



Geomorphic Process

- The process responsible for the **formation** and **alteration** of the earth's surface.
- The physical and chemical **interactions** between the **earth's surface** and the **natural forces** acting upon it to produce landforms.
- The processes are determined by such natural environmental variables as **geology**, **climate**, **vegetation** and **base level**, to say nothing of human interference.



Geomorphic Process (Cont...)

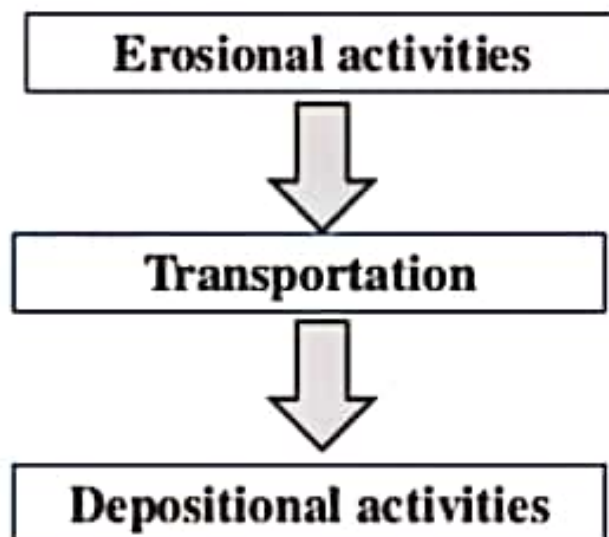
Definition:

- The geomorphic processes are all those **physical and chemical changes** which effect a modification of the earth's surgical form [W. D. **Thornbury** (1968): Principles of Geomorphology, pp. 34].
- A process by which the earth's land forms are **changed or maintained** [Jim **Gardner** (1979): Physical Geology].



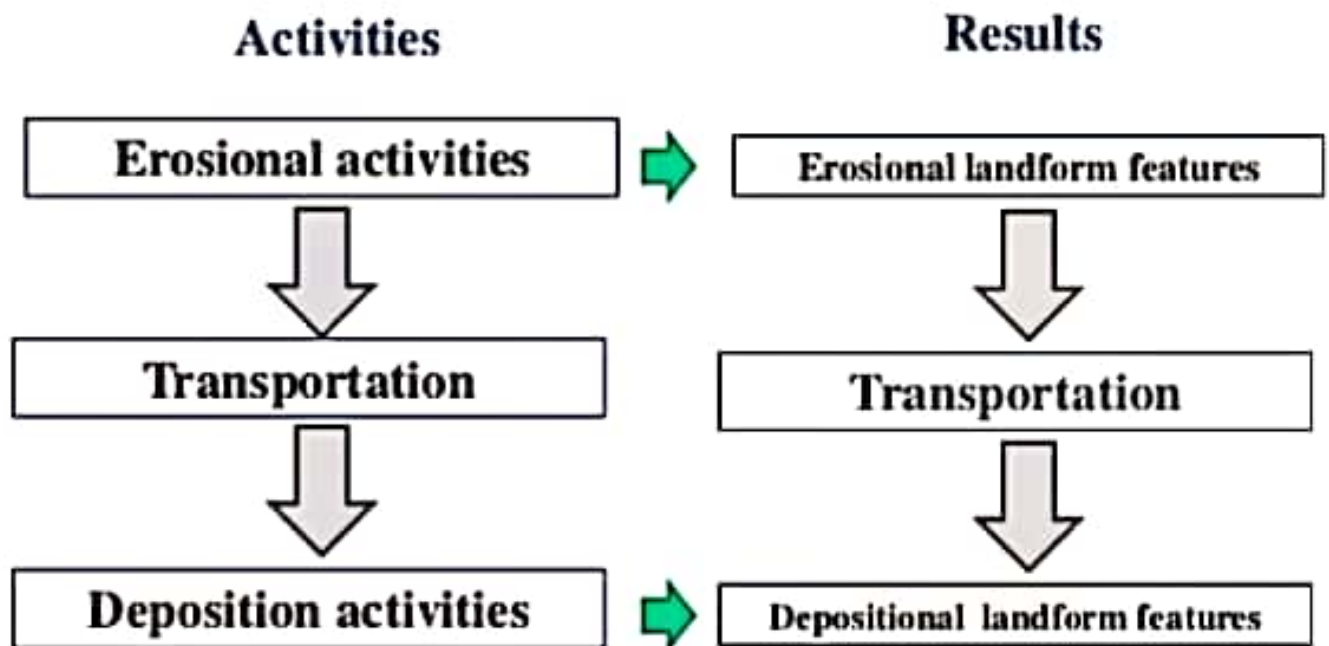
Activities of the Agent of Geomorphic Processes

Three types of activities are done





Activities of the Agent of Geomorphic Processes



Agents of Change...

