INTERIOR OF THE EARTH MODULE 3/3

Volcano -A volcano is a vent, or opening, usually circular or nearly circular in form, through which heated materials consisting of gases, water, liquid lava and fragments of rocks are ejected from the highly heated interior to the surface of the earth.

Classification on the basis of periodicity of eruptions

(i) **Active Volcanoes** – are those which constantly eject volcanic lavas, gases, ashes and fragmental materials. Etna and Stromboli of the Mediterranean Sea are examples of this category. Most of the active volcanoes are found along the mid-oceanic ridgerepresenting divergent plate margins and convergent plate margins.

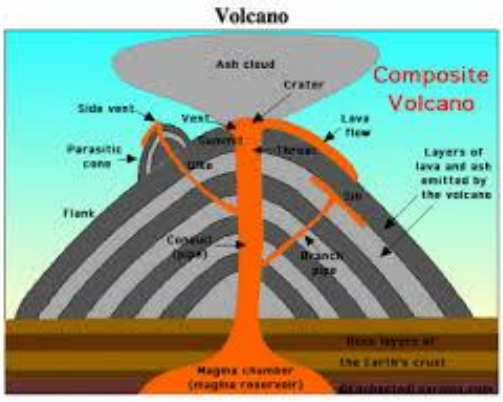
(ii) **Dormant Volcanoes** –are those which become quiet after eruptions for some time and there are no indications for future eruptions but suddenly they erupt very violently and cause enormous damage to human health and wealth.Visuvious volcano is the best example.

(iii) **Extinct Volcanoes** –The volcanoes are considered extinct when there are no indications of future eruption. The crater is filled up with water and lakes are formed.

Classification on the basis of nature of eruption and the form developed at the surface

(i) **Shield Volcanoes** –The shield volcanoes are the largest of all the volcanoes on the earth. The Hawaiian volcanoes are the most famous examples. These volcanoes are mostly made up of basalt that is very fluid when erupted. These volcanoes are not steep. They become explosive if somehow water gets into the vent; otherwise they are characterised by low-explosivity.The lava moves in the form of a fountain and throws out the cone at the top of the vent and develops into cinder cone.

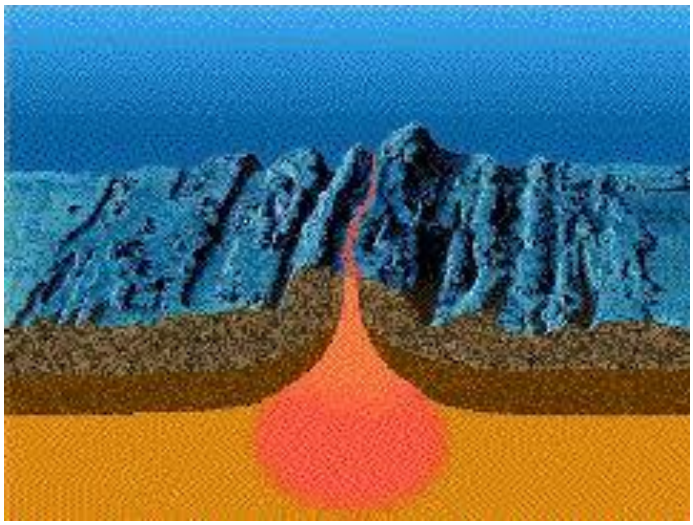
(ii) **Composite Volcanoes** –These volcanoes are characterised by eruptions of cooler and more viscous lavas. These volcanoes often result in explosive eruptions. Along with lava, large quantities of pyroclastic material and ashes come out of the volcanoes. This material accumulates in the vicinity of the vent openings leading to formation of layers, and this makes the mountain appear as composite volcanoes.



(iii) **Caldera** – A caldera is a large depression formed when a volcano erupts and collapses. During a volcanic eruption, magma present in the magma chamber underneath the volcano is expelled, often forcefully. When the magma chamber empties, the support that the magma had provided inside the chamber disappears.

(iv) **Flood Basalt Provinces**– Flood basalt is the result of a giant volcanic eruption or series of eruptions that covers large stretches of land or the ocean floor with basalt lava. These volcanoes outpour highly fluid lava that flows for long distances. The Deccan Traps from India is an example of flood basalt province.

(v) **Mid-Ocean Ridge Volcanoes** – A mid-ocean ridge is a seafloor mountain system formed by plate tectonics. It typically has a depth of 2,600meters and rises about two kilometers above the deepest portion of an ocean basin. This feature is where seafloor spreading takes place along a divergent plate boundary.



VOLCANIC LANDFORMS

Numerous types of landforms are created due to cooling and solidification of magmas below the earth's surface and lavas at the earth's surface and due to accumulation of fragmental materials, dusts and ashes with lavas. The lava that is released during volcanic eruptions on cooling develops into igneous rocks. The cooling may take place either on reaching the surface or also while the lava is still in the crustal portion. Depending on the location of the cooling of the lava, igneous rocks are classified as volcanic rocks and plutonic rocks. The lava that cools within the crustal portions assumes different forms. These forms are called intrusive forms.

