

Volcanoes and Volcanic hazards

Contents

I	Igneous rocks	2
A	Intrusive vs. Extrusive	2
	i) Intrusive igneous rocks = Plutonic rocks	2
	ii) Extrusive igneous rocks = Volcanic rocks	2
B	Volcanoes	2
C	Bowen's Series of Mineral Crystallization	4



Figure 1: Mount Etna, Italy

I Igneous rocks

A Intrusive vs. Extrusive

i) Intrusive igneous rocks = Plutonic rocks

Intrusion : A body of magma pushes its way into the crust.

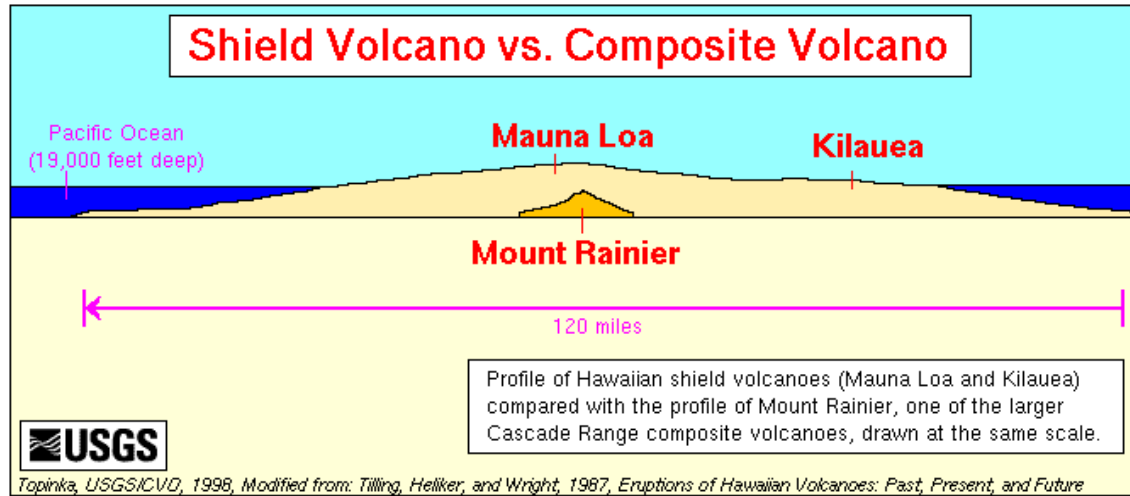
Intrusive igneous rocks: form by the cooling of magma body underground.

ii) Extrusive igneous rocks = Volcanic rocks

Form at the planet's surface, and form lava flows and/or pyroclastic deposits (ejected by explosive eruptions). Poses Geologic Hazard (e.g. Mt. St. Helens).

B Volcanoes

- Shield volcanoes: very fluid basaltic lava gashes out (Lava fountain) without any explosive activity. Form "pan-cake" like shape.
- Stratovolcanoes (composite volcanoes) Ex. Mt. Fuji
- Caldera: A large collapse depression at a volcanic summit. It may resemble a crater.