River activities



Wind activities

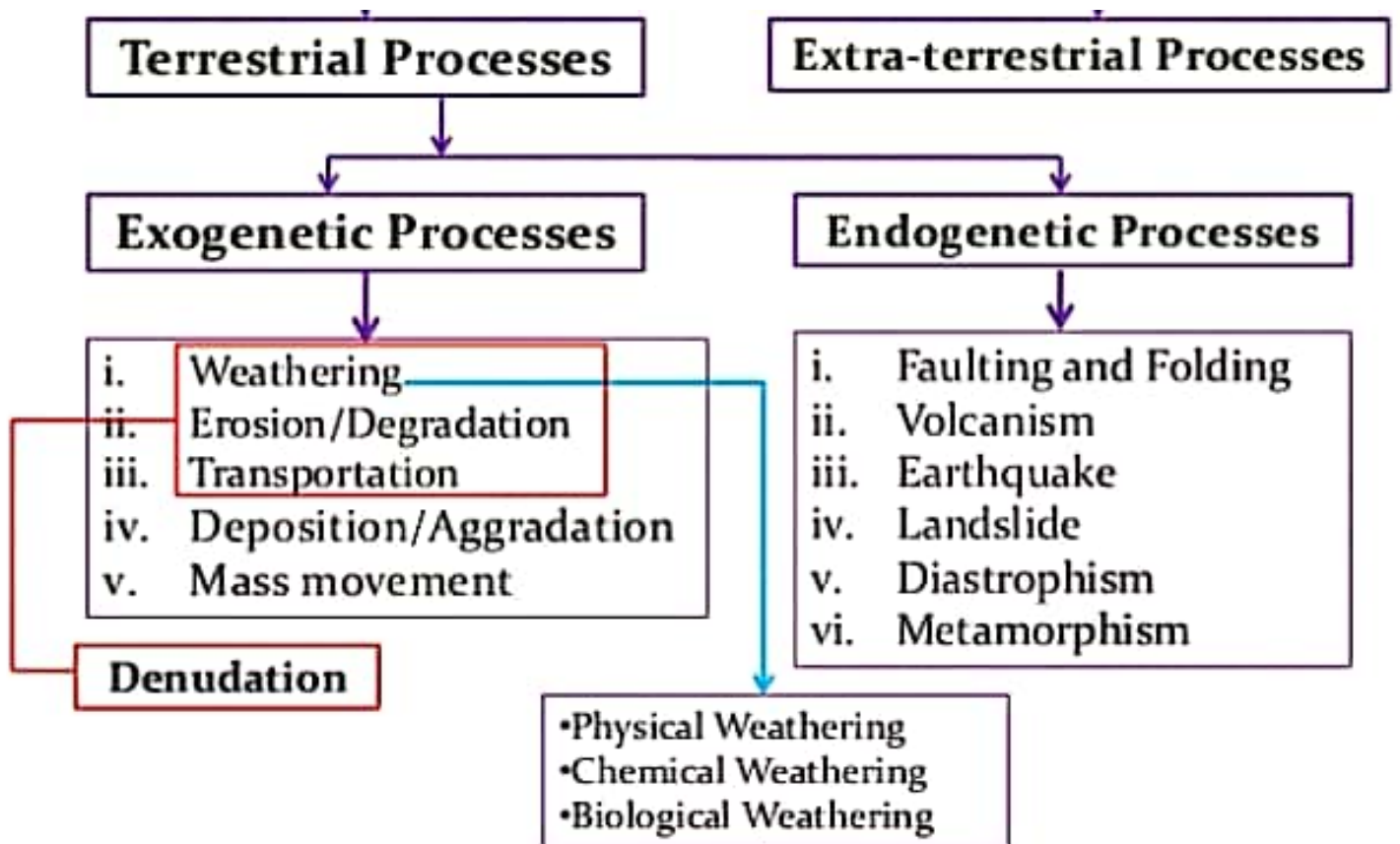


Glaciers activities



Wave activities







Types of Geomorphic Processes

Geomorphic Processes

A. Terrestrial processes

B. Extra-terrestrial processes, e.g. **fall of meteorite**
(mass/rock from outer space).

Terrestrial processes

1. Exogenetic / Exogenous Processes

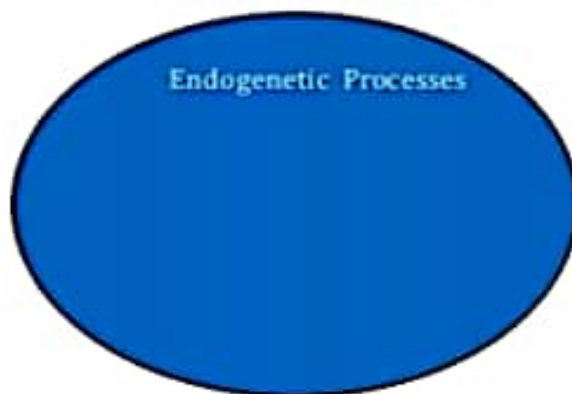
2. Endogenetic / Endogenous Processes

Types of Geomorphic Processes (Cont...)

Exogenetic/Exogenous Processes

Outer geomorphological processes = exogenetic processes (solar radiation, wind, temperature changes, water) create relief sculptures, surface features.

Exogenetic Processes

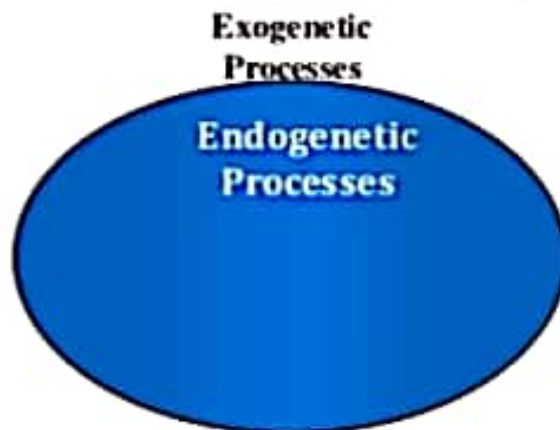




Types of Geomorphic Processes (Cont...)

Endogenetic Processes

Inner geomorphological processes = endogenetic processes (earthquakes, volcanoes, folding and faulting) create rough features of the Earth's relief. e.g. oceanic basins, mountain ranges, oceanic ridges and trenches, rift valleys, folds, faults and volcanoes, etc.





Basic difference between the two process

- Processes that are caused by forces from **within** the Earth are **endogenous** processes.
- By contrast, **exogenous** processes come from forces **on or above** the Earth's surface.

Endogenic Processes	Exogenic Processes
