

Types of Volcanic Activity

- Classification
- Explosivity
- Types (examples)
- Hydrovolcanism

Classifications

- Effusive/explosive
- Magmatic/hydromagmatic
- Location [central, fissure, parasitic]
- Frequency [monogenetic/polygenetic]

Eruption Size

- Magnitude (volume, m^3)
- Power (area covered, m^2)
- Intensity (rate, m^3/s)

Volcanic Explosivity Index (VEI)

- Used for ancient as well as recent events
- Increasing scale from 0 to 8
- Based on a combination of factors
 - Total volume of products
 - Eruptive cloud height
 - Descriptive terms
 - Other features (nature of products, etc.)

Volcanic Explosivity Index

- Scale of 0 to 8 conforms to a volume range of 10^4 to 10^{12} m^3
- Range in column height <100 m to > 25 km
- Common types: hawaiian, strombolian, vulcanian, plinian, ultra-plinian

General types

- Magmatic
 - Deep (magmatic) sources of heat, solids, and propellant
- Hydromagmatic
 - Related to the interaction of surface or near surface water with magma or magmatic heat
 - Phreatic = water in an aquifer
 - Fuel/coolant interactions FCI

Hawaiian

- Type case is on Hawaii
- Generally basaltic composition
- Fire fountains
- Column generally less than 500 m
- Scoria deposits (scoria cones)
- Welded scoria (ramparts)
- Fluid lava flows

Lava Lake

- These are rare cases
- Examples
 - Hawaii from time to time
 - Mt. Erebus, Antarctica
 - Erta Ale, Ethiopia
- Very fluid lava, weak pyroclast production
- Mauna Ulu lava lake, 1971

Strombolian

- Type case is Stromboli, Sicily
- Basaltic magma
- More viscous than Hawaiian
- Intermittent explosions, no sustained column
- Ejecta to heights of a few hundred m
- Minutes of pause between bursts

Vulcanian

- Type case is Vulcano, Sicily
- Highly viscous magma involved
- Powerful separate explosions
- Highly fragmented magma
- Clouds rise to 10-20 km
- Wide dispersal of tephra
- May be associated with growing domes

Sub-plinian

- High eruptive plumes, up to 30 km
- Sustained columns
- Generally dacite to rhyolite composition
- Continuous sheets of tephra
- Less fragmented than Vulcanian products
- Pumice is common

Plinian

- Type case is the AD 79 eruption of Vesuvius
- Rare events (2-3 per century)
- Highly evolved magmas, abundant pumice
- Stratospheric eruption columns
- Sustained columns
- Huge volumes and large mass flux

Surtseyan

- Type case is Surtsey, Iceland
- Rapid small explosions
- Column less than 500 m
- Associated surge clouds
- Highly fragmented materials
- Commonly within a standing water body

Phreatoplinian

- No historic eruptions of this type
- High eruptive column
- Extremely fine ash, accretionary lapilli
- Wide dispersal of deposit

Sub-glacial

- Type examples in Iceland
- No eruptive column
 - Some ash on the ice surface
- Only surface effect is a sag in the glacier
- Volcano melts a huge amount of ice
- Fragmented lava and water flood out