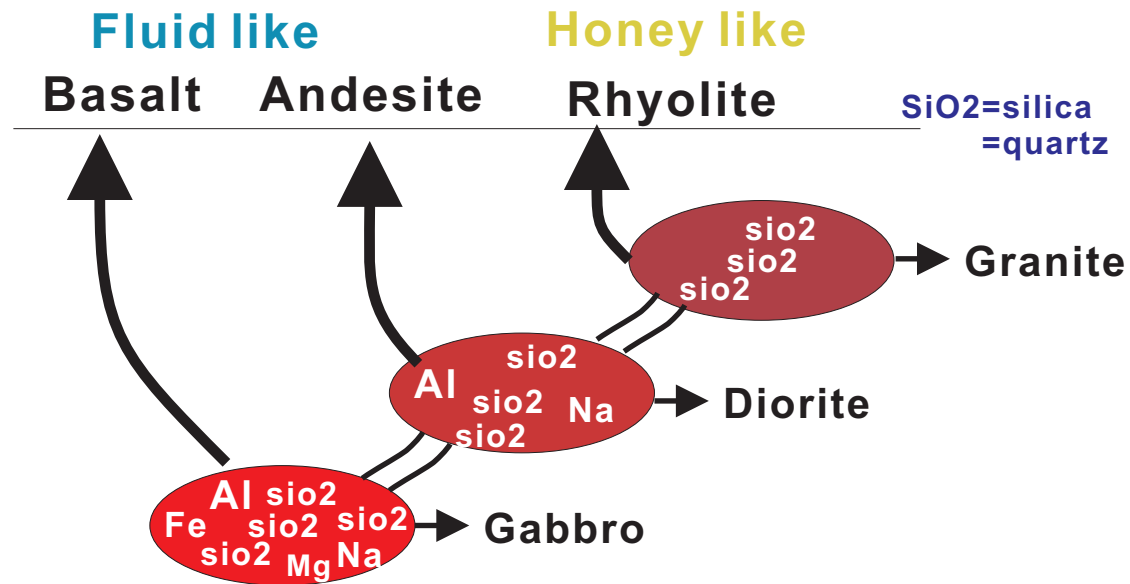


Volcanic types	amount of silica(SiO_2)	Viscosity	Trapping gases	Example	Eruption	Rock types
Caldera	very high silica	highly viscous	No gas can escape	Crater Lake	very explosive	Rhyolite
Strato/composite	high silica	very viscous	Little gas can escape	Mt. St Helens	explosive	Andesite
Shield	low silica	not viscous	Gas can escape	Hawaii	quiet (long lasting)	Basalt

C Bowen's Series of Mineral Crystallization
—Reaction in sills/dikes/batholith etc.

Magma will evolve from a source magma through mineral crystallization.

- **Single magma form multiple rock types (mafic first and felsic later).**
- Different minerals will form at different temperature.



Question Set

Do all questions of each question set. Words in parentheses are hints. Show the calculation processes or you get zero point.

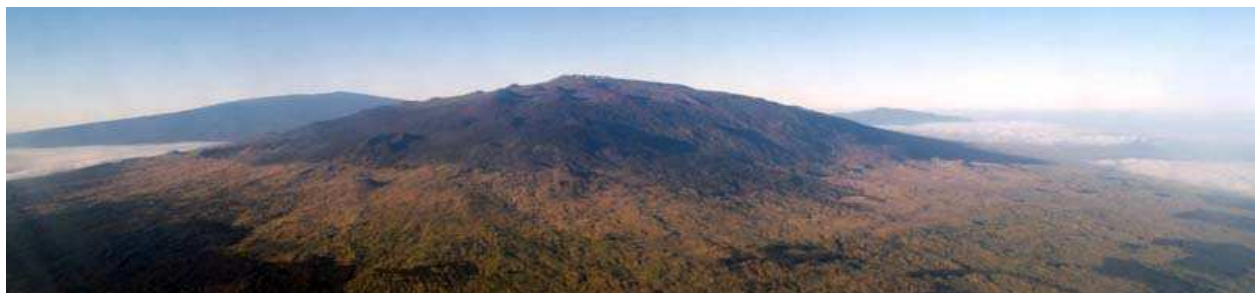
Question to skip. 80 vi, 81 vi, 82 i

- **80** [p. 157]

i, ii. (I suggest to draw one horizontal line from the summit.)

iii. It's confusing. Bedding= layering. Volcano's surface= Top of the volcanic deposits.

- **81** [p. 158] Plate VII a and c are below.



- **82** [p. 161]

- **84** [p. 163] Hint is the following picture.



- **85** [p. 164]

- ii. Lahar often doesn't stop until it hits the large mass of water.
- iv. Close to oval shape.



 NATIONALGEOGRAPHIC.COM

Photograph by Robert Madden
© 2004 National Geographic Society. All rights reserved.

Figure 2: Kilauea in Hawaii.