Originate in the interior of the earth.	Originate on the surface of the earth.
Causes sudden or rapid movements	Causes slow movements.
Eg: Earthquake, faulting, diastrophism	Eg: Erosional and Depositional



Types of Exogenetic / Exogenous Processes

- i. Weathering
- ii. Erosion/ Degradation
- iii. Transportation
- iv. Deposition/Aggradation
- v. Mass movement

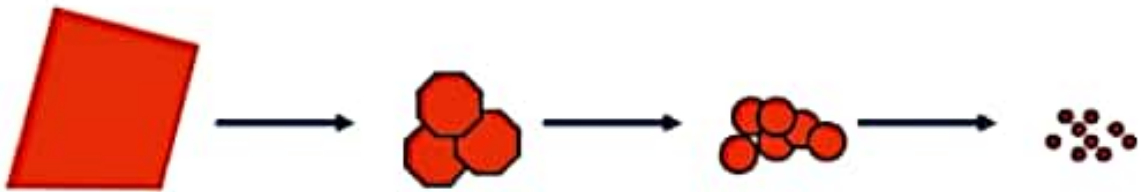


Denudation

- It means to make the things **exposed**.
- The processes by which the rocks on the earth's surface are **broken into pieces** through the application of **external physical forces** and the **debris are transported elsewhere** is known as denudation.
- This denudation work is performed through three processes such as weathering, erosion and transportation.
- **Denudation= Weathering + Erosion + Transportation**



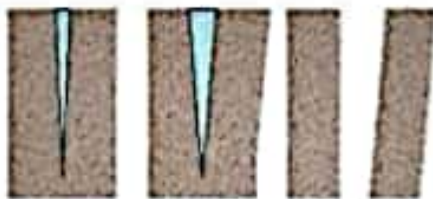
Weathering





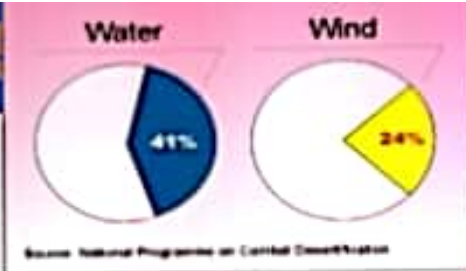
Weathering

- The weathering is a process by which the rocks on the surface of the earth is **broken mechanically into pieces** due to **snow or frost**, the **variation of temperature and pressure** or due to **chemical (dissolution) action** on the materials.
- Even the rocks are dislodged by the animals. But the rocks weathered this way, **are not transported elsewhere**.



