

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]].*

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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]].*

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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:* *Sea 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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