Geography Class 25

BRIEF REVISION OF PREVIOUS CLASS AND ADDRESSED QUERIES (9:10 AM)
PRECIPITATION (9:21 AM)

- **CLOUD BURST**
- **I] DEFINITION**
- IMD-Indian Meteorological Department defines cloud burst as **rainfall over 10cm per hour concentrated over a small area of a few kilometers.**
- **CONDITIONS-**
- The formation of a cloud burst involves the following conditions-
- 1. **Rapid convection** of highly humid air which can be triggered by strong heating of land.
- 2. **Strong convectio**n along with a funneling effect along steep topography like mountains result in a rapid build-up of clouds without precipitation.
- 3. After a limit as clouds reach higher altitudes, **the air becomes thin, and the raindrops become too heavy for the cloud to hold on.**
- 4. All the water in the **cloud drops down in quick succession** causing the cloudburst.
- **REGIONS IN INDIA AFFECTED BY CLOUD BURST-**
- 1. The Himalayas
- 2. Rajasthan
- 3. The monsoon coast

Due to intense convection in desert areas and if these convectional air gets humidity from somewhere.

example:- 2013 Kedarnath cloudburst
2010 Leh cloudburst
2005 Mumbai cloudburst

TORNADO (9:45 AM)

- **Violently rotating column of air** that extends from a thunderstorm to the ground.
- It appears **like a funnel descending from the cloud,** the wind speed goes up to 400 per hour. km
- It is **formed when changes in wind speed and direction** within the thunderstorm create a horizontal spinning effect.
- This effect is tipped verticle by rising air currents moving up through the thunderstorms.
- Tornados are **observed in all the continents except Antarctica.**
- It is **more prevalent in the USA.**
- **Water sprout-**
- It is a whirling column of air and water mist.
- It is similar to a tornado on land but develops over water bodies.

JETSTREAMS (10:06 AM)

- **DEFINITION**
- **World Meteorological Organisation defines jetstreams** as strong narrow currents concentrated along the quasi-horizontal access in the upper troposphere or lower stratosphere characterized by strong verticle and later wind shear featuring one or more velocity maximum.

- **I] CHARACTERISTICS OF JETSTREAMS-**
- 1. They are **thousands of km in length and a few hundreds of km in width.**
- 2. It follows a **zig-zag path in the form of Rossby waves.**
- 3. They normally blow from **west to east.**
- 4. They are **faster and stronger during winter.**
- 5. The entire system **follows the sun, changing its position with the seasons.**

they flow because of pressure difference or we can say because of temperature difference so if more is temperature difference more will be its speed so for example during winter temperature difference between hadley and ferrel cell will be high so their speed is higher in winter.

- **II] REASONS**
- The jet streams are **generated** due to **temperature differences** between two regions of different characteristics.
- Such as tropical and temperate or temperate and polar or two different air masses.
- The **difference in pressure gradient with altitude above**, cold and warm air mass causes strong movements of winds.
- The **larger the temperature difference stronger the winds.**
- **III] TYPES OF JETSTREAMS**
- **A. POLAR FRONT JETSTREAM**
- It is formed with Ferrel and polar cells.
- They are irregular and discontinuous. → because temperature difference between ferrel and polar cell is not so large and not continuous.
- They blow from west to east.
- **B. SUB-TROPICAL WESTERLY JETSTREAMS-**
- It is associated with a temperature gradient at the poleward limit of the Hadley cell.
- It is more regular and strong.
- It blows from west to east.
- **C. TROPICAL EASTERLY JETSTREAMS-**
- It is formed over India and Africa in summer due to the intense heating of this region.
- The direct is east to west.
- **D. POLAR NIGHT JETSTREAMS-**
- It occurs near polar regions during winter.
- The direct is west to east.
- **E. ~~LOCLA~~** Local **JETSTREAMS-**
- It is formed due to local thermal and dynamic conditions.
- Example-Somali jetstream.

