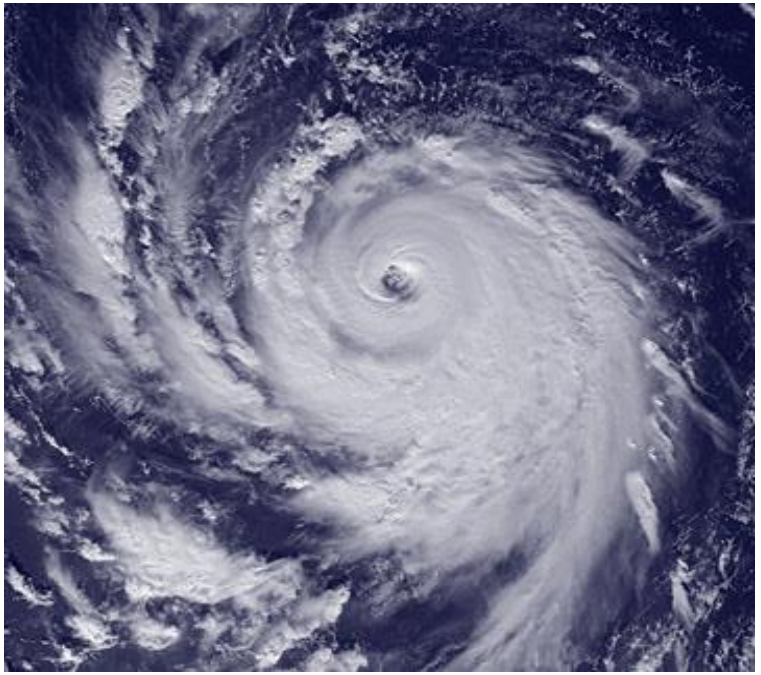
Cyclonic Storm

A cyclonic storm is a rapidly rotating storm system characterized by a low-pressure center, strong winds, and a spiral arrangement of thunderstorms that produce heavy rain.

- **Formed from *organized groups of thunderstorms*.**
- **Classified depending on its location and strength:**

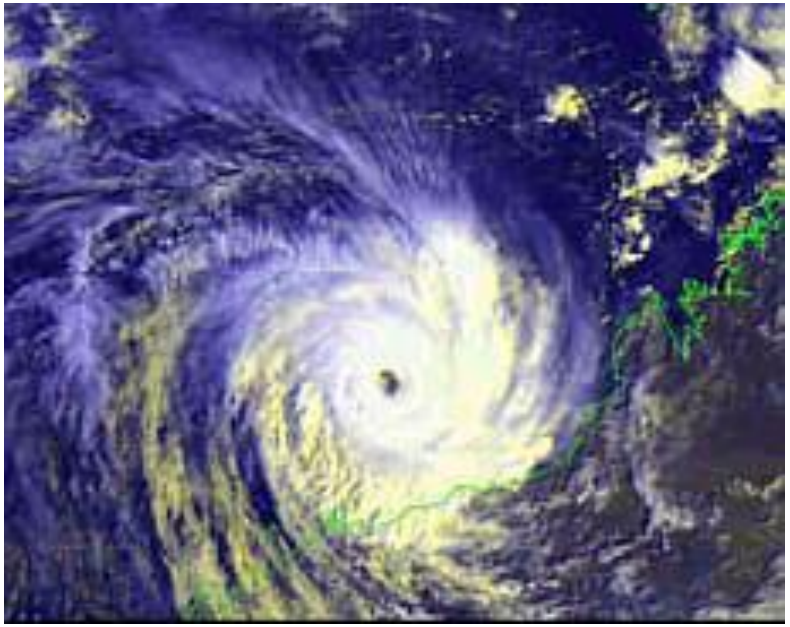
  - **Tropical Depression**
  - **Tropical Storm**
  - **Tropical cyclone (Southern Hemisphere and Indian Ocean)**
  - **Typhoon (Northwestern Pacific)**
  - **Hurricane (Northeast Pacific or North Atlantic)**



