a. sill-flat magma flow between layers of sedimentary rock
 - b. laccolith- rounded magma flow between layers of sedimentary rock
 - c. dike-flow of magma that moves upward and cuts across sedimentary rock layers
 - d. batholith-largest pluton; over 100 square kilometers
2. Volcano categories:
 - a. Extinct- not erupted in recorded history and probably never will erupt
 - b. Dormant- (sleeping) currently not erupting but probably will again
 - c. Active- currently erupting or showing signs of erupting in the near future.
3. Predicting volcanoes
 - a. Earthquake activity increases
 - b. Surface starts bulging (gps monitors)
 - c. Changes in the composition of the gases that come out