

Bomb Cyclones: Notes for UPSC Geography

Bomb cyclones are a concept in Geography that was recently seen in the news. Hence, it is important to know what it means for the IAS exam. In this article, you can read about bomb cyclones for the UPSC geography section.

What is a Bomb Cyclone?

Bomb cyclone is actually used by meteorologists to indicate a mid-latitude cyclone that intensifies rapidly. It is a massive winter storm hammering the coast, bringing strong winds, flooding, ice and snow. It is a combination of rapidly declining pressure and extreme cold. This particular storm is the most explosive ever, observed on the east coast. It is called a bomb cyclone, a dramatic name for what happens when the storm explosively strengthens while the pressure plummets.

How is a Bomb Cyclone formed?

There are many reasons cited for the formation of Bomb Cyclones. Out of these the principal mechanism for its formation has been cited as baroclinic instability. But even this principle mechanism has been subjected to debate amongst the scientific community as many case studies conducted over this matter have proven otherwise.

There are other factors in play as well such as:

- Deep tropospheric frontogenic processes which occur both during upstream and downstream of the cyclone's surface
- Influence of air-sea interaction
- Latent heat release

In which region does a Bomb Cyclone occur?

There are four active regions which are hot spots for Bomb Cyclone:

1. The Northwest Pacific
2. The Northern region of the Atlantic Ocean
3. The Southwest Pacific
4. The Southern region of the Atlantic Ocean.

There is speculation that there may be new regions that will be subject to bomb cyclones due to climate change.

In the Northern Hemisphere, the maximum frequency of explosively deepening cyclones is found within or to the north of the Atlantic Gulf Stream and Kuroshio Current in the western Pacific, and in the Southern Hemisphere, it is found with Australian east coast lows above the East Australian Current, which shows the importance of air-sea interaction in initiating and rapidly developing extratropical cyclones.

Explosively deepening cyclones south of 50°S often show equator-ward movement, in contrast with the poleward motion of most Northern Hemisphere bombs.

Over the year, 45 cyclones on average in the Northern Hemisphere and 26 in the Southern Hemisphere develop explosively, mostly in the respective hemisphere's wintertime. Less seasonality has been noticed in bomb cyclogenesis occurrences in the Southern Hemisphere.

Relevant Questions for Bomb Cyclones

How rare are Bomb Cyclones?

Intense hurricanes often have high-intensity speed, so what sounds like a little pressure drop can go a long way. Drops in atmospheric pressure allow a storm system to pick up more air and strengthen, but a fall as sharp as 24 millibars in less than a day—while not exactly **rare**—is considered, in meteorological terms, explosive.

What causes Bomb Cyclones?

Bomb cyclones are caused when a cold air mass collides with a warm air mass, such as air over warm ocean waters. The formation of this rapidly strengthening weather system is a process called bombogenesis, which creates what is known as a bomb cyclone.