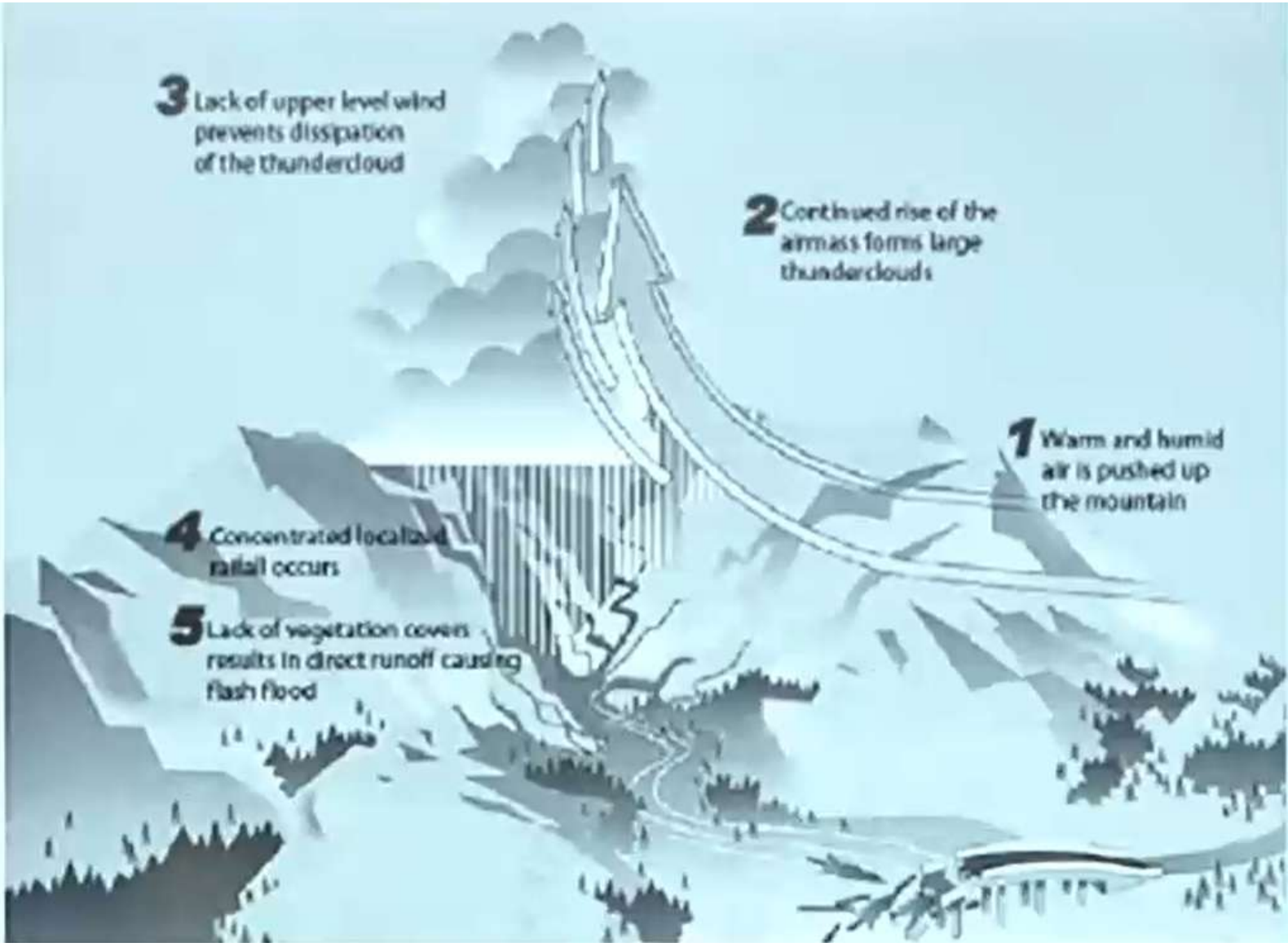
- **IV] SIGNIFICANCE OF THE JETSTREAMS-**
- As the jetstream moves across different regions, it **changes the weather conditions and impacts the local climatic patterns.**
- The jetstreams are responsible for the **creation of cyclonic and anti-cyclonical circulation** along the surface-
- Upper divergence creates lower convergence-
- Upper convergence creates lover divergence.
- The subtropical westerly jetstreams are responsible for **western disturbances in India during winter.**
- The **monsoon of South Asia** is greatly controlled by sub-tropical westerly jetstreams, tropical easterly jetstreams, and Somalian jetstreams.
- The jetstream is responsible for the **formation of fronts and intensification of temperate cyclones.**
- The polar night jetstreams are **responsible for ozone depletion** near polar regions.
- Jet streams help in the transfer of pollutants from the urban centers into the upper troposphere and **improve air quality.**
- It is useful for **aircraft navigation** across the world.
- Jetstreams are responsible for **intense heat waves or heat domes** across the world.
- The weakening of jetstreams causes the jetstreams to meander more and **bring more variation in weather patterns.**

- **POLAR VORTEX-**
- The polar vortex is a **large area of low-pressure and cold air surrounding the earth's pole.**
- The term vortex refers to the **counter-clockwise flow of air** which keeps the cold polar air locked inside.
- The polar winter night jetstreams keep this region covered with strong winds.
- Occasionally when the vortex weakens it expands and sends the cold air southward along with jetstream.
- This brings downs the temperature of southern regions to colder levels of below zero degree Celsius.

