

Igneous Activity

- 1) Volcanic Activity-Role of Viscosity
 - a) Factors Controlling Violent Nature of Volcanic Eruptions
 - i) Magma composition – silica content
 - (1) High silica content – high viscosity
 - (2) Low silica content – low viscosity
 - ii) Temperature
 - (1) High temperature – low viscosity
 - (2) Low temperature – high viscosity
 - iii) Dissolved gas
 - (1) Low viscosity – gases escape
 - (2) High viscosity – gases cannot escape (pressure builds up)
 - a) Lava flows – low silica content of basalt lava allows it to flow up to 30 km/hour, typically 10 to 300 m/hour
 - i) Nuée ardente
 - (1) Glowing avalanche of ash, steam, gas, and pyroclastics
 - (2) Travels at speeds of 200 km/ hr (125 mph)
 - b) Gases – reduction of confining pressure allows gases to escape
 - i) 70% water vapor
 - ii) 15% carbon dioxide
 - iii) 5% nitrogen
 - iv) 5% sulfur dioxide
 - v) Trace amounts of chlorine, hydrogen, and argon
 - vi) Acid Rain
 - c) Pyroclastic material – welded ash, dust, and lava
 - d) Landslide
- 3) Rock Cycle and Plate Tectonics
 - a) Divergent Boundaries
 - i) Ophiolite Complex
 - (1) Oceanic Crust
 - (a) Marine Sediment
 - (b) Pillow Basalts
 - (c) Sheeted Dikes
 - (d) Gabbro
 - b) Volcanoes
 - i) Convergent boundaries
 - (1) Composition
 - (2) Types
 - (a) Cinder Cones
 - (i) Built from ejected lava fragments
 - (ii) Have steep slopes (controlled by angle of repose – the steepest angle at which material remains stable)
 - (iii) Small – 300 m (1000 ft) high, 2 km in diameter
 - (b) Composite Cones - Stratovolcano
 - (i) Most encircle the Pacific Ocean (ring of fire) as part of magmatic arcs
 - (ii) Large – ~1 km high, 5 - 25 km wide
 - (iii) Symmetrical structure
 - (iv) Composed of alternating lava flows and pyroclastic deposits
 - (v) Product of high viscosity magma

(vi) Have violent eruptions

ii) Hot Spots

(1) Composition

(2) Types

(a) Shield Volcanoes

(i) Broad, slightly domed structure

(ii) Large structure 9 km (~6 miles) high & 50 km (~30 miles) wide

(iii) Produced by fluid (low viscosity) lava

(iv) Example: Mauna Loa, Kilauea, other island chains