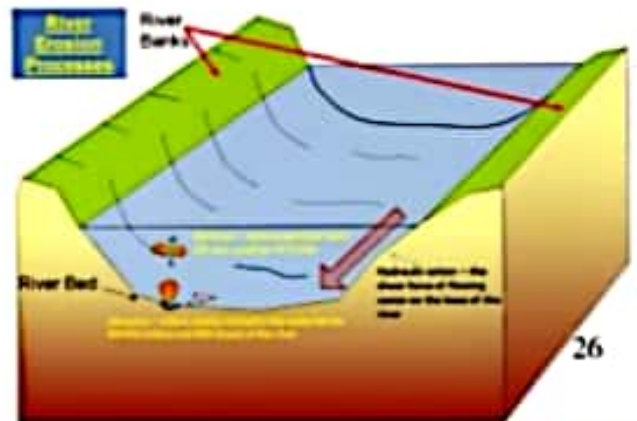
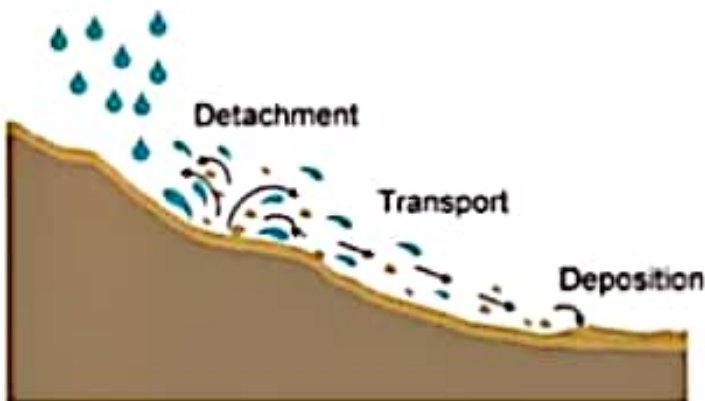
Water-filled crack Freezes to ice Breaks Rock





Erosion

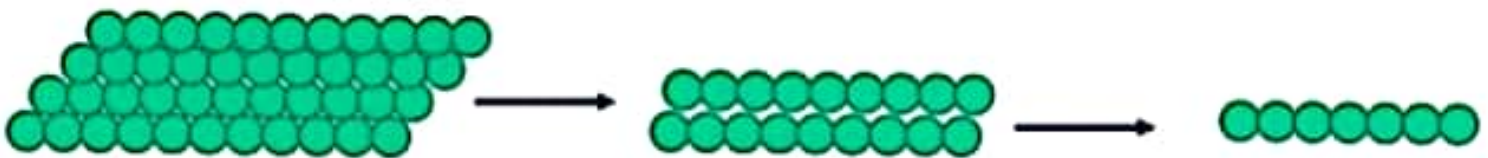
- Erosion and transportation are **accomplished** together.
- The process by which the rocks of the earth's crust are **eroded** by the river, wind, glacier, ocean currents etc. are transported elsewhere is known as erosion.





Degradation

- Degradation is the **lowering** of a bottomland **surface** through the process of erosion;
- Conceptually it is the opposite of the vertical component of aggradation and is most frequently applied to sediment removed from a channel bed or other low-lying parts of a stream channel.





Weathering vs. Erosion

- Weathering = process of disintegration or **decomposition** of rocks which stay then in the same place.
- Erosion = process of disintegration or **decomposition** of rocks which are **transported** somewhere else.

