Vo canoes and eruptions

A volcanic eruption occurs when magma, as a liquid containing crystals, fragments of rock and gas, rises up to the Earth surface above and below water. Eruptions can be effusive or explosive, moreover the same eruption can often have both effusive and explosive phases.

EFFUSIVE ERUPTIONS

An effusive eruption is characterized by the emission of magma in a continuous liquid state. The products of these eruptions are lavas.



Main factors controlling the size and shape of lava flows are the effusion rate, the chemical and physical properties of the magma and the nature of the ground. An effusive eruption can generate aa lavas, with a wrinkled surface structure formed by the chaotic accumulation of fragments, or pahoehoe lavas with smooth or undulated surfaces forming lobe-like or rope-like structures.

Effusions of lava can also take place underwater and lead to the formation of pillow lava.



VOLCANOES

Most of the volcanic material emitted accumulates around the eruption vent to form volcanic edifices varying greatly in shape and size. Volcanoes are divided into monogenetic, which are formed through accumulation of the products of a single eruption, and polygenetic, which are instead formed through accumulation of the products of a several eruptions.

DOME VOLCANO

A generally monogenic volcano caused by the accumulation of highly viscous lava that does not give rise to a flow but builds up around the vent.

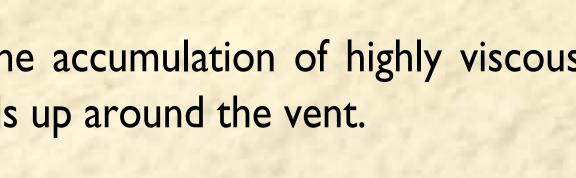
SHIELD VOLCANO

DOME VOLCANO

A polygenetic volcano resulting from frequent eruptions of fluid lava from summit craters or along a side of volcano edifice. Shield volcanoes are cones with slope at a low inclination angle (of about 5°), often with lateral eruptive centers.

SCORIA OR CINDER CONE

A monogenetic volcano formed during moderate energy explosive activity, through accumulation of volcanic scoria emitted in a fluid state but already solidified on falling to the ground. These cones can vary from perfectly circular to elliptic, mainly in relation to the morphology of the eruption conduit. The slopes' angles can reach 30-35°.



• a lava flow if a fluid lava spill

over the crater along the sides of

• a lava dome, if the magma is

unable to flow due to its high

• a lava lake if lava accumulates

inside the crater or in a small

depre-ssion around the eruption

a volcano

viscosity

centre;

Colata Etna 2002









Explosive eruptions are characterized by the fragmentation of rising magma, which changes from a liquid containing gas bubbles into a mixture of gas and fragments of magma and crystals. This mixture is then ejected violently from the vent to generate a range of phenomena which include:

- ejection of fragments of magma and rock (pyroclasts) that fall around the crater;
- generation of eruption columns that can rise as high as 50 km