Winds, Pressure, Rotation

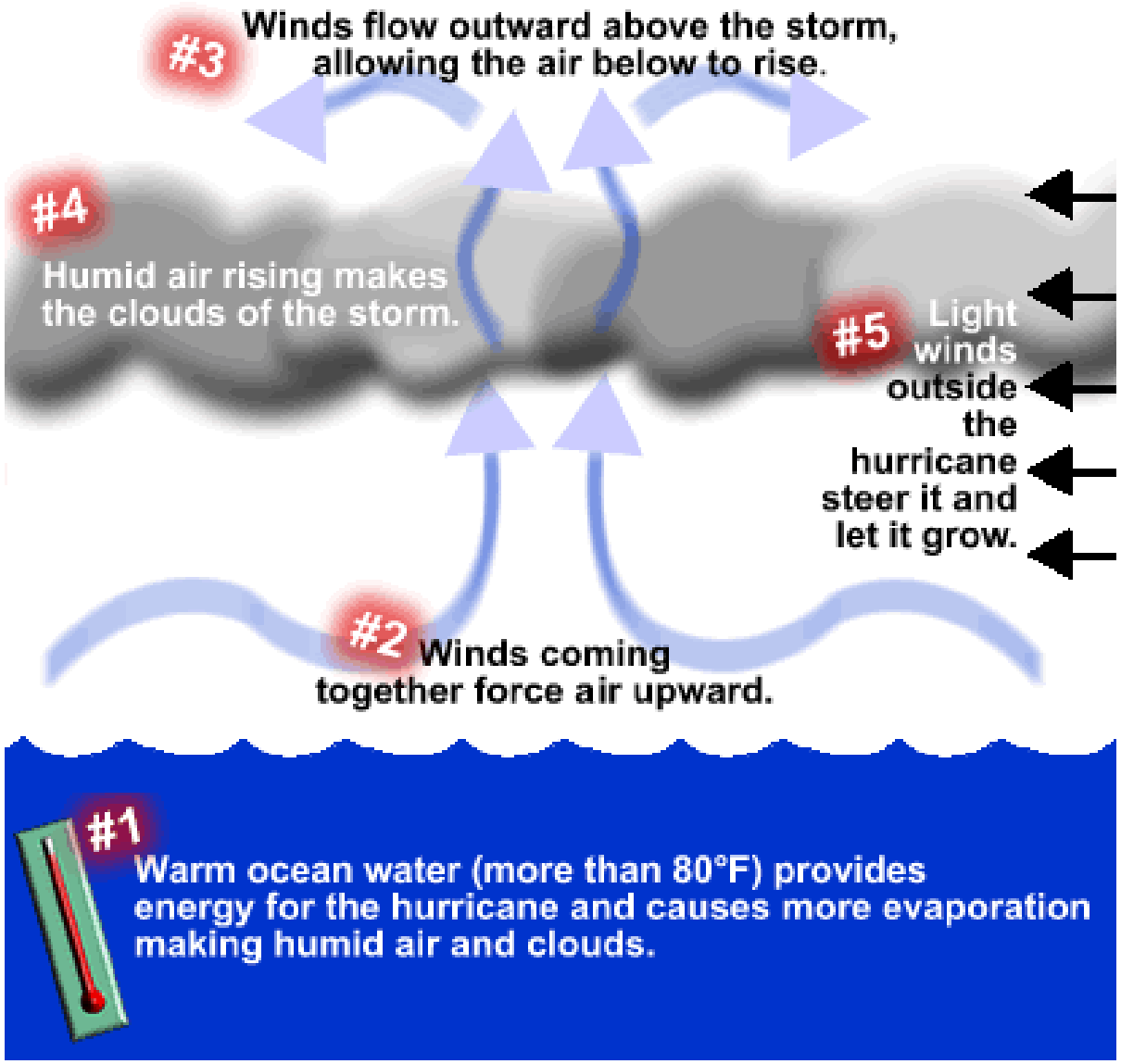
- "Hurricane strength" wind speeds > 74 mph.
- Barometric pressure inside a cyclonic storm is LOW.
- In which direction does a cyclonic storm rotate?