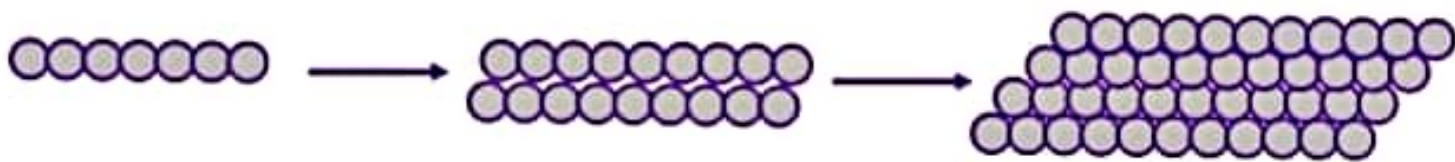
DEPOSITION





Aggradation

- Aggradation is the **raising** or **elevating** of a bottomland **surface** through the process of alluvial deposition;
- Conceptually it is the vertical component of accretion and is most frequently applied to sediment deposition on a channel bed, bar or other near-channel surfaces, flood plain, or, less often, low-lying alluvial terrace.

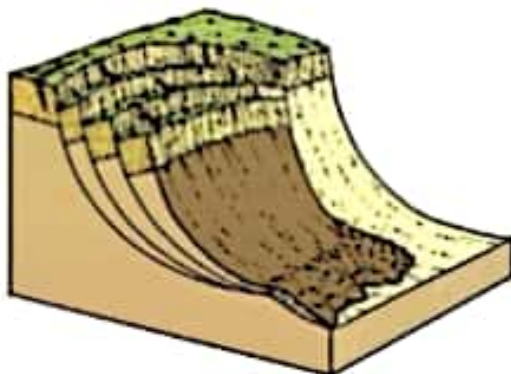




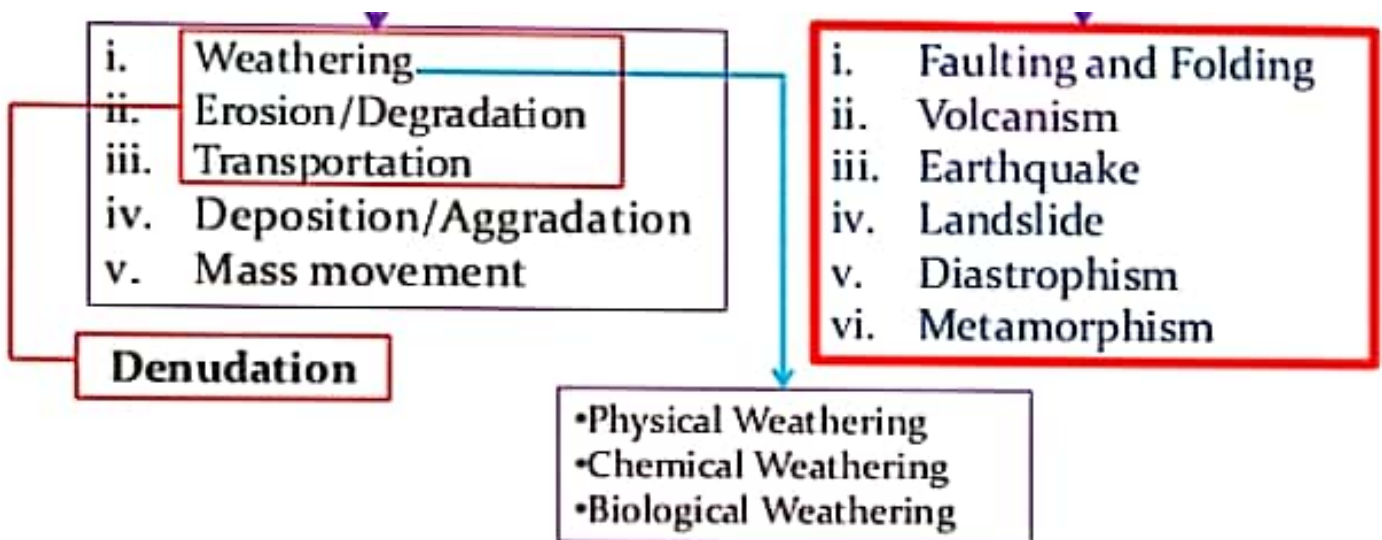


Mass movement/Mass Wasting

- Mass movement is any **downslope transfer**, through **gravitational** and generally water-facilitated (viscous) processes, of near-surface **soil and rock material**;
- Rates of mass movement range from very slow **creep** to nearly instantaneous **slope failure**.