MAPPING (11:50 AM)

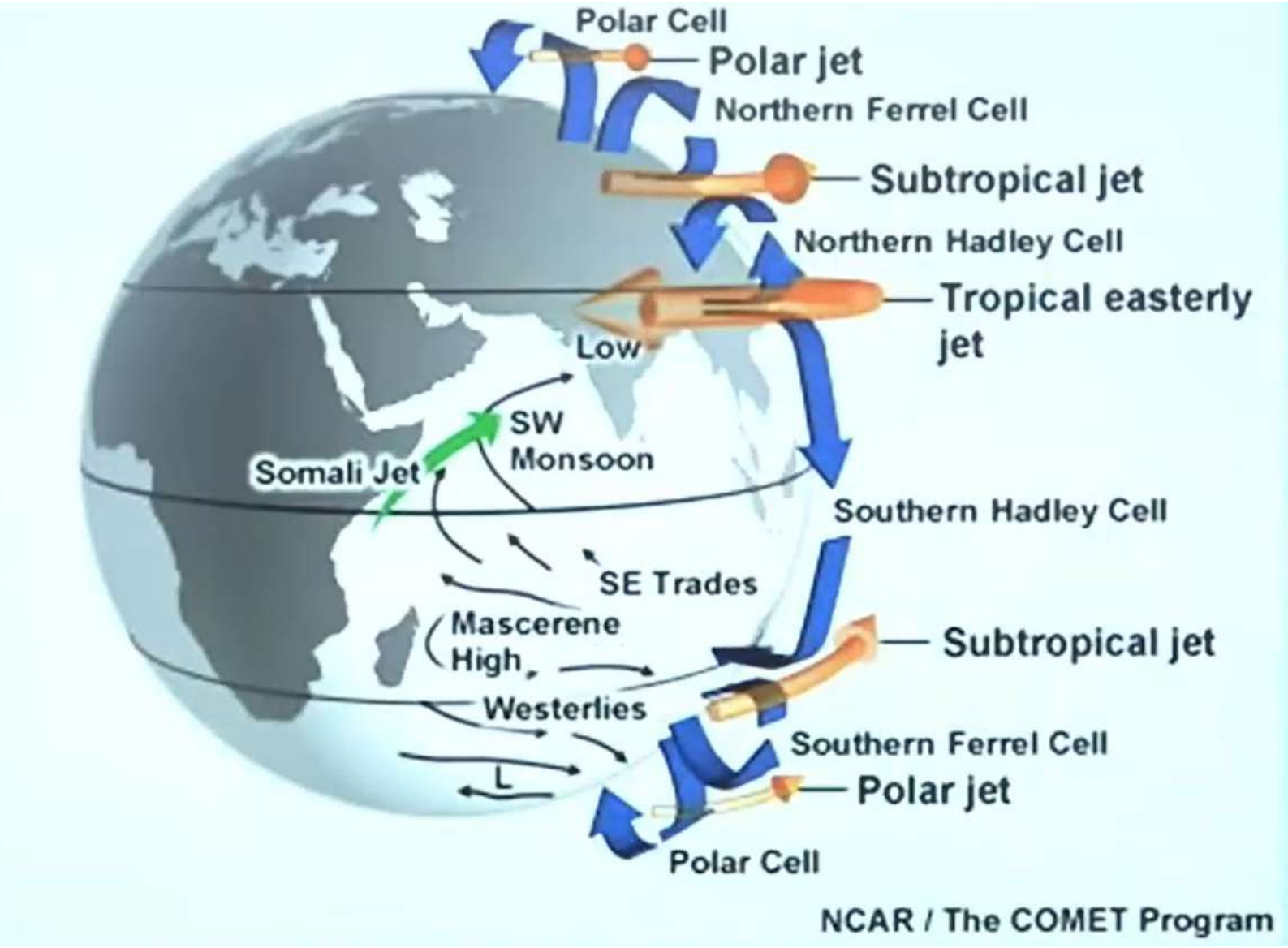
- Latin America-
- South America-
- Andes Mountain
- The highest point in South America-Aconcagua
- The lowest point in South America-~~Laguna del Carbon~~ → Valdes Peninsula
- Amazon forest
- Amazon river-largest river by volume.
- Amazon River -Second longest river after the Nile.
- Angel waterfall → 979m high
- South Panama

