Jet Stream

Introduction

- The Jet Stream is a geostrophic wind blowing horizontally through the upper layers of the troposphere, generally from west to east, at an altitude of 20,000 - 50,000 feet.
- Jet Streams develop where air masses of differing temperatures meet. So, usually surface temperatures determine where the Jet Stream will form.
- Greater the difference in temperature, faster is the wind velocity inside the jet stream.
- Jet Streams extend from 20 degrees latitude to the poles in both hemispheres.
- Their shape is circular. Speed in the jet streams decreases radially outwards

Types of Jet Streams

Jet stream classified in to three types -

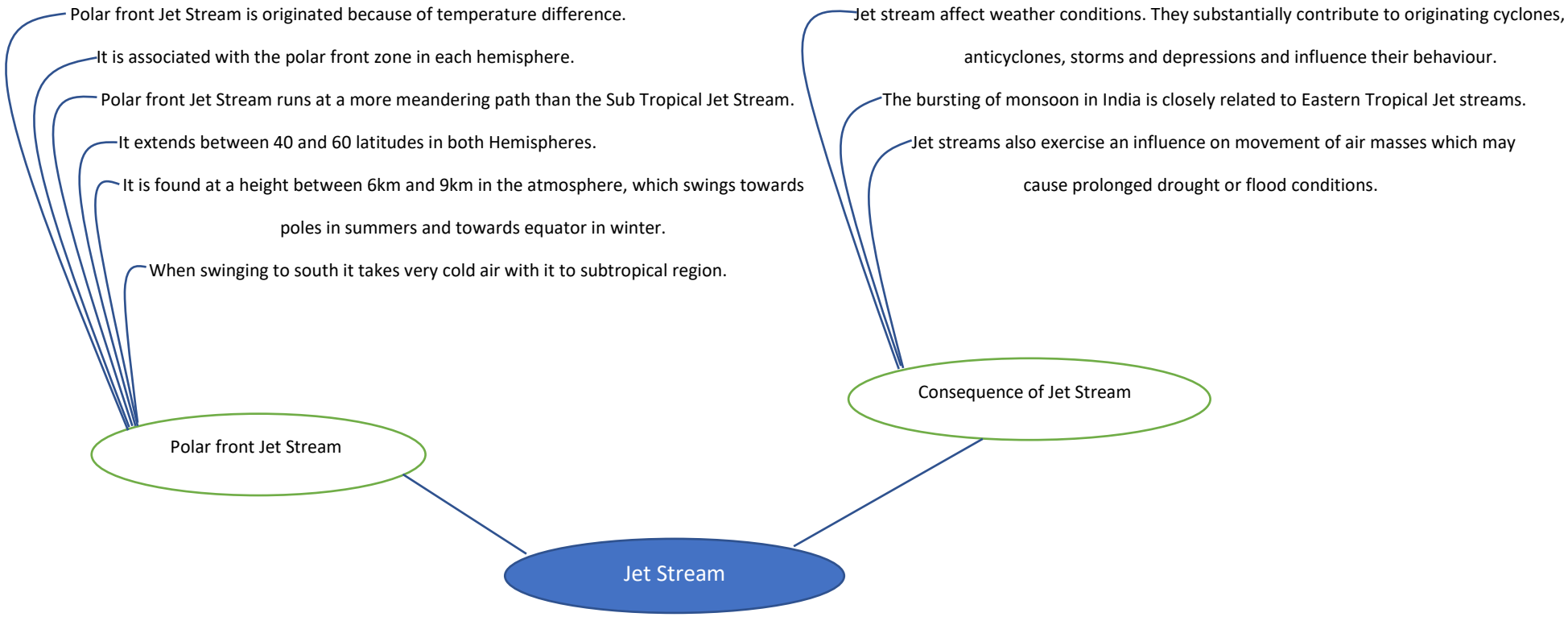
- Sub Tropical Jet Streams
- Eastern Tropical Jet Stream
- Polar front Jet Stream

Eastern Tropical Jet Stream

- Eastern Tropical Jet Stream occurs near the tropopause over Southeast Asia, India and Africa during summer.
- It is a seasonal Jet Stream.
- Its direction is opposite to that of other two jet streams. It runs in eastern direction.
- It is located comparatively at higher height between 14km and 16km.
- Its speed is around 180 km per hour.

Sub Tropical Jet Streams

- Sub Tropical Jet Streams are best developed in winter and early spring.
- Their maximum speed approaches 300 knots which are associated with the merger with polar-front jets.
- It runs between 250 and 300 latitudes in both the hemispheres.
- Its speed is comparatively lower than polar jet streams.
- It swings to the north of Himalayas in summer in North India.


Polar front Jet Stream is originated because of temperature difference.
It is associated with the polar front zone in each hemisphere.
Polar front Jet Stream runs at a more meandering path than the Sub Tropical Jet Stream.
It extends between 40 and 60 latitudes in both Hemispheres.
It is found at a height between 6km and 9km in the atmosphere, which swings towards poles in summers and towards equator in winter.
When swinging to south it takes very cold air with it to subtropical region.
Polar front Jet Stream
Jet Stream
Consequence of Jet Stream
Jet stream affect weather conditions. They substantially contribute to originating cyclones, anticyclones, storms and depressions and influence their behaviour.
The bursting of monsoon in India is closely related to Eastern Tropical Jet streams.
Jet streams also exercise an influence on movement of air masses which may cause prolonged drought or flood conditions.