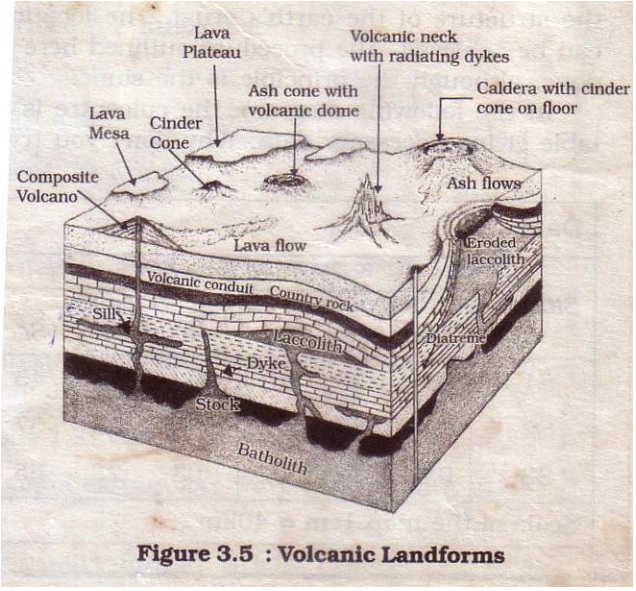
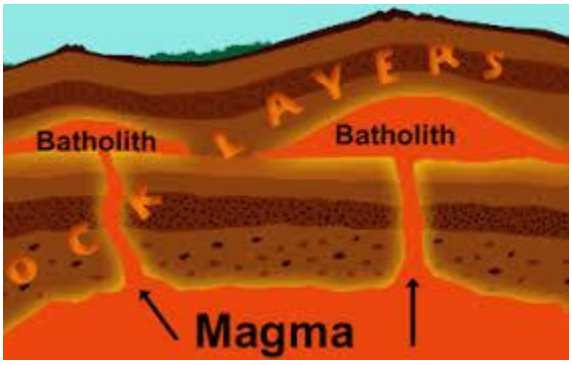
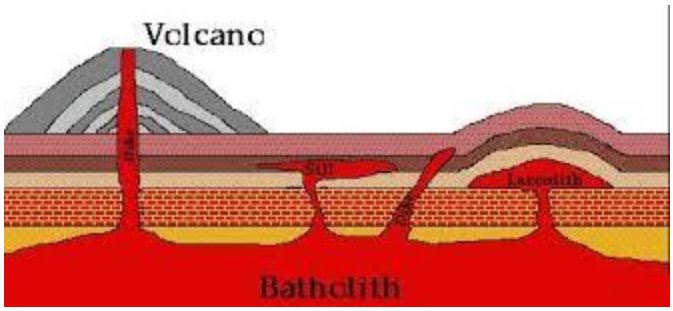


Figure 3.5 : Volcanic Landforms

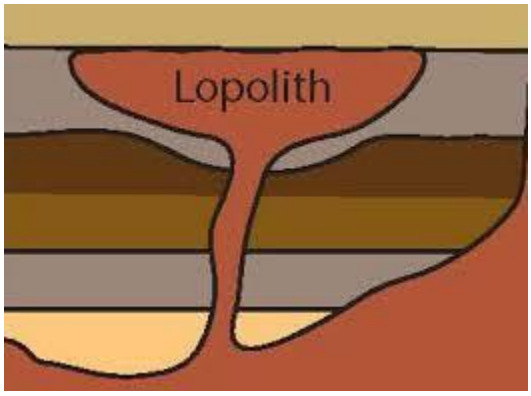
(i) **Batholiths** – A batholith is a large mass of intrusive igneous rock, larger than 100 square kilometres in area that forms from cooled magma deep in the Earth's crust. Batholiths are almost always made mostly of felsic or intermediate rock types; such as granite, quartz, monzonite or diorite. It develops in the form of large domes. They appear on the surface only after the denudational processes remove the overlying materials.



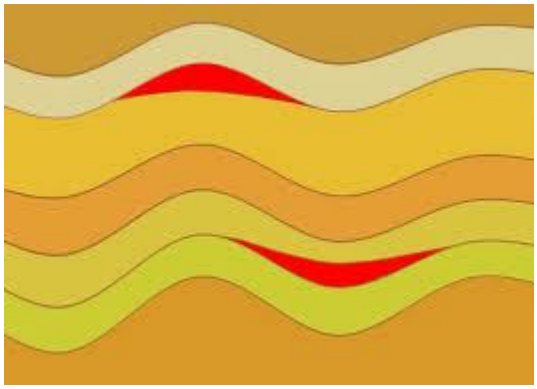
(ii) **Lacoliths**– A laccolith is a sheet-like intrusion that has been injected within or between layers of sedimentary rock. The pressure of the magma is high enough that the overlying strata are forced upward and folded, giving the laccolith a dome or mushroom-like form with a generally planar base.



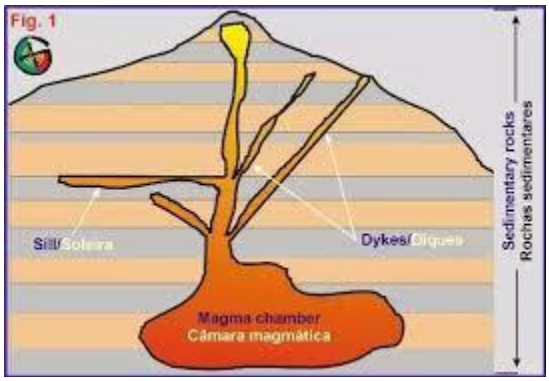
(iii) **Lapolith**– When the lava moves upwards, a portion of the same move in a horizontal direction. In case it develops into a saucer shape, concave to the sky body, it is called lapolith.



(iv) **Phacolith** – A wavy mass of intrusive rocks is found at the base of synclines or at the top of anticline in folded igneous country. Such wavy materials have a definite conduit to source beneath in the form of magma chambers. These are called the phacoliths.



(v) **Sills** – The horizontal bodies of the intrusive igneous rocks are called sill or sheet, depending on the thickness of the material. The thinner ones are called sheets while the thick horizontal deposits are called sills.



(vi) **Dykes** – When the lava makes its way through cracks and fissures, it solidifies almost perpendicular to the ground. It gets cooled in the same position to develop a wall –like structure. Such structures are called dykes.