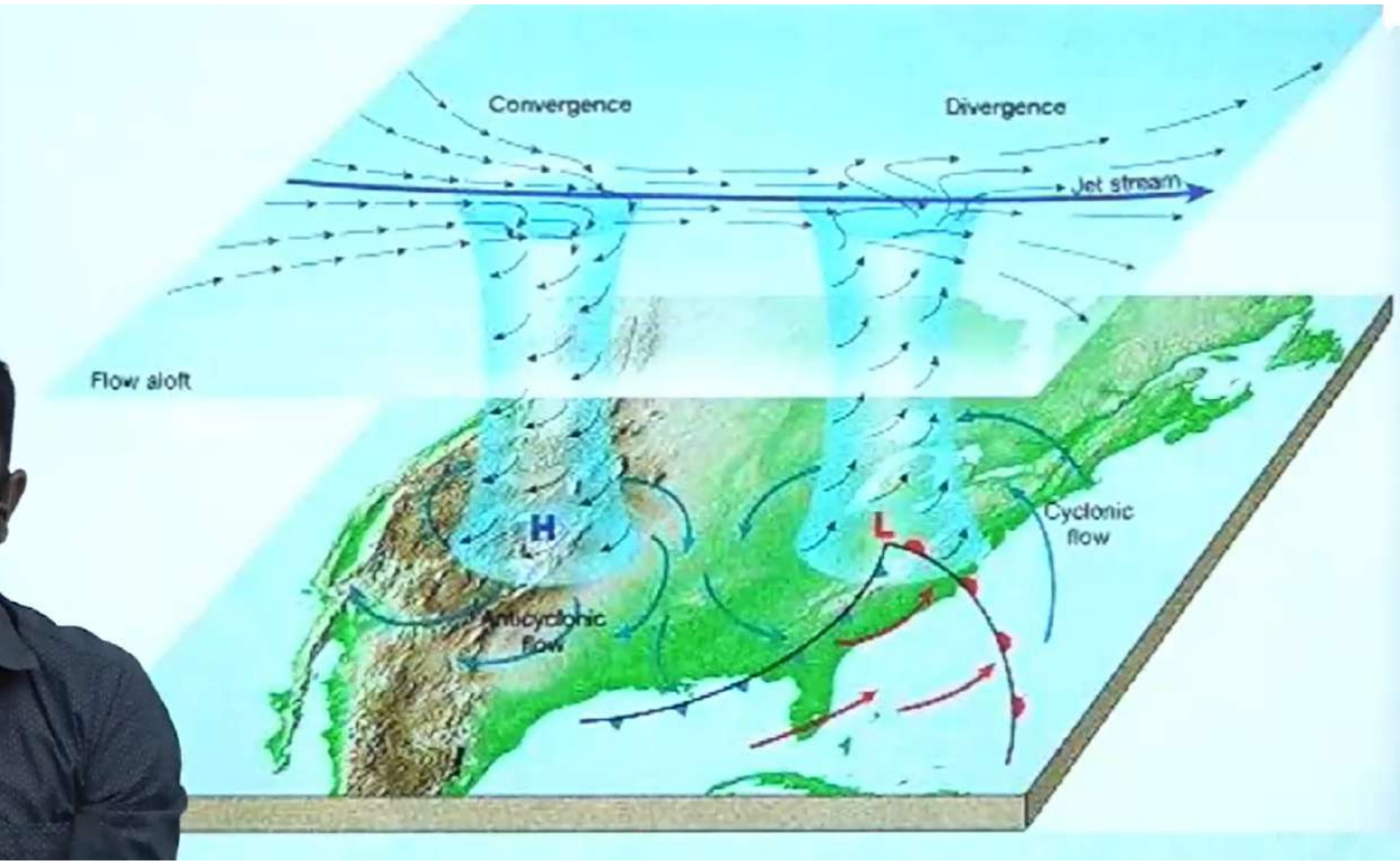
THE TOPIC OF THE NEXT CLASS -AIRMASSES.

