

# Geomorphic Processes

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- exosion
- weathering
- deposition


→ earth's materials go through chemical actions and physical pressures.

- Mass wasting, weathering, deposition, and exosion are exogenic geomorphic processes.
- Volcanism  
Radioactivity, rotational and tidal friction and primordial heat generating from the interior of the earth  
↑  
endogenic geomorphic processes.

## Geomorphic Agents

- mobile mediums  
waves . . .  
↳ running water, wind, currents,  
↳ remove, transport and deposit the earth materials.
- Gravity also plays an important role.

Diatrophism - reshaping of the earth's surface through rock movements and displacement.

1) Orogenic processes (mountain building) -  
 severe folding taking place.

2) Epeirogenic processes (continent building) -

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uplifting or warping of large parts of the  
earth's crust.



3) Earthquakes -

4) Plate tectonics involving horizontal movements of  
crustal plates.

Weathering - it is the process of  
disintegration and decomposition of rocks through the  
actions of various elements of weather and climate.

• Physical Weathering - disintegration of  
rocks brought about by elements of weather.

→ changes in pressure, temperature, wind and water

• Thermal Weathering

→ arid + semi arid areas

→ temperature is high

Due to extreme temperatures in arid / semi arid  
areas, rocks expand during daytime and contract  
during nighttime (fall in temperature). Because of  
extreme temperature conditions, rocks crack and  
eventually split.

- Granular disintegration → Block disintegration
  - ↓
  - small pieces
  - ↓
  - large rectangular shaped blocks

E.g - granite rocks.

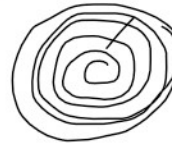
### • Frost Wedging -

- water entering the cracks of the rocks.
- temperature falls, water changes into ice
- frozen water needs more space, so putting pressure, expanding the cracks and further deepening the crack.



### Exfoliation - When due to

weather variations, outer layers of rocks peel off from the main mass of the rock in concentric layers then it is known as exfoliation.



similar to onion skins

### Chemical Weathering -

e.g. solution formation, oxidation, reduction, carbonation and hydration processes.

↳ disintegrate, decompose and dissolve the rocks into a fine state.

rocks into a fine state.

a) Solution - Soluble minerals present in the rocks get dissolved in water. Over a long period of time, soluble minerals get washed away from the rocks and this can even lead to the formation of caves.

b) Hydrolysis - It is the chemical breakdown of a rock material when it comes in contact with water, forming an insoluble precipitate like clay mineral.

For e.g., hydrolysis of feldspar, found in granite changing to clay.

c) Carbonation - formation of carbonic acid.

/   \

water + CO<sub>2</sub>

• entire reaction is important for formation of caves.

d) Oxidation - when oxygen combines with water and iron, it weakens the rock and disintegrates it.

E.g - rusting of iron

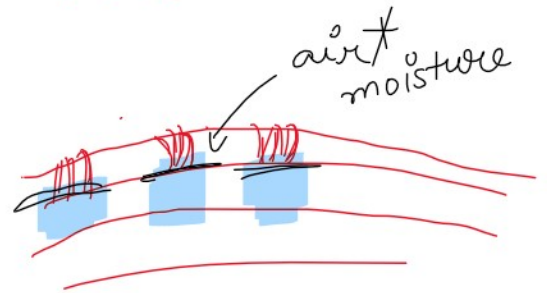
c) Hydration - absorption of water; rocks absorb water; increase in volume and results in rock deformation.

For E.g., absorption of water by anhydrite ( $\text{CaSO}_4$ ) leading to the formation of gypsum ( $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ ).

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### Biological Weathering

- alteration of rock by the action of plants, animals and humans.
- Burrowing and wedging  
E.g. rodents, termites, earthworms, etc. . . . .

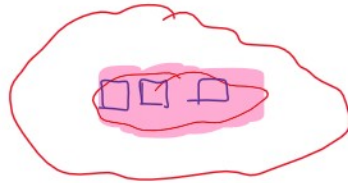


- human activities like vegetation, ploughing, cultivation
- Decomposition of animal and plant matter helps in the production of humic, carbonic and other acids which increase the decomposition and also help in solubility of some elements.

acids which increase the decomposition rate also helps in solubility of some elements.

## Importance of Weathering

- weathering helps in the formation of fresh soils.
- It prepares the soil for erosion and mass movements.



## Mass Movements



water, air, ice

- Transfer the mass of rock debris down the slopes under the direct influence of gravity.

