

Rossby Waves

Rossby Waves are a form of inertial wave that occurs in rotating fluids. Also known as planetary waves, they were discovered by Carl-Gustaf Arvid Rossby. These waves are associated with jet streams and the earth's pressure systems

The article on Rossy Waves will be useful in the Geography segment of the Civil Services Examination.

Overview of Rossby Waves

Rossby waves are formed when air from the polar region makes its way towards the Equator while the air from the tropics makes its way towards the poles. This is because of the differences in the solar radiation received, heat tends to move from high low to high latitudes.

The existence of the waves explains the functioning of low-pressure cells such as cyclones and high-pressure cells that are important in producing the weather of middle and higher latitudes.

Types of Rossby Waves

The following are the types of Rossby Waves:

1. **Atmospheric Waves:** Atmospheric Rossy waves are a result of conservation of potential vorticity and influenced by Coriolis force and pressure gradient. As it moves towards the northern hemisphere the rotational fluids turn to the right and to the left while it moves to the southern hemisphere. An atmospheric Rossby Wave can be identified by its phase velocity and wave crest which has a west ord component.

It has been proposed that a number of regional weather extremes in the Northern Hemisphere associated with blocked atmospheric circulation patterns may have been caused by amplification of Rossby waves

2. **Poleward-propagating atmospheric waves:** When heat is transferred to the lower layer of the atmosphere (known as the troposphere) is strengthened over very warm sea surface, it generates a form of atmospheric Rossby waves which have a polewards and eastwards direction. This is seen during El Niño events.

Poleward-propagation atmospheric waves help in establishing statistical connection between low and high-latitude climates.

3. **Oceanic Waves:** Oceanic Rossby waves are waves with an ocean basin. Compared to the atmospheric Rosby waves , the oceanic variant has a low amplitude. The ocean

Rosby Waves gain pace through wind strength at the ocean surface layer and thus shows the effects of climate change due to factors like wind and buoyancy .

Frequently Asked Questions about Rossby Waves

Are Rossby waves dispersive?

Rosby waves are dispersive waves. These waves can occur in the atmosphere only when the atmosphere is stably stratified.

Why do Rossby waves break?

Tropospheric mixing and transport in the middle and high latitudes are driven mainly by synoptic eddy activity. In many cases, these eddies grow by baroclinic instability and decay barotropically by breaking and inducing irreversible mixing of the surrounding air, termed "wave breaking

Where have observations about the Rossby Wave made?

The observations regarding Rossby waves have been done on those in Earth's atmosphere where they are easy to observe.