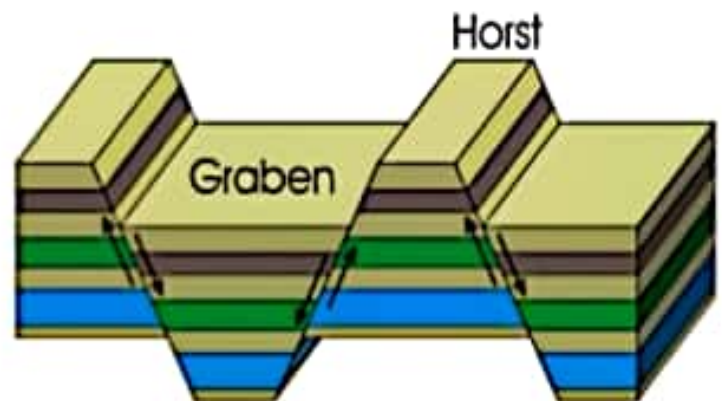
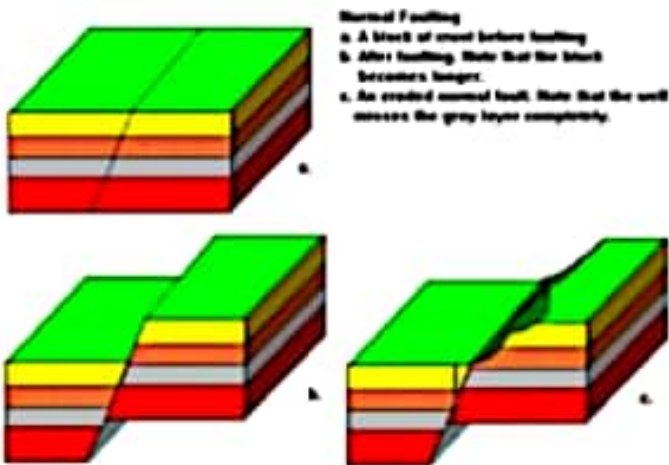
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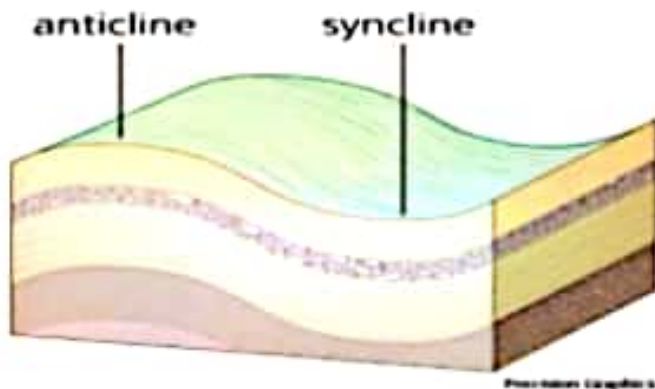
Faulting

- Fault is a planar or gently **curved fracture** in the rocks of the earth's crust, where compressional or tensional forces cause relative displacement of the rocks on the opposite sides of the fracture.



Folding

- Fold is an **undulation** or **waves** in the stratified rocks of the earth's crust.
- A fold occurs when one or a mass of originally flat and planar **surfaces**, such as sedimentary strata, are **bent or curved** as a result of permanent **deformation**.





Volcanism

- Volcanism is the phenomenon of **eruption of molten rock** (magma) onto the surface of the earth, where lava and volcanic gases erupt through a break in the surface called a vent.
- Eruption of the volcanoes or the magma is the main **sources of igneous rocks** on the surface of the earth.







Landslide

- A landslide, also known as a landslip, which includes a wide range of ground movements, such as rock fall, deep failure of slopes and shallow debris flows, which can occur in offshore, coastal and onshore environments.





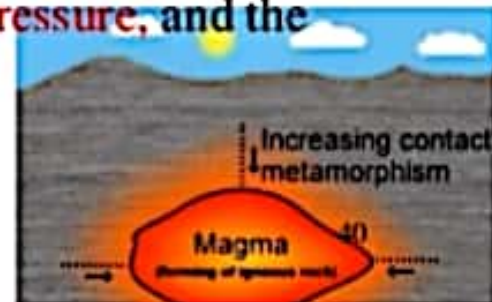
Diastrophism

- Diastrophism is also called tectonism, **large-scale deformation** of earth's crust by **natural processes**, which leads to the formation of **continents and ocean basins, mountain systems, plateaus, rift valleys**, and other features by mechanisms such as plate movement, volcanic loading, or folding.
- Internal forces active here



Metamorphism

- Metamorphism is the **change in rock structure, minerals or geologic structure.**
- It is a process of change in the physical structure of rock as a result of long-term heat, pressure and introduction of chemically active fluids, especially a change that increases the rock's hardness and crystalline structure.
- The change occurs primarily due to **heat, pressure, and the introduction of chemically active fluids.**





Geomorphological Processes at a glance