COUNTERCLOCKWISE
in Northern Hemisphere



CLOCKWISE
in Southern Hemisphere

Ingredients of a Cyclonic Storm



- **Warm water**

(at least 26.5°C/ 79.7°F are needed down to a depth of at least 50 m/ 160 ft)

- **Time to grow**
- **Conditions to develop circulation**

(location off equator)

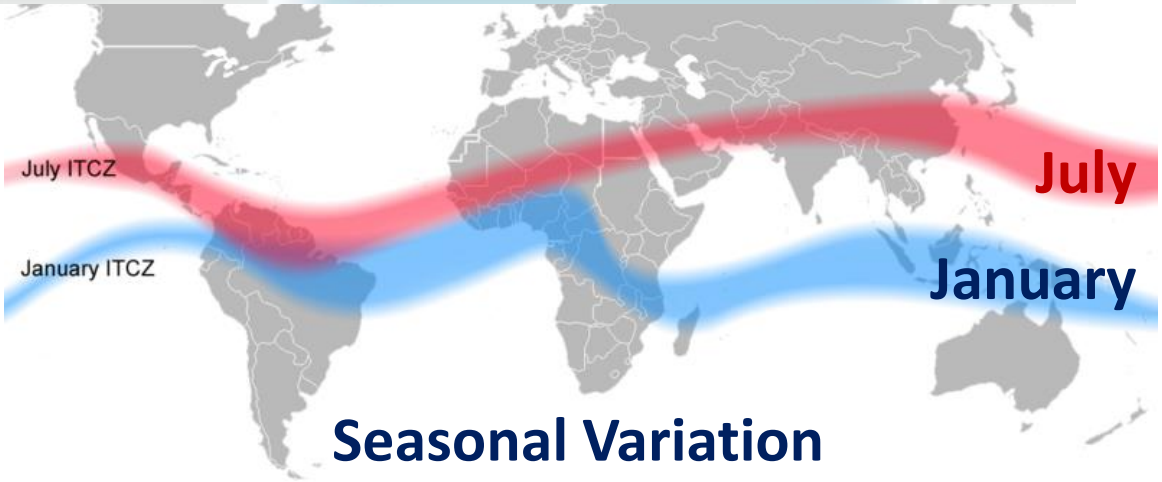
- **Light upper level winds**

(wind shear destroys thunderstorm organization)

Where are Hurricanes Forming?

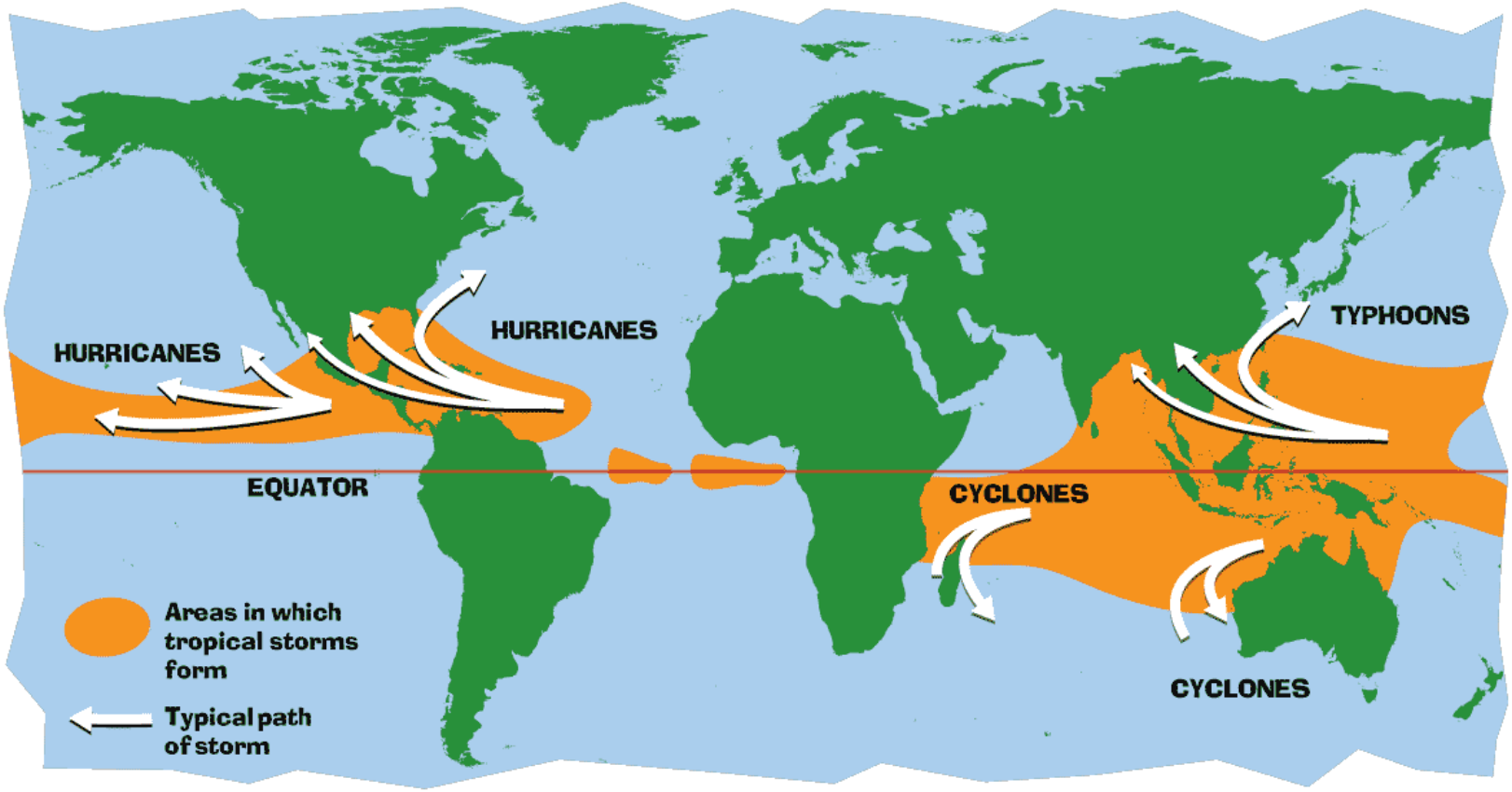
InterTropical Convergence Zone (ITCZ)

