

### Atmospheric Pressure

1. Fundamentals of Atmospheric Pressure  
*Definition:* *Force/weight of atmosphere*, *Exerted on unit area*, *Pressure = Force/Area*. Human Physiology: *Equal outward pressure*, *Counter-pressure*, *Blood exerts pressure to balance air*. \* Measurement: *Barometer (instrument)*, *Millibars (mb) (unit)*, *1013.2 mb (mean sea level)*.

2. Factors Influencing Pressure  
*Altitude:* *Highest at sea level*, *Decreases with height*, *Thinner/less dense air in upper layers*. *Air Temperature:* *Cold air = heavier/greater pressure*, *Hot air = lighter/lower pressure*. \* *Moisture Content:* *Water vapor molecules are lighter*, *Moist air = lighter/less pressure*, *Dry air = heavier/more pressure*.

### Atmospheric pressure- 2

3. The Global Pressure Belts  
*Creation Factors:* *Temperature (thermal)*, *Earth's rotation (dynamic)*, *Apparent movement of Sun*. The Four Major Belts: *Equatorial Low (ITCZ): 0° to 5° N/S*, *Doldrums (calm waters)*, *High insolation*, *Vertical Sun rays*, *Rising air*, *Convection currents*, *Severe thunderstorms*, *200+ days of rain*. *Sub-tropical High:* *Tropic of Cancer to 30° N*, *Tropic of Capricorn to 30° S*, *Descending cold air*, *High pressure*. *Sub-polar Low:* *60° N/S*, *Convergence zone*, *Westerlies vs. Polar Easterlies*, *Rising air*, *Zone of storms*. *Polar High:* *85° N/S to 90° N/S*, *Low solar energy*, *Low terrestrial radiation*, *Cold/dense/heavy air*.

### Atmospheric pressure- 2 (cont)

4. Wind Mechanics and Laws  
*General Wind:* *Moving air*, *High to Low pressure*, *Breeze (gentle)*, *Gusts/Gales (strong)*. Instruments: *Wind Vane (direction)*, *Anemometer (speed)*, *Cup-Digital versions*. *Naming Convention:* *Direction of origin*, *North winds blow from North*, *South-west winds blow from South-west*. Deflection Laws: *Coriolis Force:* *Earth's rotation*, *Deflects movement*, *Right in Northern Hemisphere*, *Left in Southern Hemisphere*. *Ferrel's Law:* *States freely moving bodies deflect sideways due to rotation*.

### Classification of Winds

Permanent (Planetary/Prevailing) Winds  
*Trade Winds:* *Sub-tropical High to Equatorial Low*, *Tropical zone*, *NE Trades (North)*, *SE Trades (South)*, *Constant direction*, *Sailors' charts*.  
*Westerlies:* *Sub-tropical High to Sub-polar Low*, *Blow from West*, *No large landmasses in South (40°-70°S)*, *Roaring Forties (40°S)*, *Furious Fifties (50°S)*, *Screeching Sixties (60°S)*. \*  
*Polar Winds:* *Polar High to Sub-polar Low*, *Polar North-easterlies*, *Polar South-easterlies*, *Very cold*.

### Classification of Winds (cont)

B. Periodic (Seasonal) Winds  
*General:* *Blow at certain times*, *Seasonal variations*, *Unequal heating/cooling*. The Monsoons: *Rain-bearing*, *Differential heating of land/sea*, *Indian Subcontinent*. *Indian Summer (SW) Monsoon:* *Asian landmass heats*, *Low pressure trough*, *South-east trades cross Equator*, *Deflected right*, *Pick up moisture from Indian Ocean*. *Retreating (NE) Monsoon:* *Oct to Dec*, *Blows from North-east*, *Moisture from Bay of Bengal*, *Rain in Tamil Nadu/Andhra/Karnataka/Telangana*. *Diurnal Variations:* *Breeze:* *Daytime*, *Land heats faster*, *Sea (High) to Land (Low)*. \* *Land Breeze:* *Nighttime*, *Land cools faster*, *Land (High) to Sea (Low)*.

C. Local Winds  
*The Loo:* *Hot/dry/dusty*, *Northern Plains of India*, *Summer*, *Rajasthan deserts*, *Alluvial plains of Ganga*. *The Harmattan:* *Dry/dusty*, *NW Africa*, *Sahara to Gulf of Guinea*, *Nov to March*, *Cool/dry relief from humid heat*. *The Foehn:* *Warm/strong/dry*, *Leeward mountain slopes*, *European Alps*, *Temperature rise up to 30°C*, *Drying effect*. *The Chinook:* *Foehn-type*, *Rockies (North America)*, *Eastern flank*, *Snow-eater*, *Melts snow*.

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