

Stromboli, 1969

2. Volcanoes



Volcano

- structure where magma & gases are erupted;
- one or more vents;
- pipe or fissure vents;
- includes the erupted deposits around the vent(s).

Volcano

- **Active:** in eruption, or has erupted recently
- **Dormant:** no recent eruption, but expected to erupt again in the future
- **Extinct:** no further eruptions expected

Volcanoes may be **active** for periods ranging from days to decades.

Dormant periods may last for decades, centuries or thousands of years

Repose Period.....time gap between eruptions

Monogenetic

- conduit used once
- continuous eruption
- usually small size and simple

Polygenetic

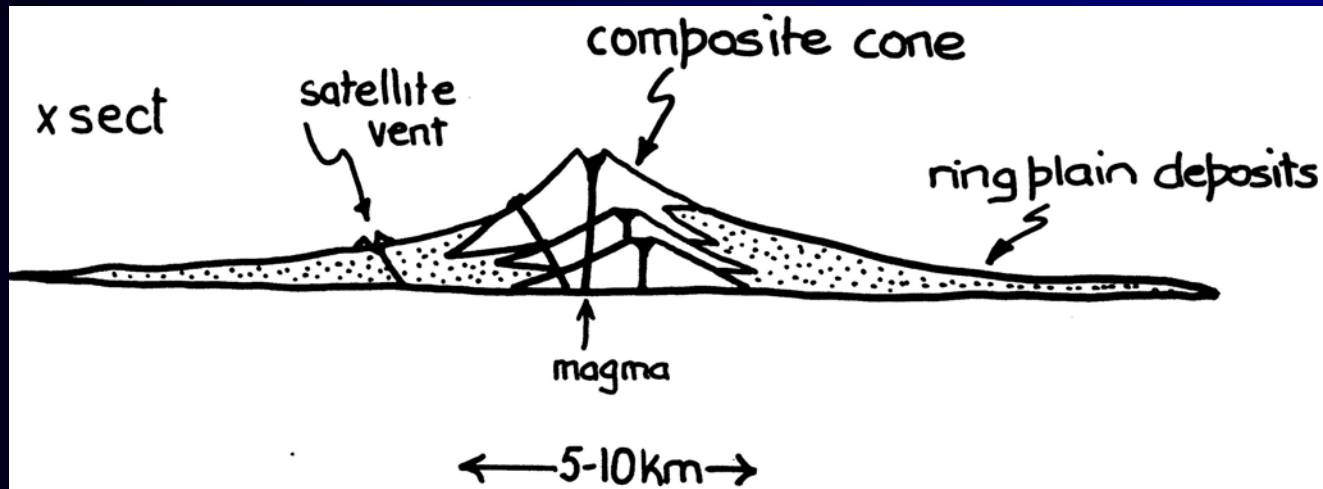
- conduit(s) repeatedly used, sealed, used again
- multiple vents
- usually large and complex

Volcano Types

- composite volcano (andesite)
- shield volcano (basalt)
- scoria cone (basalt)
- tuff ring and maar (basalt)
- lava dome (andesite, dacite, rhyolite)
- caldera (andesite, dacite, rhyolite)
- volcanoes under water

