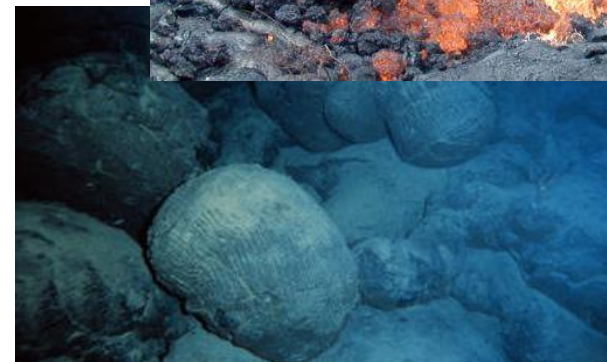


Lava is magma that reached the surface!

Lava (“the liquid”) is mostly molten rock:

- Pahoehoe lava - basaltic lava, low viscosity (flows easily), allows gases to escape.
- Aa lava (pronounced “aa-aa”) - basaltic lava, higher viscosity; solidifies flowing, forms angular pieces.
- Pillow lava - lava extruded *underwater*; cools and contracts, forms spherical masses; found at the ocean floor.



Viscosity of lava is mostly determined by the *amount of silica* in it.

Selected Lava Videos

Pahoehoe lava flow, Big Island, Hawaii

<https://www.youtube.com/watch?v=XQVBBdFY8pk>

Lava fountains, Iceland

<https://www.youtube.com/watch?v=fmCJSS2YAP0>

Viscous (Aa) lava flow, Big Island, Hawaii

<https://www.youtube.com/watch?v=ndB2WRwyK1w>

Solid Ejecta

Ash and **pyroclastic material** (“the solid”) is airborne material ejected by a volcano:

- **Volcanic ash**
< 0.06 mm to 2 mm;
composed of rock, mineral,
and volcanic glass
- **Cinders**
2 mm to 64 mm;
composition same as ash
hazardous when falling!



- **Bombs**
> 64 mm, shapes vary;
formed by molten rock
solidifying in the air



Selected Eruption Videos

Eruption of Mt Etna, Sicily, Italy

<https://www.youtube.com/watch?v=coqEmEyg95Q>

Anak Krakatau eruption

<https://www.youtube.com/watch?v=JmPuy-pqIQE>

Different Volcanoes Erupting Across The World

<https://www.youtube.com/watch?v=vMM9KFM3tTg>

Volcanic Gases



Significance?
Determines violence
of an eruption:

**High gas = violent
eruptions!**

- **Volatiles** (substances that easily boil and evaporate)

H_2S – Hydrogen sulfide

H_2O – Water vapor

SO_2 – Sulfur dioxide

CO_2 – Carbon dioxide

N_2 – Nitrogen

HCl – Hydrochloric Acid

Effect on global climate

← block sunlight

← greenhouse gas

Dangerous volcanoes are constantly being monitored by volcanologists using the following methods:

- **Measuring slope**
 - bulges may form with magma pushing up.
- **Measuring volcanic gases**
 - outflow of volcanic gases (*sulfur dioxide, carbon dioxide*) may precede eruption.
- **Measuring temperature from orbit**
 - monitoring changes in temperature over time.
- **Measuring small quakes**
 - increase in number & intensity before eruption.