

Cyclone and its repercussions

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By: Jagriti Yadav A cyclone is a large scale air mass that rotates around a strong center of low atmospheric pressure. Cyclonic winds move across nearly all regions of the Earth except the equatorial belt and are generally associated with rain or snow.

A cyclone is a system of winds rotating counterclockwise in the Northern Hemisphere around a low-pressure center.

Types of Cyclone-

Tropical Cyclone- It is a system of low pressure occurring in tropical latitudes. Tropical cyclone activity is at its maximum in late summer and early autumn. This cyclone follows a parabolic path; their axis being parallel to the isobars. The differential heating over land and sea probably causes a small area of low atmospheric pressure to develop.

Polar Cyclone- These are cyclones that occur in polar regions like Greenland, Siberia and Antarctica. Unlike tropical cyclones, polar cyclones are usually stronger in winter months.

Mesocyclone — A mesocyclone is a vortex of air within a convective storm. That is, it is air that rises and rotates around a vertical axis, usually in the same direction as low-pressure systems in a given hemisphere. They are most often cyclonic, that is, associated with a localized low-pressure region within a severe thunderstorm. Such thunderstorms can feature strong surface winds and severe hail. Mesocyclones often occur together with updrafts in supercells, where tornadoes may form. Mesocyclones are normally relatively localized, approximately 2 mi (3.22 km) to 50 mi (ca. 80 km) in diameter in thunderstorms.

Conditions favorable for Cyclone formation:

1. Large sea surface with temperature higher than 27° C.

2. Presence of the Coriolis force enough to create a cyclonic vortex.
3. Small variations in the vertical wind speed.
4. A pre-existing weak low-pressure area or low-level-cyclonic circulation.
5. Upper divergence above the sea level system.
6. A distance from the Equator is necessary, so that it allows the Coriolis effect to deflect winds blowing toward the low-pressure center. They develop in inter-tropical convergence zone.
7. Presence of anticyclonic circulation at the height of 9 to 15 km above the surface.

Cyclone Formation-

Factors like wind speed, wind direction, temperature and humidity contribute to the development of cyclones.

Before cloud formation, water takes up heat from the atmosphere to change into vapor. When water vapor changes back to liquid form as raindrops, this heat is released to the atmosphere.

The heat released to the atmosphere warms the air around. The air tends to rise and causes a drop in pressure. More air rushes to the center of the storm. This cycle is repeated.

Since Hurricanes derive their energy from heated seawater which can be prevented by presence of upper-level-winds that disrupt the storm circulation forcing it to lose its strength.

Cyclone Naming –

1. The WMO/ESCAP Panel on Tropical Cyclones (PTC) at its 27th Session held in 2000 in Muscat, Oman agreed in principle to assign names to the tropical cyclones in the Bay of Bengal and Arabian Sea.
2. The naming of the tropical cyclones over the north Indian Ocean commenced from September 2004.
3. This list contained names proposed by then eight member countries of WMO/ESCAP PTC, viz., Bangladesh, India, Maldives, Myanmar, Oman, Pakistan, Sri Lanka and Thailand.
4. The requirement for a fresh list of tropical cyclones including representation from five new member countries: Iran, Qatar, Saudi Arabia, United Arab Emirates and Yemen (total 13 member countries) was tabled during the 45th session of WMO/ESCAP, held in September 2018. The session was hosted by Oman.

Recent Cyclone Amphan-

Cyclone Amphan (pronounced as UM-PUN) is a tropical cyclone formed over Bay of Bengal that has intensified and likely to turn into a “super cyclonic storm (maximum wind speed is 120 knots)”. It has been named by Thailand. Affected Regions: West Bengal, Odisha and Bangladesh.

Amphan is the second pre-monsoon cyclone to form in the Bay of Bengal in two years. The first one was Cyclone Fani. Amphan formed over the Bay of Bengal as a tropical cyclone and later intensified into a ‘Very Severe Cyclonic Storm’ (VSCS) to ‘Extreme Severe Cyclonic Storm (ESCS)’.

National Disaster Response Force (NDRF) is a specialized authority constituted under the Disaster Management Act 2005. It has monitored Amphan with the parallel monitoring by:

1. National Crisis Monitoring Committee (constituted by the Government of India, to meet the exigencies of natural calamities.)
2. Cabinet Committee on Security (CCS)
3. Indian Meteorological Committee (IMD)

Reasons responsible for intensification of Cyclones in Bay of Bengal:

1. In 2020, the Bay of Bengal has observed record summer temperatures due to global warming from fossil fuel emissions that have been heating up oceans.
2. However, such unusual warming around India is no longer restricted to just the BoB(Bay of Bengal) but also the Arabian Sea and the Indian Ocean. It makes storm prediction less reliable as well as disrupting monsoon patterns.

3. Further, reduced particulate matter emissions during the lockdown resulted in fewer aerosols such as black carbon that are known to reflect sunlight and heat away from the surface.

Disaster Management of Cyclone in India:

Pre-Disaster

Structural Measures: Structural measures include construction of cyclone shelters, construction of cyclone resistant buildings, road links, culverts, bridges, canals, drains, saline embankments, surface water tanks, communication and power transmission networks etc.

Non-Structural Measures:

Non-structural measures include early warning dissemination systems, management of coastal zones, awareness generation and disaster risk management and capacity building of all the stakeholders involved.

Government Initiatives

National Cyclone Risk Mitigation Project (NCRMP)

Aim: The scheme aims to: upgrade cyclone forecasting, tracking and warning systems, build capacity in multi-hazard risk management construct major infrastructures including multi-purpose cyclone shelters and embankments. Integrated Coastal Zone Management Project (ICZMP)

1. It is a World Bank assisted project which aims at national capacity development for implementation of comprehensive coastal management in India. Broad objectives of the project include: •Cyclone forecasting •Tracking and warning systems •Cyclone Risk Mitigation and Capacity Building •Major infrastructure to be constructed under multipurpose cyclone shelters, access roads, underground cabling and saline embankments •Disaster Mitigation •Lowering loss of lives, property in vulnerable states. Cyclone effect on human life:

Cyclones cause a lot of damage on the human environment. They have been responsible for about 1.9 million deaths worldwide over the last two centuries, and it is estimated that 10,000 people are killed each year by these storms. Cyclones tend to do the most damage in coastal areas, where they have been known to alter the landscape and remove forest canopy. Losses of life and material damage are significant due to strong winds, heavy rains, large swells and storm surges.

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