Geography · GS - I

What is a twister? Why are the majority of twisters observed in areas around the Gulf of Mexico?

EXAM YEAR	PAPER	SUBJECT
2024	GS - I	Geography

MARKS	WORD LIMIT
15	~250 words

Answer Hint

twister, tornado, cumulonimbus cloud, supercell, warm moist air, Gulf of Mexico, cold continental air, atmospheric instability, wind shear, convection, Tornado Alley

Model Answer

Introduction

A **twister** is a commonly used term for a tornado, a violently rotating column of air extending from a thunderstorm cloud towards the Earth's surface. Tornadoes are highly localised but can produce destructive winds.

Conditions for Formation

Tornado formation generally requires the simultaneous presence of:

1. Warm moist air: It provides abundant moisture and latent heat near the surface.

2. Cold air aloft: A significant temperature contrast creates atmospheric instability and vigorous convection.

3. Strong vertical wind shear: Changes in wind speed and direction with height can generate rotation within developing thunderstorms.

4. Severe thunderstorms: Particularly powerful supercell thunderstorms can organise rotating updrafts capable of producing tornadoes.

Role of the Gulf of Mexico

The Gulf of Mexico is an important source of **warm, moist maritime air** for the southern and central United States. This air frequently meets colder, drier continental or polar air masses moving southward.

The resulting temperature and moisture contrasts create strong atmospheric instability. The central United States also provides a broad continental area where different air masses can interact without major topographic barriers.

Strong upper-level winds can simultaneously create substantial vertical wind shear. Under favourable conditions, these factors support the development of supercell thunderstorms and tornadoes.

The central plains are consequently associated with the frequently used term **Tornado Alley**.

Conclusion

The concentration of twisters in the Gulf-influenced regions is therefore not because the Gulf directly creates tornadoes, but because it supplies **warm moist air that interacts with colder air masses under strong instability and wind-shear conditions**, creating a favourable environment for tornado formation.

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