

Chapter 4 is Circulation Patterns to Transfer and distribute this heat energy

WINDS instrumental for TRANSFER OF ENERGY

WIND CAUSES MOVEMENT OF ATMOSPHERE OVER THE SURFACE of OCEANS AND CONTINENTS

AIR PRESSURE causes movement of air from HIGH PRESSURE to LOW PRESSURE

WIND PUSHES WATER AND CREATES SEA SURFACE CURRENTS

HOW ARE WIND DIRECTIONS NAMED?

Earth's Troposphere undulates and has topography just as the surface of the earth has lowlands and highlands. High pressure has a lot of weight and Low Pressure has less weight in a column of air.

Gravity

Pressure Gradient the steepness of the slope between low and high pressure systems

PRESSURE FORCES

LOW PRESSURE ALLOW AIR TO RISE (thus cooling due to lapse rate) see class notes of other qualities of an low pressure

HIGH PRESSURE HAS MORE WEIGHT AND PUSHES DOWN causing **descending air** (thus warming due to lapse rate) see class notes of other qualities of an low pressure

Pressure Gradient is the **steepness** of the transition between low and high pressures. Low and high pressures always alternate although the gradient can be steep or shallow. If the gradient is shallow we call it weak (little to moderate change); if steep, it is referred to as a strong pressure system (that will dominate the weather and make a great change).

What type of pressure is divergent at earth's surface? Convergent?

PRESSURE IS MEASURED IN **MILLIBARS** AND ISOLINES SHOW EQUAL BAROMETRIC PRESSURE. (JUST LIKE CONTOUR LINES ARE EQUAL ELEVATION)

CORIOLIS FORCE

CORIOLIS FORCE DEFLECTS THE ATMOSPHERE DUE TO THE EARTH'S ROTATION.

Earth's rotational speed over earth varies with latitude. The

Arctic circle has less distance around it than the equator's distance making the equator move faster than poleward.

This speed difference causes deflection.

FROM A STRAIGHT PATH angular momentum changes with latitude

FRICTION

ROUGH SURFACE = MORE FRICTION

FRICTION REDUCES SPEED AND DISRUPTS STRENGTH AND CAUSES WIND TO MOVE ACROSS ISOBARS AT AN ANGLE FORMING CYCLONES OR ANTI-CYCLONES DEPENDING ON THE HEMISPHERE

PRIMARY HIGH AND LOW PRSSURE BELTS.= ITCZ SubTropical High

These belts are major parts of the Hadley Cells. Where are they? Why?

Subtropical high pressure cells; HOT DRY over continents IF OVER OCEAN ITS EVAPORATES MEGA-TONS OF WATER AS LATENT HEAT ENERGY

TROUGH AND RIDGES fig 4.13

Trough of ITCZ= LOW

Ridge of Subtropical HIGH = DESERTS (or over ocean = evaporation/latent

Jet Stream. ATMOSPHERE CIRCULATION helped by it. See figure 4.15

POLAR JET MOST POWERFUL separating cold air of poles from warmer air of lower latitudes.

Trough and ridges

SUBTROPICAL JET IS 9-14 k FEET ALTITUDE Less powerful due to more similar temperatures on either side from season to season.

Jets Flow WEST TO EAST in both hemispheres

PREVAILING WINDS – most dominant winds of the globe. Where? Why?

IN BOTH HEMISPHERES THEY ARE CALLED WESTERLIES AND EASTERLIES (EASTELIES AKA TRADE WINDS).

Due to the Coriolis force creating the **opposing direction** of the sub-tropical **high pressure spin** in each hemisphere, divergence at the surface sets the prevailing wind direction in our atmosphere. Be able to find these on the map and understand.

LOCAL Winds

LAND -SEA BREEZE onshore flow in afternoon when land heats

Reverses at night land cools and offshore breeze

MOUNTAIN VALLEY BREEZE

Warm air rises up during day as sun hits valley sides and floor

Cold air travels down valley at night (funnels higher cold air)

MONSOON

Seasonally change direction from clockwise to counter-clockwise with pressure systems shift due to the **ITCZ**

Pressure patterns –continentally

Shape of continent

South Asia get dry wind spilling from bitter cold winter High Pr in center of continent

Summer sub-solar point moves north with ICTZ

brings extreme low pressure over India, drawing in moisture from Arabian Sea and Bay of Bengal

OCEAN SURFACE CURRENTS See maps in text (pushed by prevailing winds). Be able to name a few. **SURFACE WINDS** push water and surface currents

Thermohaline current are DEEP CURENTS and significant in global climate change. 1000 year cycle.

Study/know all locations from map quiz 1 only (not upcoming Mountain quiz)