

10. Explain the phenomenon of a Polar Vortex. Also, comment on the reasons as to why tropical areas as south as Florida have been witnessing sub-zero temperatures in recent years. (150 words) 10

**Approach:**

- Introduce and explain the concept of Polar Vortex.
- Identifying the Polar vortex event as cause of sub-zero temperature in tropical areas, briefly explain concept of polar vortex event.
- In short, talk about different reasons for this polar vortex events.

**Answer:**

**Polar vortex is a large area of low pressure and cold air surrounding the Earth's North and South Pole.** The term vortex refers to the counterclockwise and clockwise flow of air in the Northern and Southern hemisphere respectively, that keeps the colder air locked close to the poles.

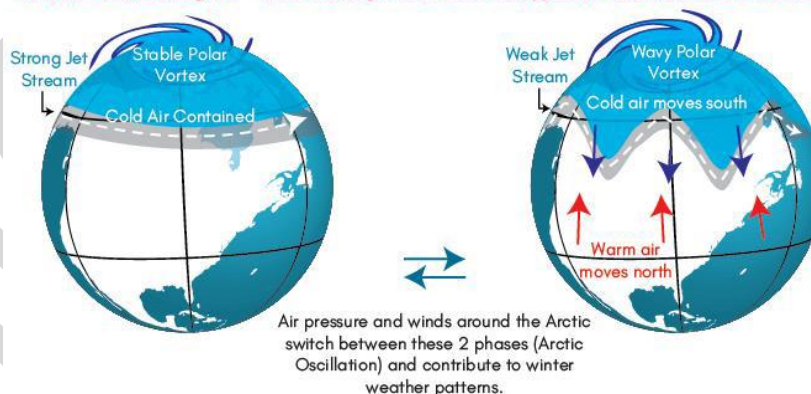
The boundary of the polar vortex is actually the boundary between the cold polar air to the north, and the warmer sub-tropical air (considering Northern Hemisphere). It is defined by the **polar front jet stream**- a narrow band of fast-moving air, moving from west to east.

The boundary, defined by polar front jet stream, shifts all the time. It shrinks in summer, poleward while **in winter, the polar vortex sometimes becomes less stable and expands**, sending cold air southward with the jet stream. This '**breaking off**' of a part of the vortex as the polar jet stream weakens is termed as '**polar vortex event**'.

This disruption and weakening of the polar vortex is caused due to wave energy propagating upward from the lower atmosphere. This causes sharp warming of the stratosphere in an event known as sudden stratospheric warming, in just a few days, miles above the Earth's surface.

his polar vortex event affects temperatures in tropical areas as south as Florida. This explains why sub-zero temperatures are observed in certain tropical areas. Also, there is observational evidence that such weak polar vortex conditions are happening more frequently. It may be attributed to various reasons such as:

The Polar Vortex is nothing new — In fact it's thought that the term first appeared in an 1853 issue of E. Littell's Living Age.



- **Green House gas emissions** that amplify arctic warming leading to melting of ice and snow, thereby exposing darker ocean and land surfaces resulting in increased absorption of sun's heat.
- Due to rapid **arctic warming, the north-south temperature differences have diminished**, reducing pressure differences between the Arctic and mid-latitudes, weakening jet stream winds which tend to meander.

11. The most powerful trend of medieval Indian literature is devotional poetry which dominates almost all the major languages of the country. Elucidate. (250 words) 15

**Approach:**

- Give a brief introduction about the nature of Indian literature during medieval period.
- Bring out with examples how major languages of India were dominated by devotional poetry like Bhakti, Sufi.
- Conclude by briefly mentioning other poetic forms of the time.