

Chapter five

Atmospheric Pressure and wind system

- **Distribution of atmospheric pressure** on the **surface** of the **earth** is not uniform.
- The mass of air above in the column of air compresses the air under it hence its lower layers are denser than the upper layers;
- As a result, the lower layers of the atmosphere have higher density, hence, exert more **pressure**.
- The **distribution** of atmospheric **pressure** across the latitudes is termed as global **horizontal distribution**.

- **Air pressure** is caused by the weight of the **air** molecules above
- This **pressure causes air** molecules at the Earth's surface to be more tightly packed together than those that are high in the **atmosphere**.
- A blown-up balloon is a good **example of atmospheric pressure**.
- **Atmospheric pressure** and wind are both significant **controlling** factors of Earth's weather and climate

Cyclone and Anticyclone

- A **cyclone** is a storm or system of winds that rotates around a center of low atmospheric pressure.
- An **anticyclone** is a system of winds that rotates around a center of high atmospheric pressure.
- Distinctive weather patterns tend to be associated with both **cyclones and anticyclones**.

- **Cyclones** and **anticyclones** are both wind systems indicating distinctive weather patterns, but they have opposite characteristics.
- A major **difference** is that a **cyclone** is a low pressure system and an **anticyclone** is a high pressure system.
- The development of **anticyclones** aloft occurs in warm core
- **cyclones** such as tropical **cyclones** when latent heat **caused** by the formation of clouds is released aloft increasing the air temperature

Wind system and turbulence

Wind is the movement of air caused by the uneven heating of the Earth by the sun

wind systems are created by the uneven heating of the Earth's surface

- **Turbulence** close to the ground is often **caused** by heavy **winds**
- Turbulence is one of the most unpredictable of all the weather phenomena that are of significance to pilots.
- Turbulence is an irregular motion of the air resulting from eddies and vertical currents.
- Turbulence is associated with fronts, wind shear, thunderstorms, etc.

Types of Wind

- Forces governing wind
- Permanent /planetary wind
- Local winds
- Regional /monsoon wind

Chapter six

Atmospheric Moisture

- **MOISTURE IN THE ATMOSPHERE**, in the form of water vapor, liquid water, and ice, controls most aspects of our weather and climate
- **Moisture** moves back and forth from Earth's surface to the **atmosphere** and, once in the **atmosphere**, is transferred vertically and laterally by moving air.

Evaporation & Transpiration

- . water changes from liquid state into gaseous state.
- **Factors affecting evapotranspiration:**
 - **High insolation input (latitudes):** It raises up the surface temperature because more energy will be received. And also high temperature enables the air to hold more moisture.
 - **High relative humidity:** More moisture exists, thus the air is near the point of saturation.
 - **The humidity of the wind:** Hot dry wind (onshore wind) can increase (decrease) evaporation.
 - **Dense vegetation:** increase transpiration rate.

Chapter seven

Precipitation

- precipitation is any product of the condensation of atmospheric water vapour that falls under gravity from clouds.
- The main forms of **precipitation** include drizzle, rain, sleet, snow, graupel and hail.
- **Precipitation** occurs when a portion of the atmosphere becomes saturated with water vapor.

El Nino and La Nina

- **El Niño** is an abnormal weather pattern caused by the warming of the Pacific Ocean near the equator.
- El Niño is a climate pattern that describes the unusual warming of surface waters in the eastern tropical Pacific Ocean.
- El Nino is the “warm phase” of a larger phenomenon called the El Nino-Southern Oscillation (ENSO)
- La Nina, the “cool phase” of ENSO, is a pattern that describes the unusual cooling of the region’s surface waters.

- **El Nino** is essentially caused by the interaction between the surface layers of the tropical Pacific Ocean and the atmosphere over it.
- The water is warmer due to the trade winds reversing direction or becoming less intense.
- **La Niña** is a climate pattern that describes the cooling of surface ocean waters along the tropical west

Chapter Eight

Climatic classification

- The **Köppen climate classification** scheme divides **climates** into five main **climate** groups:
 - ❑ A (tropical), This type of climate has every month of the year with an average temperature of 18 °C (64.4 °F)
 - ❑ B (dry), This type of climate has the coldest month averaging between 0 °C (32 °F) (or –3 °C (27 °F)) and 18 °C (64.4 °F)
 - ❑ C (temperate), This type of climate has the coldest month averaging between 0 °C (32 °F)^[10] (or –3 °C (27 °F))^[8] and 18 °C (64.4 °F) and at least one month averaging above 10 °C (50 °F).^[10]^[8]
 - ❑ D (continental), his type of climate has at least one month averaging below 0 °C (32 °F) (or –3 °C (27 °F)) and at least one month averaging above 10 °C (50 °F)
 - ❑ E (polar). This type of climate has every month of the year with an average temperature below 10 °C (50 °F).

Agro climate classification

- **Agro**-ecosystems are defined as “a biological and natural resource system managed by humans for the primary purpose of producing food as well as other socially valuable nonfood goods and environmental services” (WRI).