Area of low pressure near the Equator, a worldwide band of thunderstorm activity.



Seasonal Variation

Formation and Typical Paths



The <u>majority</u> of cyclonic storms form between 10 and 30 degrees of latitude away of the equator:

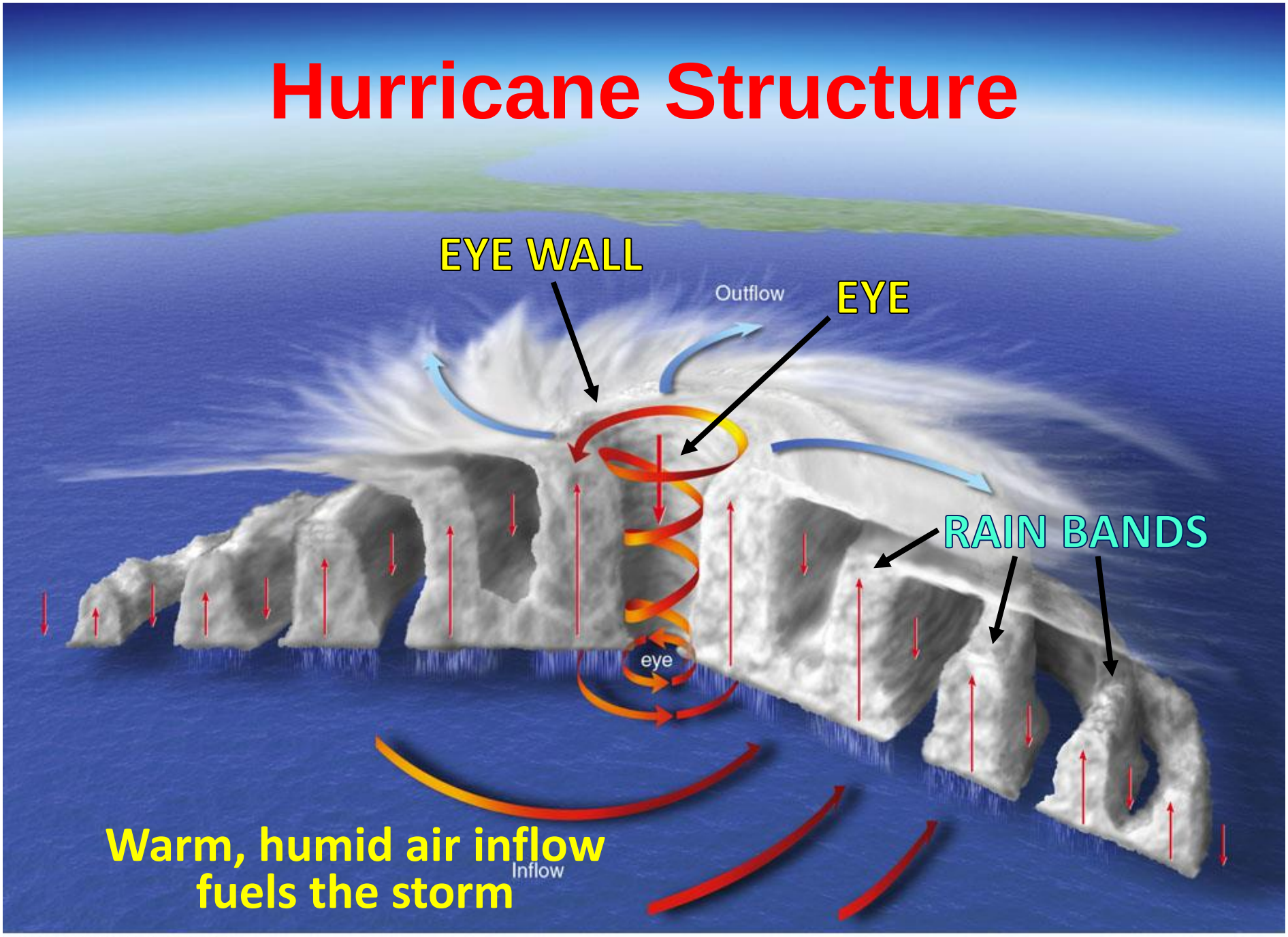
- 87% between 10-20 degrees north or south,
- rarely form or move within 5 degrees of the equator where Coriolis effect (responsible for storm rotation) is low.

