

Effusive Eruptions Lecture

Mafic Magmas

- Plumes rise straight up through the mantle and create 'Hot Spot' volcanoes or Flood Basalts.
- Hot Spots are fixed, the plates move over the hot spots at varying rates.
- Pacific Plate shifted direction around same time as India colliding with Asia.
- Flood Basalts are caused by a large plume and are very rare.
- Columbia Basalts occurred ~16 m.y.a. spreading 250,000 cubic km.
- Because Flood Basalts have never been seen, there are many theories, such as convection in the mantle.
- **All magmas contain gas.**
- Lava can erupt from fissures or vents.
- **Lava channels** – As lava flows, the sides solidify creating a channel. If the solidified magma roofs over (solidifying around molten material) it is referred to as a **lava tube**.
- **Lava Lake** – Lava filling a depression.
- **Intracanyon flows** – Lava that moved through water channels. If the surrounding cliff is eroded away, basalt will be exposed on top of stream deposits.
- **Tumulus (blister)** – Lava tube roof pushed upwards at area of weakness.
- **Pahoehoe** – Runny basalt moves faster down slope.
- **Aa** – Viscous, crumbly solidifying lava falls in front of advancing flow. Moves slowly, when core solidifies it formed as a chunk (clinker).
- **Columnar Jointing** – Solidified lava takes up less space than liquid, angular fractures form as it solidifies. This occurs in all Lava types (Mafic – Felsic)
- **Pillow Basalts** – When low-gas basalt flows under water it forms 'poofy' rounded rocks.
- **Oceanic Crust** – Composed of 3 layers of basalt. Top – Pillow Basalts, Mid – Sheeted dykes, & Gabbro.

Intermediate (Andesite) lavas

- Frequently explosive
- Block Flows – Similar to Aa in basalt, but these flows move much **slower** (weeks – months), are much **thicker**, and form large blocks rather than crumbly rock.
- Form steep sided cones
- Platy Jointing – Sheeted or brick-like blocks of solidified magma.

Felsic (Dacite/Rhyolite) Lavas

- -Explosive
- Produces domes + Block flows
- Often forms obsidian