

D.N.R.COLLEGE(AUTONOMOUS), BHIMAVARAM
DEPARTMENT OF GEOGRAPHY

PHYSICAL GEOGRAPHY
E- CONTENT

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UNIT I: Definition, Nature, Scope of Physical Geography

Definition and Nature of Physical Geography:

- Physical Geography studies the physical features of the Earth's surface.
- Focuses on understanding the processes and patterns in the natural environment.

Scope of Physical Geography:

- Includes geomorphology, climatology, hydrology, and biogeography.
- Examines Earth's landscapes, environments, and the relationships between human activities and the physical world.

Classification of Rocks:

1. **Igneous Rocks:** Formed from solidified molten material (magma/lava).
 - Intrusive (Plutonic): Formed inside the Earth (e.g., granite).
 - Extrusive (Volcanic): Formed on the Earth's surface (e.g., basalt).
2. **Sedimentary Rocks:** Formed from the accumulation of sediments.
 - Clastic: Composed of fragments of other rocks (e.g., sandstone).
 - Chemical: Precipitated from solutions (e.g., limestone).
 - Organic: Composed of organic material (e.g., coal).
3. **Metamorphic Rocks:** Formed from existing rocks transformed by heat and pressure.

- Foliated: Have a banded or layered appearance (e.g., schist).
- Non-foliated: Do not have a layered appearance (e.g., marble).

Earth Movements:

- **Orogenic Movements:** Related to mountain building, result in folds and faults.
- **Epeirogenic Movements:** Broad, gentle uplift or subsidence of the Earth's crust.
- **Earthquakes:** Sudden release of energy in the Earth's crust causing seismic waves.
- **Volcanoes:** Eruptions of magma from the Earth's mantle to the surface.

Wegener's Theory of Continental Drift:

- Proposed that continents were once a single supercontinent (Pangaea) and drifted apart.
- Evidence: Fit of continents, fossil distribution, and geological similarities.

Plate Tectonic Theory:

- The Earth's lithosphere is divided into tectonic plates that move over the asthenosphere.
- Plate boundaries: Divergent, convergent, and transform.
- Causes of plate movement: Convection currents in the mantle.

UNIT II: Weathering, Mass Movements, and Erosion

Weathering:

- **Causes:** Temperature changes, water, biological activity.
- **Types:**
 - Physical (Mechanical): Breakdown of rocks without chemical change (e.g., freeze-thaw).
 - Chemical: Breakdown involving chemical reactions (e.g., oxidation, hydrolysis).
 - Biological: Breakdown due to organisms (e.g., plant roots, lichens).

Mass Movements:

- **Causes:** Gravity, water saturation, earthquakes, volcanic activity.
- **Types:**
 - Slow: Soil creep.
 - Rapid: Landslides, mudflows, rockfalls.
- **Impacts:** Landscape alteration, destruction of habitats, property damage.

Concept of Cycle of Erosion (W.M. Davis):

- Stages: Youth, maturity, and old age.
- Each stage has distinct features (e.g., V-shaped valleys in youth, wide floodplains in maturity).

Erosional Processes:

- **Wind:** Deflation, abrasion; forms like dunes and loess deposits.
- **River:** Hydraulic action, abrasion, attrition, solution; forms like valleys, deltas.

- **Underground Water:** Solution, precipitation; forms like caves, stalactites, stalagmites.
- **Glaciers:** Plucking, abrasion; forms like U-shaped valleys, moraines.
- **Sea Waves:** Hydraulic action, abrasion, corrosion; forms like cliffs, arches, stacks.

UNIT III: Weather and Climate

Weather and Climate:

- **Weather:** Short-term atmospheric conditions.
- **Climate:** Long-term average of weather patterns over a significant period.

Origin, Composition, and Structure of Atmosphere:

- **Origin:** Primordial atmosphere evolved from volcanic outgassing and biological processes.
- **Composition:** Nitrogen (78%), Oxygen (21%), other gases (1%).
- **Structure:**
 - Troposphere: Weather occurs here, temperature decreases with altitude.
 - Stratosphere: Contains ozone layer, temperature increases with altitude.
 - Mesosphere: Temperature decreases with altitude.
 - Thermosphere: Temperature increases with altitude, contains ionosphere.
 - Exosphere: Outer limit, merges with space.

Insolation:

- Incoming solar radiation.
- Affects temperature distribution.

Temperature Distribution:

- **Horizontal:** Varies with latitude, altitude, distance from sea, ocean currents.
- **Vertical:** Generally decreases with altitude, exceptions due to temperature inversion.

Atmospheric Pressure:

- **Measurement:** Barometer.
- **Distribution:** Varies with altitude, temperature, and humidity.
- **Pressure Belts:** Equatorial low, subtropical high, subpolar low, polar high.

Planetary Winds:

- Driven by pressure differences.
- **Types:**
 - Trade Winds: Blow from subtropical high to equatorial low.
 - Westerlies: Blow from subtropical high to subpolar low.
 - Polar Easterlies: Blow from polar high to subpolar low.

Monsoon and Local Winds:

- **Monsoon:** Seasonal reversal of winds due to differential heating of land and sea.

- **Local Winds:** Sea breezes, land breezes, mountain and valley breezes, Chinook, Bora.

UNIT IV: Humidity, Evaporation, and Precipitation

Humidity:

- **Measurement:** Hygrometer.
- **Variables:** Absolute humidity, relative humidity, specific humidity.

Evaporation:

- Process of water converting into vapor.
- Influenced by temperature, humidity, wind speed, and surface area.

Condensation:

- Process of water vapor converting into liquid.
- Forms: Dew, frost, fog, clouds.

Precipitation:

- **Forms:** Rain, snow, sleet, hail.
- **Types:**
 - Convectional: Due to convective currents.
 - Orographic: Due to topographic barriers.
 - Cyclonic: Due to cyclonic activity.

Distribution of Precipitation:

- Varies geographically and seasonally.

Climate Classification by Köppen:

- Based on temperature and precipitation.
- Major types: Tropical, dry, temperate, continental, polar.

UNIT V: Oceanography

Configuration of Oceanic Floors:

- Features: Continental shelf, continental slope, abyssal plains, oceanic trenches, mid-ocean ridges.

Temperature and Salinity of Oceans:

- **Temperature:** Decreases with depth, influenced by latitude, seasons, and currents.
- **Salinity:** Amount of dissolved salts, varies with evaporation, precipitation, river inflow.

Land and Water Distribution:

- Uneven distribution affects climate and weather patterns.

Tides:

- Caused by gravitational pull of the moon and sun.
- Types: Spring tides, neap tides.

Waves:

- Formed by wind action.
- Factors: Wind speed, duration, fetch.

Ocean Currents:

- Large-scale water movements.
- Types: Surface currents (driven by wind), deep-water currents (driven by density differences).
- Examples: Gulf Stream, Kuroshio Current.