When is Hurricane Season?

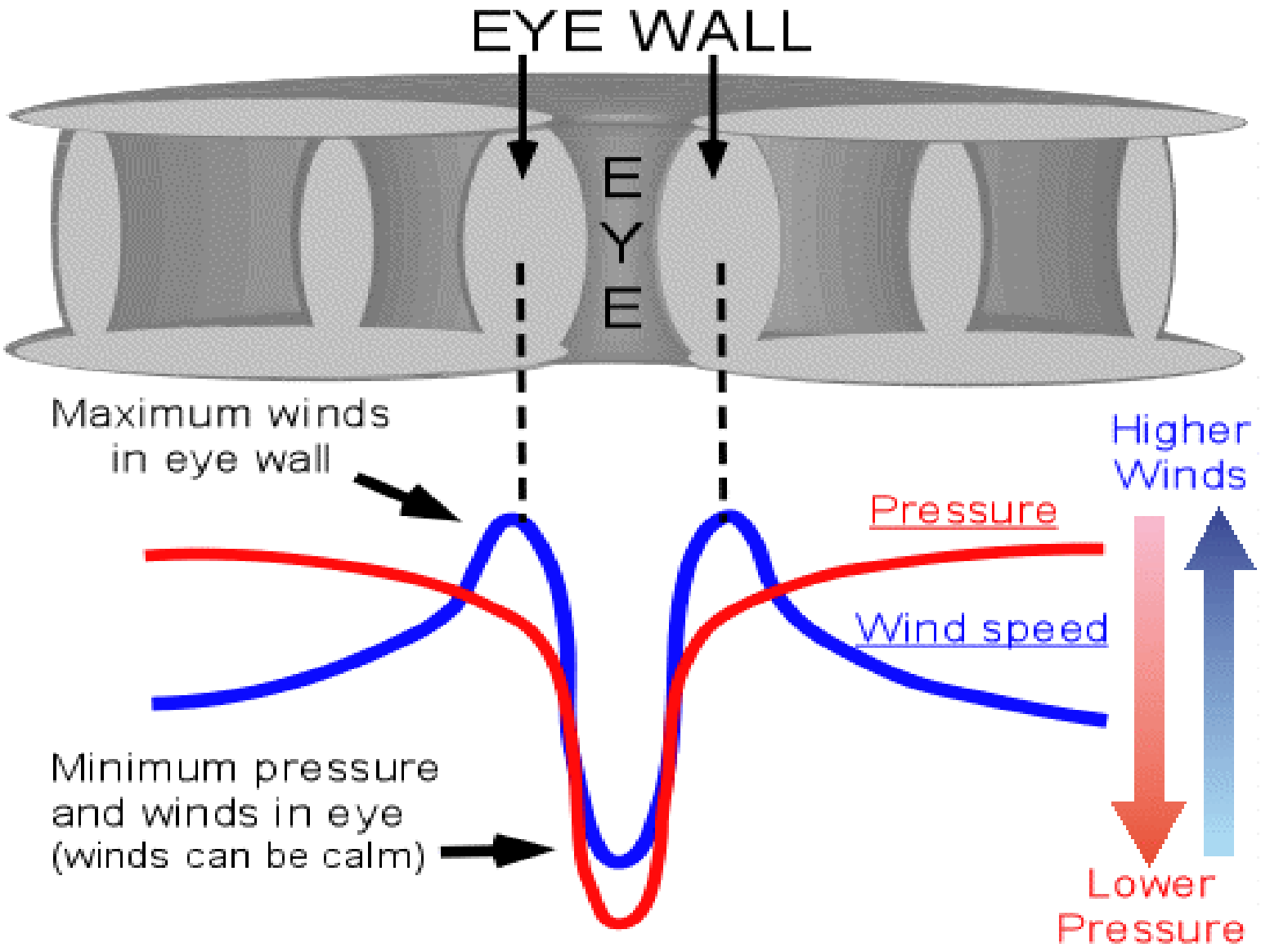
- **Northern Atlantic Ocean: a distinct cyclone season occurs from June 1 to November 30 (peaking from late August through September).**

