Storms: forms & causes
3.1.5.5 Hazards

What you need to know
How tropical storms are created
About tropical storm spatial distribution, magnitude, frequency, regularity and predictability

How tropical storms are created:

For a tropical storm to form, there needs to be a range of causational factors present. They are as follows:

- Ocean water needs to be warmer than 26.5 degrees Celsius.
- An area of low atmospheric pressure is required.
- Low vertical wind shear is needed.
- Within the tropics so that the Coriolis force, which is caused by the Earth's rotation, can give the tropical storm the ability to spin.

Tropical storms begin as an atmospheric disturbance of low pressure. Wind moves into the low-pressure area from surrounding areas of high pressure. As warm ocean water heats the air, it evaporates at the centre of the developing storm to a higher altitude where it condenses, causing thunderstorms. Latent heat is released in the condensation processes giving greater thermal energy to the developing storm system and generating more violent updrafts of moist air. Clusters of individual thunderstorms begin to coalesce and rotate as one unified tropical storm. The entity then continually feeds on itself as a self-sustaining system, using warm ocean water as its primary energy source.

Even so, some tropical storms will diminish quickly and not become hurricanes. This is usually due to changes in atmospheric pressure or reduction in winds. All storms will diminish as they travel over land as the fuel that energises the weather system; the warm water, is no longer available.

Spatial distribution, magnitude frequency, regularity and predictability:

Spatial distribution:
Tropical storms form between approximately 5° and 30° latitude north and south of the equator and initially move westwards (owing to predominantly easterly winds) and slightly away from the equator. Many tropical storms eventually drift far enough from the equator to move into areas dominated by westerly winds (found in the middle latitudes). These winds tend to reverse the direction of the tropical storm to an eastward path. As the tropical storm moves pole-wards it picks up forward speed and may reach 30 m.p.h. or more. An average tropical storm can travel about 300 to 400 miles a day, or about 3000 miles before it dies out.

Storms: forms & causes
3.1.5.5 Hazards

Magnitude:
Although developed in the USA, the **Saffir-Simpson** hurricane wind scale is used to rank tropical storm wind strength in many parts of the world. (The same feature is referred to as a 'cyclone' in the Indian Ocean and a 'typhoon' in the Pacific Ocean.) A tropical storm officially becomes a 'hurricane' in the western Atlantic when wind speeds reach and exceed 74 m.p.h.

- Category 1 - sustained wind speeds of 74 to 95 m.p.h
- Category 2 - sustained wind speeds of 96 to 110 m.p.h
- Category 3 - sustained wind speeds of 111 to 129 m.p.h
- Category 4 - sustained wind speeds of 130 to 156 m.p.h
- Category 5 - sustained wind speeds greater than 156 m.p.h

Frequency & regularity:
Tropical storms occupy a general 'season' that occurs when ocean temperatures are at their maximum: mid- to late-summer and autumn. This means they tend to occur six months apart in the northern and southern hemispheres. Despite tropical storms occurring within the tropics, they are not evenly distributed and some areas experience more frequent, regular storms than others. The highest number of storms occur in the north Pacific affecting the Philippines, Taiwan and Japan.

Predictability:
Meteorological satellite monitoring is more advanced and to some extent tropical storms can be tracked over the course of their development. However, the extent to which the forecasting of their track is reliable improves the closer the storm gets to land, as many storms can radically change direction from their predicted course whilst over the open ocean.