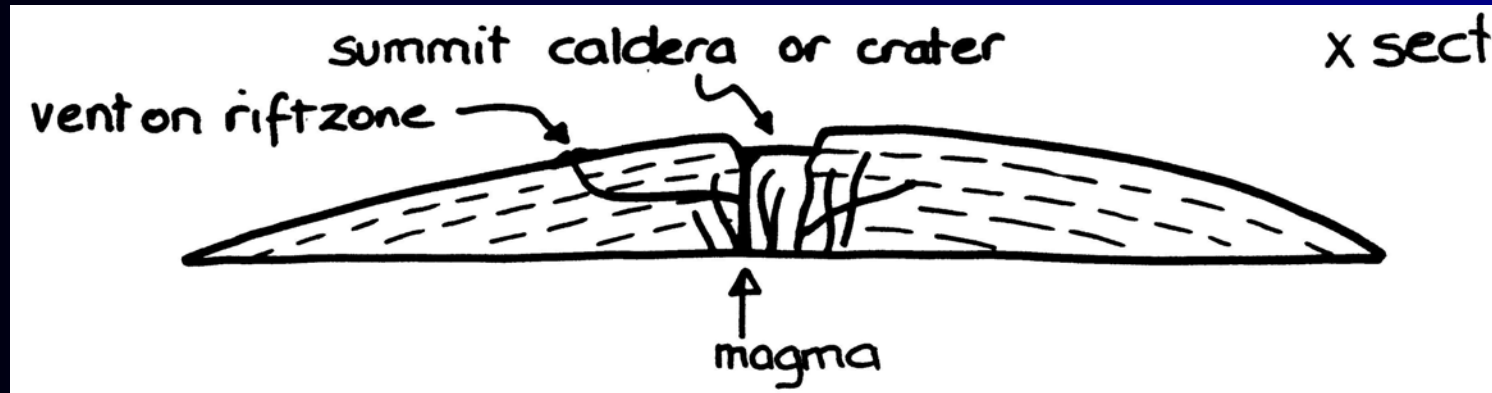
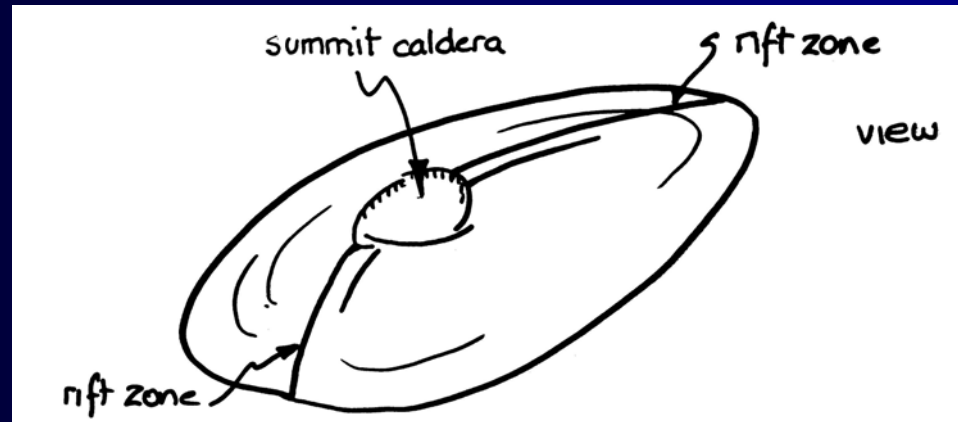
Composite

= stratovolcano, stratocone



- well-defined cone or overlapping “composite” cones
 - central vent ± satellite vents
 - cone made of lavas and breccia
 - ring plain made of clastic deposits
 - steep slopes; sector collapse and volcanic landslides
- e.g. Parinacota, Chile; Ruapehu, NZ; Merapi, Indonesia