- **Northeast Pacific Ocean: May 15 to November 30.**
- **Northwest Pacific: year-round (a minimum in February and March and a peak in early September).**
- **North Indian basin: April to December (has two peaks - May and November).**
- **Southern Hemisphere: year-round (peaking mid-February to early March).**

Hurricane Structure

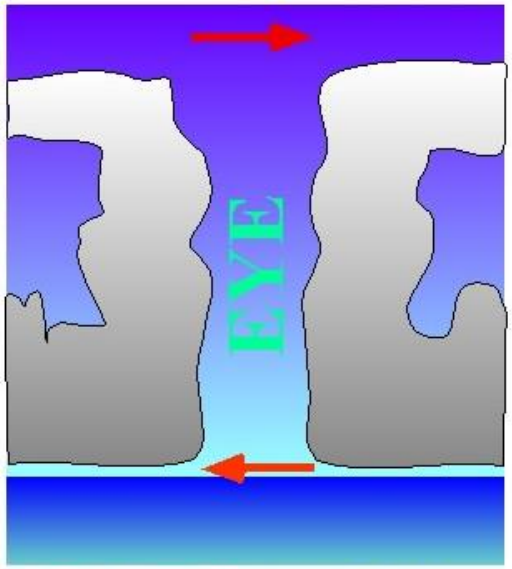


Pressure and Wind Speed Profile

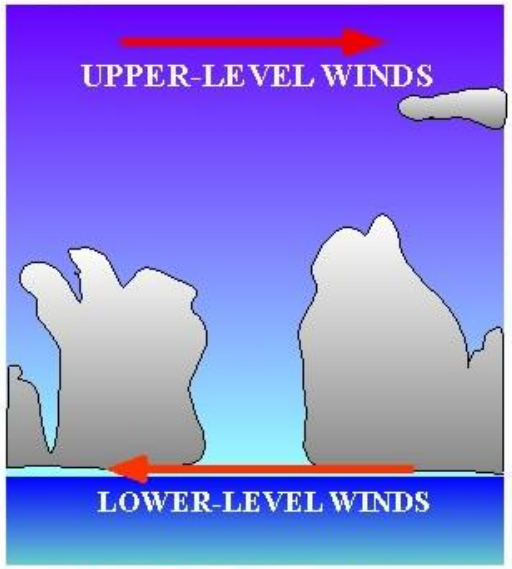


What destroys a hurricane?

- **Strong vertical wind shear** causes convection and loss of vertical storm organization.
- **Cold water** (moving over waters significantly below 26.5 °C/79.7 °F).