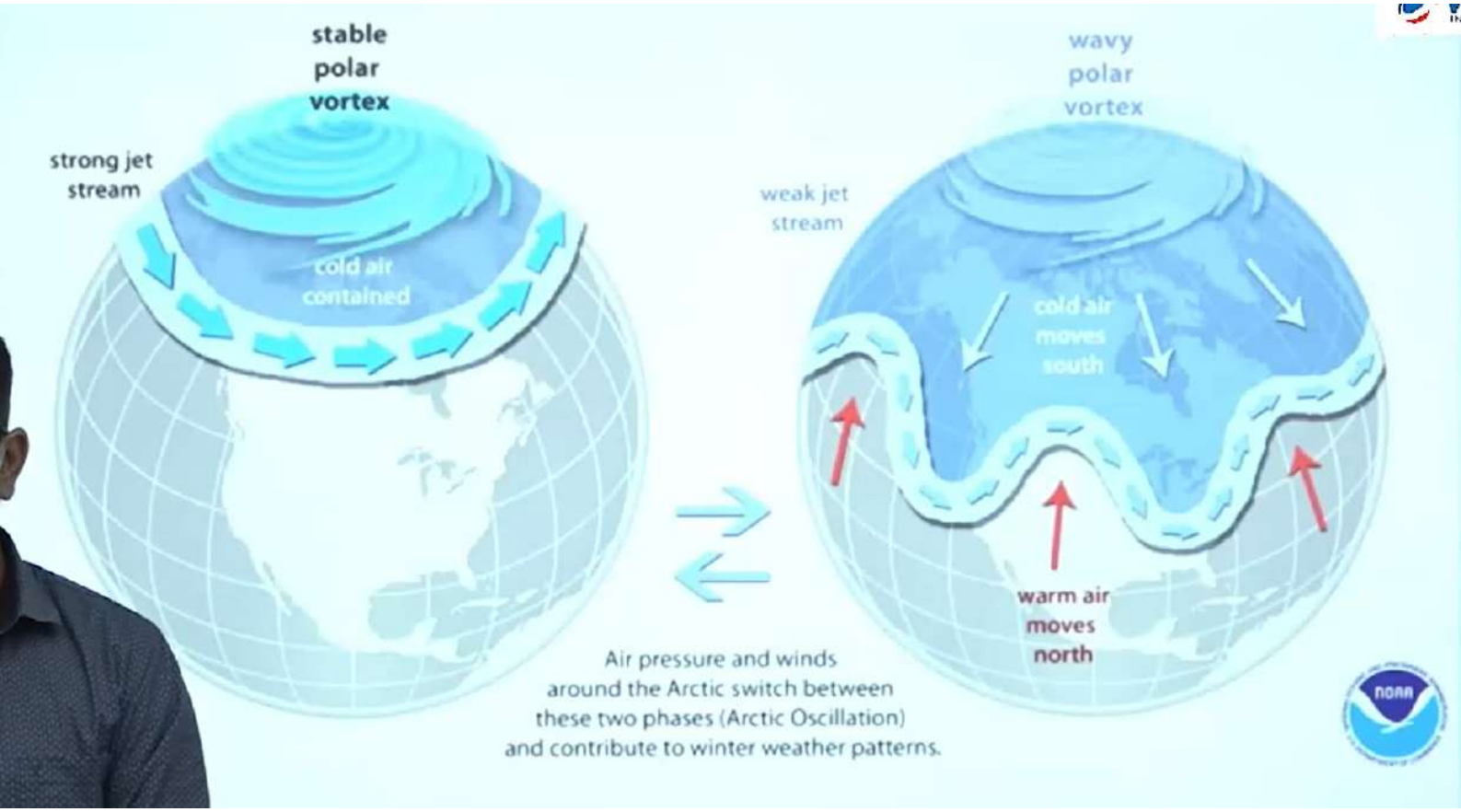

3 Lack of upper level wind prevents dissipation of the thundercloud
2 Continued rise of the airmass forms large thunderclouds
1 Warm and humid air is pushed up the mountain
4 Concentrated localised rainfall occurs
5 Lack of vegetation cover results in direct runoff causing flash flood

Tornado

Waterspout


Polar Cell
Polar jet
Northern Ferrel Cell
Subtropical jet
Northern Hadley Cell
Tropical easterly jet
Low
SW Monsoon
Somali Jet
Southern Hadley Cell
SE Trades
Mascerene High
Subtropical jet
Westerlies
Southern Ferrel Cell
L
Polar jet
Polar Cell
NCAR / The COMET Program


Convergence
Divergence
Jet stream
Flow aloft
H
L
Anticyclonic flow
Cyclonic flow


stable
polar
vortex
strong jet
stream
cold air
contained
wavy
polar
vortex
weak jet
stream
cold air
moves
south
warm air
moves
north
Air pressure and winds
around the Arctic switch between
these two phases (Arctic Oscillation)
and contribute to winter weather patterns.
noaa