Shield

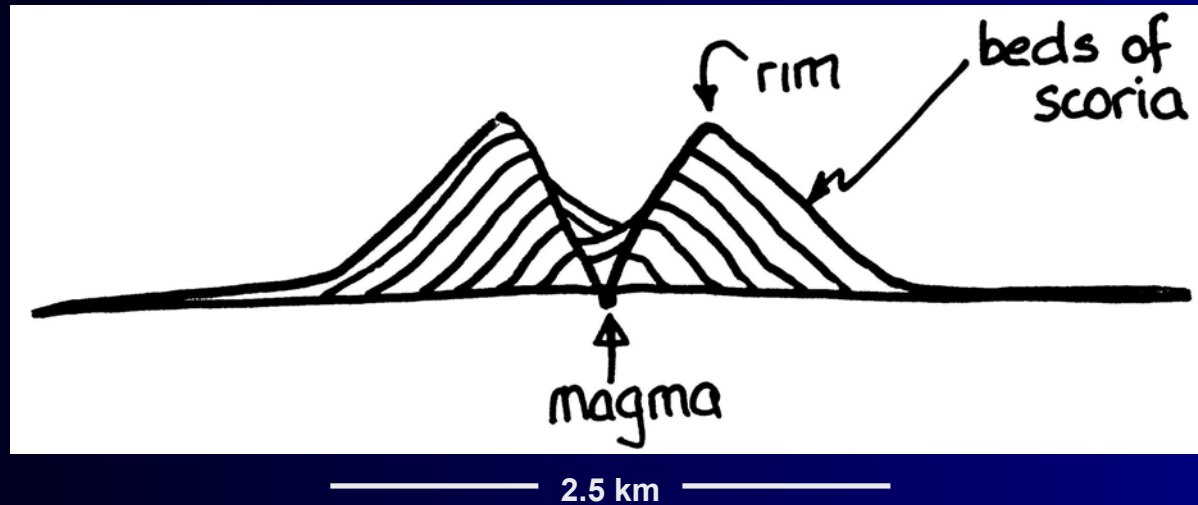


20 - 30 km

- gently sloping “shield” profile
 - radial rift zones, summit crater or caldera
 - summit vent + rift zone vents
 - shield made of extensive, thin lavas
- e.g. Kohala & Mauna Kea, Hawaii, USA

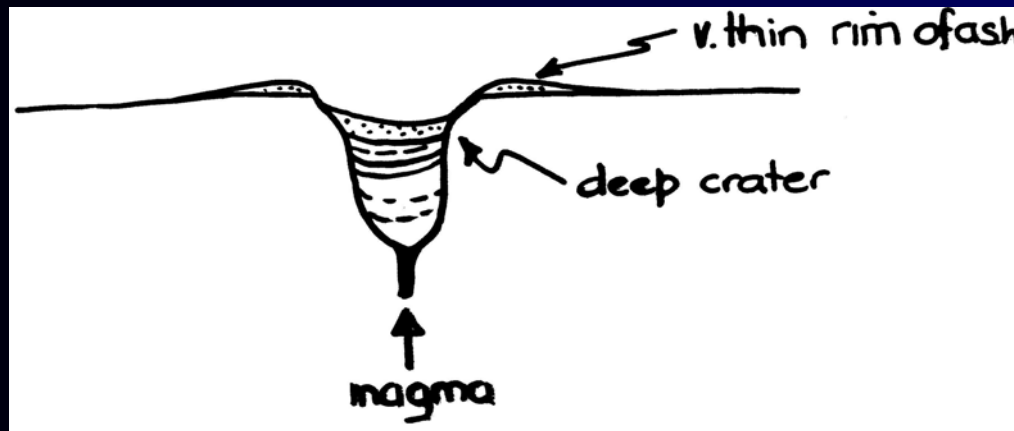
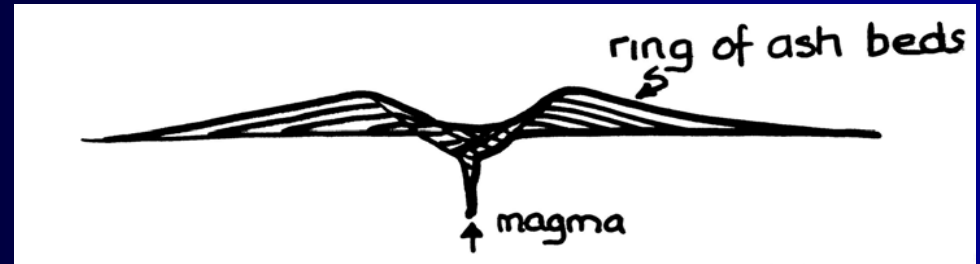
Scoria Cone

= cinder cone



- usually small; single vent
 - monogenetic
 - cone made of outward-dipping beds of loose scoria
 - mainly pyroclastic fall deposits
- e.g. Mt Capulin, New Mexico, USA
Mt Elephant, Victoria