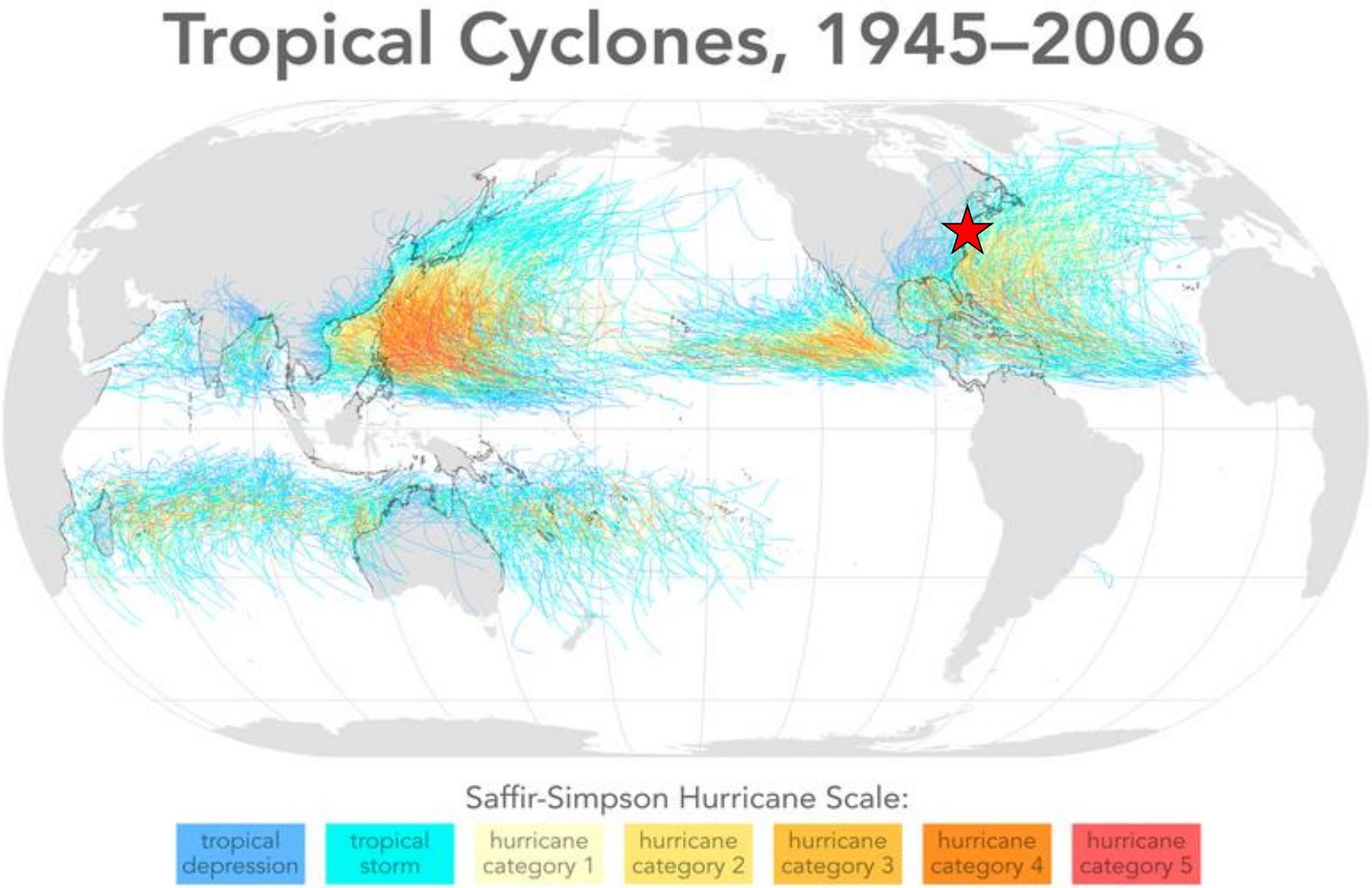
WEAK SHEAR = FAVORABLE



STRONG SHEAR = *UN*FAVORABLE

- **Movement over land** - most strong storms lose their strength very rapidly after **landfall** and become disorganized areas of low pressure within a day or two as a result of **friction** and **lack of moisture**.

Historical Data



Measuring Hurricane Strength

Saffir-Simpson Hurricane Scale		
Category	Wind speed (mph)	Storm surge (feet)
5	156+	More than 18
4	131–155	13–18
3	111–130	9–12
2	96–110	6–8
1	74–95	4–5
Additional classifications		
Tropical storm	39–73	0–3
Tropical depression	0–38	0