Weathering And Erosion

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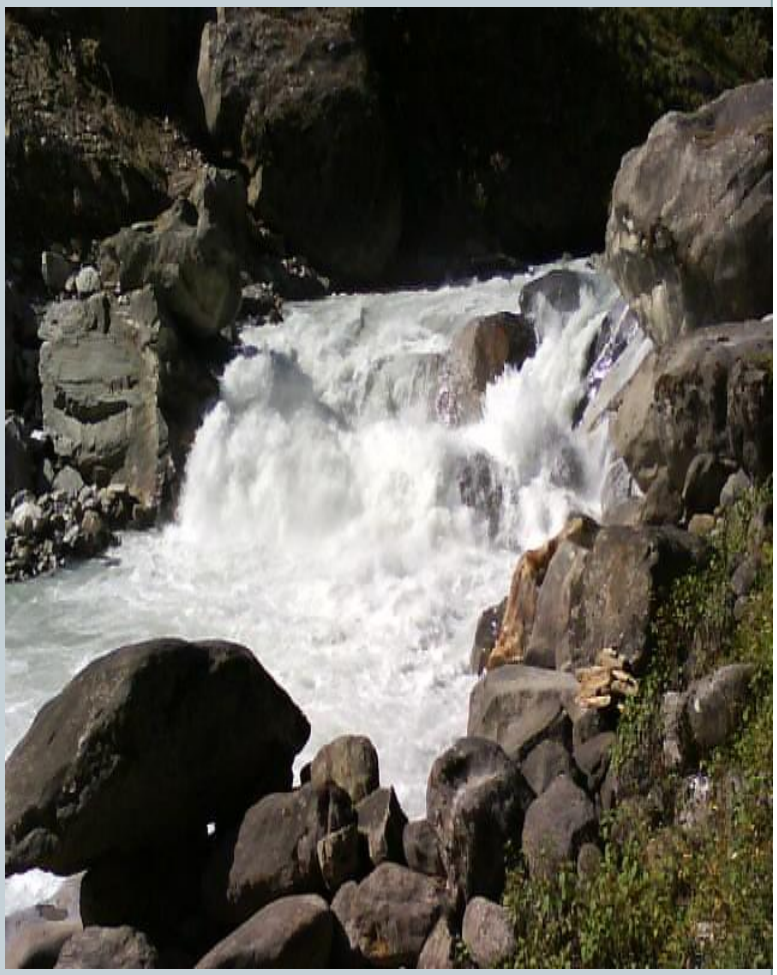
- Weathering- the break-up of rock due to exposure to the atmosphere (H_2O + gases)

- Erosion - removal and transport of earth materials by natural agents (glaciers, water, winds)

Types of Weathering

- **<u>Mechanical Weathering-</u> rock is broken down into smaller pieces of the same material**
- **No change in the composition**
- **Ex. Rock cliff→pebbles and boulders same as cliff**



Agents of Mechanical Weathering:

- Abrasion – rocks hitting other rocks
- Frost Action (Ice Wedging) – water seeps into cracks in rocks, then freezes→expands→melts→refreezes
- Wetting and Drying – effective in breaking up rocks containing clay) Clay swells up when wet and shrinks when dry→ causing rocks to fall apart

Agents of Mechanical Weathering:

- **Plant and Animal Action – (mosses, ants, earthworms, moles)**
  - plant roots grow into cracks → wedging rock apart; animals dig into the earth

- **Exfoliation – peeling of rock layers due to gravity (sheet of rock peels away) Happens to granite**

Types of Weathering

- **Chemical Weathering - rock's minerals are changed into different substances**
- **change in composition and appearance**
- **occurs when a chemical reaction takes place between the rock and H2O, CO2, O2, or acid**

Agents of Chemical Weathering

- Hydrolysis – Chemical reaction of water and minerals
- EX. Feldspar + H_2O → Kaolin (clay)

- Oxidation – Chemical reaction of oxygen + minerals (occurs in rocks with iron)
- Ex. Fe + O_2 → FeO_2 (iron oxide) Hematite or rust

Agents of Chemical Weathering

- **Carbonation – chemical reaction of CO_2 (dissolved in water) and minerals→ produces carbonic acid and results in a mineral changing**

- **Acids – (plant decay, industrial runoff, and acid rain) acid seeps into rocks and produces cracks→ rocks break apart**

- ***These two processes rarely occur alone! Mechanical and chemical weathering almost always act together.***

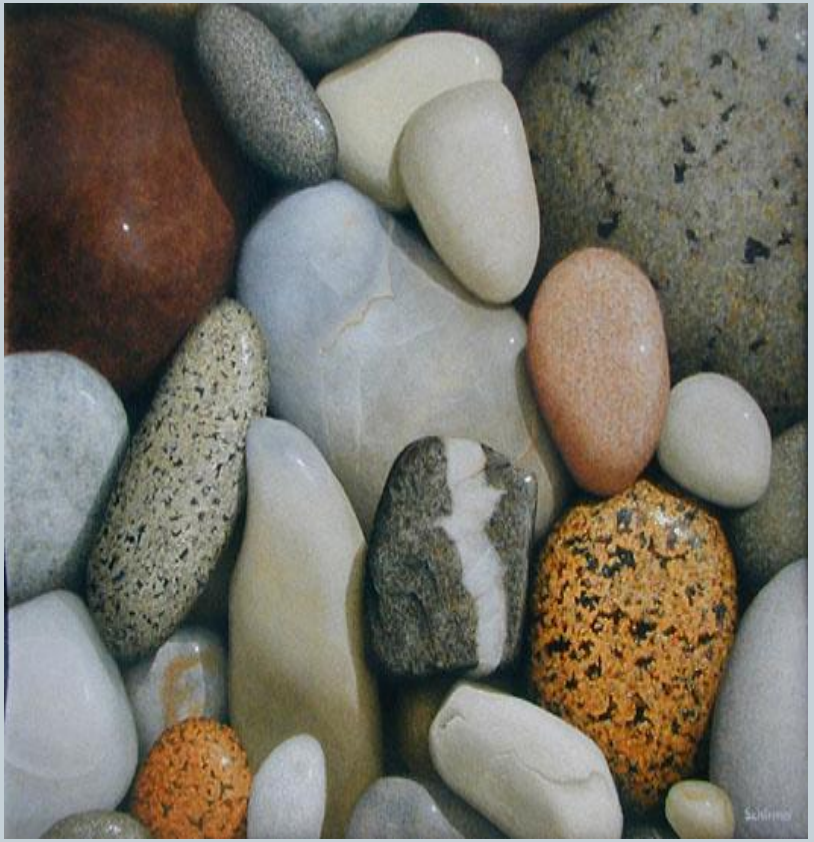
Factors that affect Weathering Rates:

- **Amount of rock surface exposed: faster weathering with more surface area**

- **Climate: Rainfall, alternating freeze/thaw cycles**
  - ***Warm, humid climates→ More chemical weathering
  - ***Cool, dry climates→ More mechanical weathering

Factors that affect Weathering Rates:

- **Type of Rock: all rocks do not weather at the same rate**
  - EX. Marble tombstones weather faster than granite or slate because of acid rain.



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