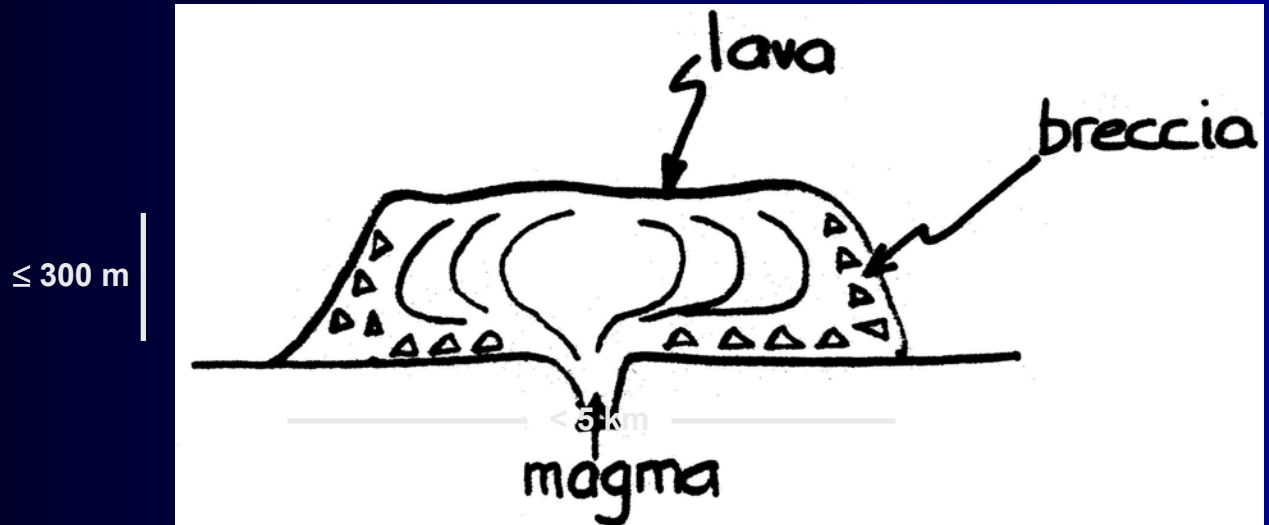
Tuff Ring & Maar



< 5 km

- small; usually single vent
 - monogenetic
 - vent surrounded by low ring of ash beds
 - mainly pyroclastic surge deposits
- e.g. Ubehebe, Death Valley, California, USA