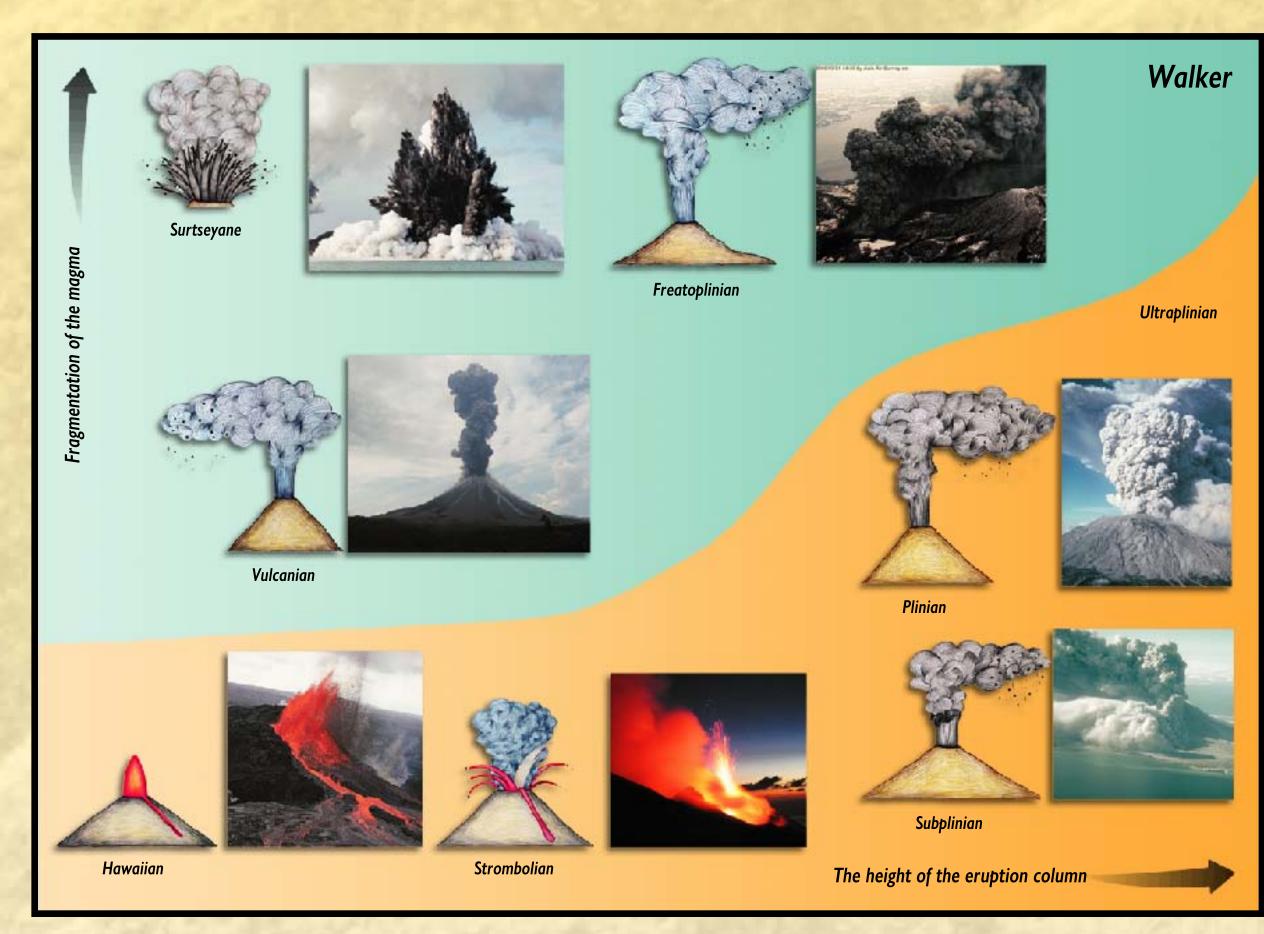




Explosive eruption

whose immediate vaporization produces high magma fragmentation and generates both low eruption columns and dilute and turbulent currents (pyroclastic surges).

The pyroclastic fragments from eruption columns can form either fall deposits, generated by the accumulation of volcanic particles, or flow deposits, generated by the deposition of pyroclastic currents due to gravity collapse of eruption columns.



This plot is used for the classification of magmatic and phreatomagmatic explosive eruptions. Eruptions are classified on the basis of the energy of the explosions involved, the fragmentation of the magma, and the area of distribution of volcanic products.

TUFF CONE

A monogenetic volcano generated by a phreatomagmatic eruption and composed of surge deposits and, subordinately, of pyroclastic flow and fall deposits. It has a large crater, with inner and outer walls at a low angle (< 10-12°).

STRATOVOLCANO

A stratovolcano or composite volcano is a polygenetic one, made up of overlying layers of deposits of effusive and explosive activity. The cone is generally of several kilometers or tens of kilometres in diameter, steep slopes and a summit crater. The shape can be extremely irregular as a result of collapse and the growth of lateral edifices.

CALDERA

A broad and generally subcircular depression in the earth's surface due to collapse of the rock above a magmatic chamber near the surface. A caldera is caused by the emptying of the magma chamber during largescale explosive eruptions.

STRATOVOLCANO