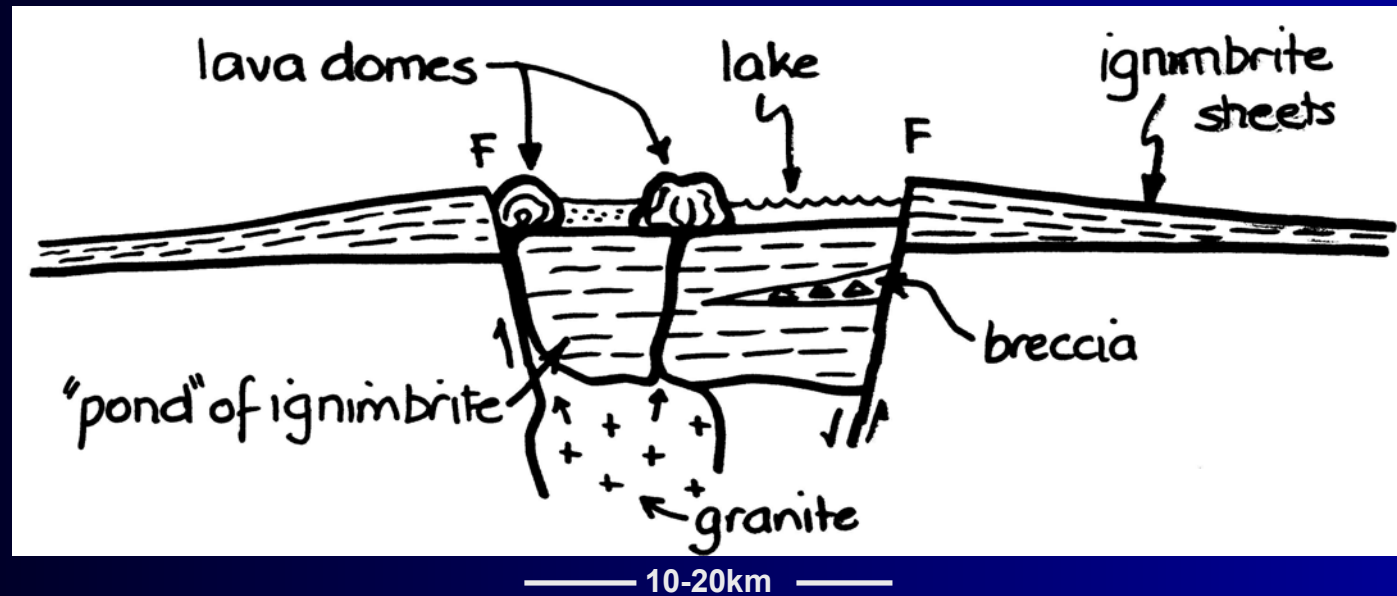
Lava Dome



- usually small
- single vent, monogenetic
- made of lava & autobreccia
- steep margins surrounded by talus, flat top

e.g. Novarupta, Alaska, USA; Chao, Chile; Tarawera, NZ

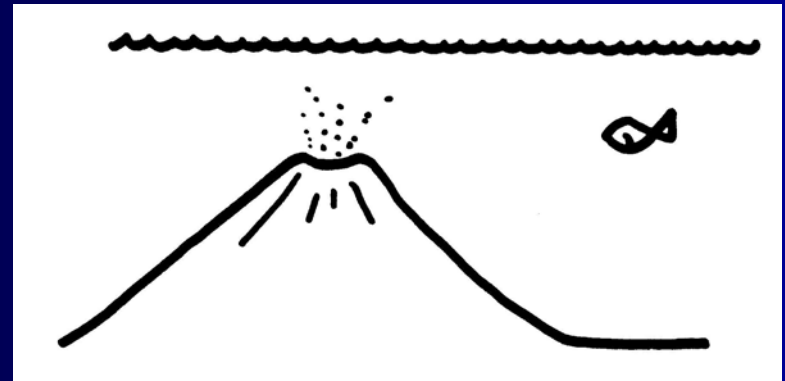
Caldera



- big, multiple-vent volcanic centres
 - very large volumes erupted explosively
 - ⊘ widespread ignimbrite & fall deposits
 - low topographic relief; capture drainage
 - ⊘ lakes
 - collapse of centre along ring faults
 - develop over 10^3 to 10^5 years
- e.g. Rotorua caldera, NZ; Valles caldera, New Mexico, USA

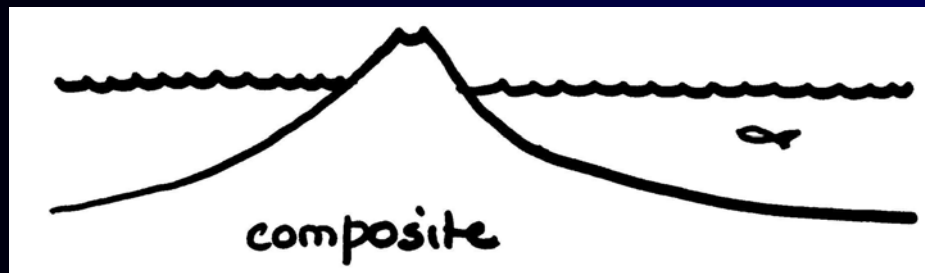
Seamounts

- build up from sea floor
- mainly lava and breccia
- commonly located on faults; may be elongate in plan



Plan view

- may emerge
..... **island volcano**



composite

e.g. Maui, Hawaii, USA
White Island, NZ

Eruptions in Water



e.g. volcanoes on the sea floor, volcanoes in lakes

Lavas

- quenched to glass
- broken; “hyaloclastite”



– pillow lava

Explosive eruptions

- OK in shallow water
- deep water: gas cannot expand (P too high)