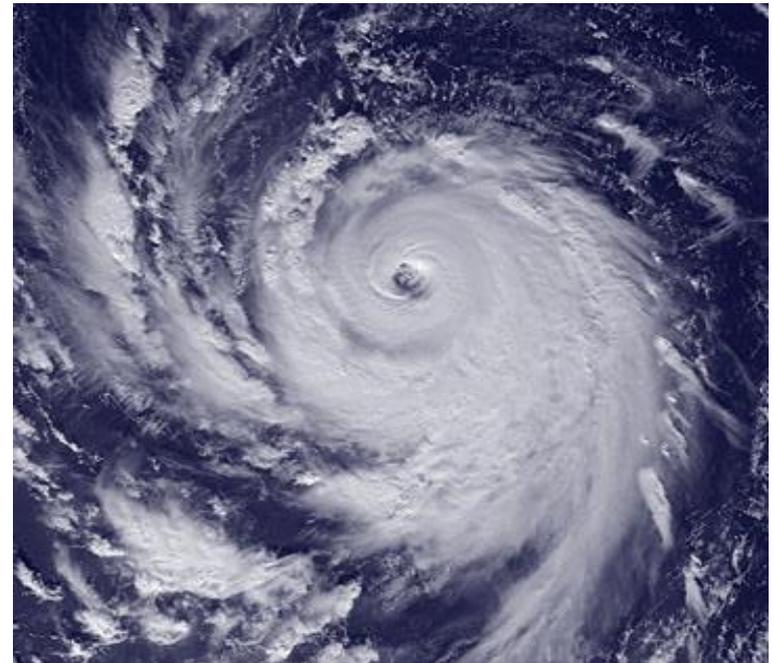


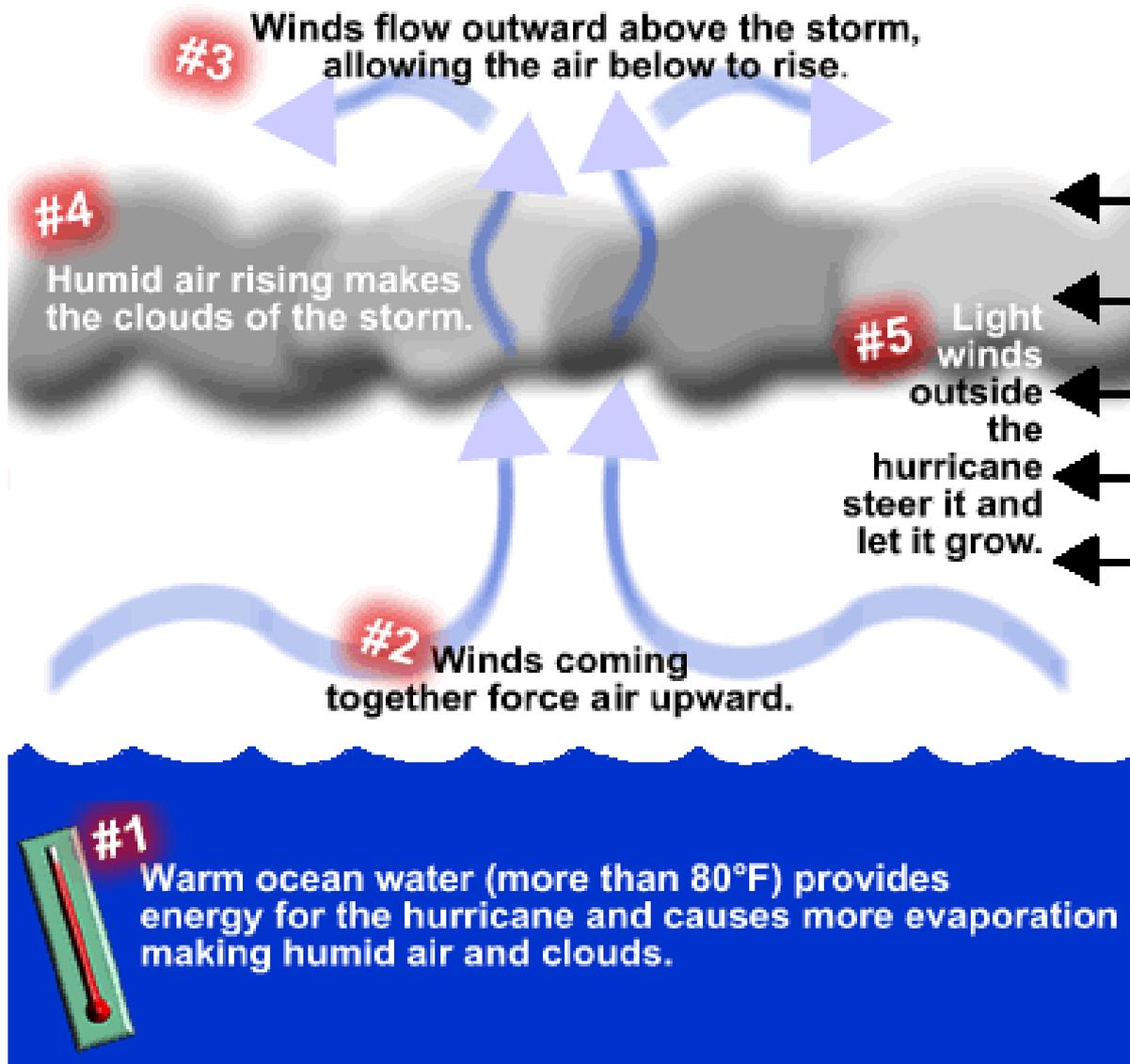
Cyclonic Storm

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)



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)

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



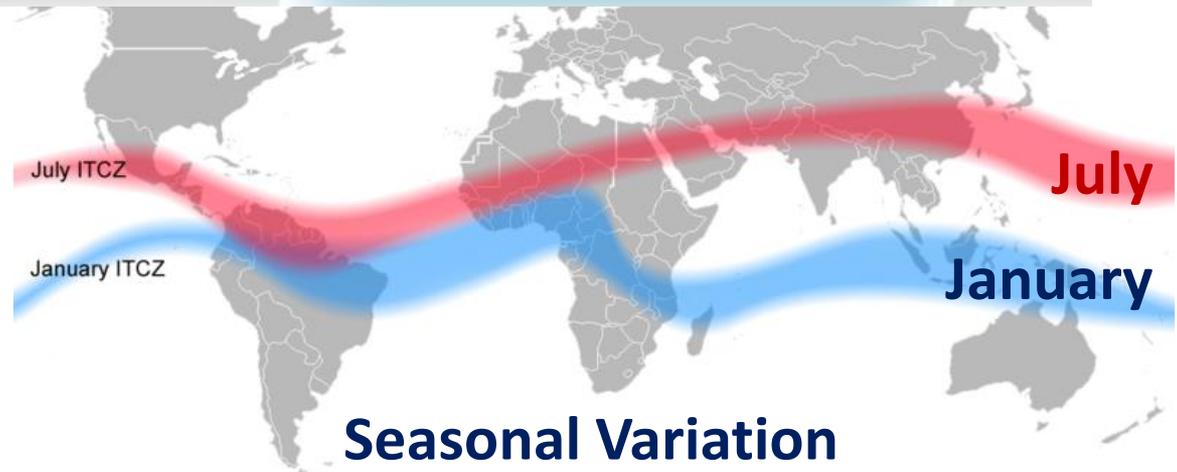
CLOCKWISE
in **Southern** Hemisphere

Where are Hurricanes Forming?

InterTropical Convergence Zone (ITCZ)



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



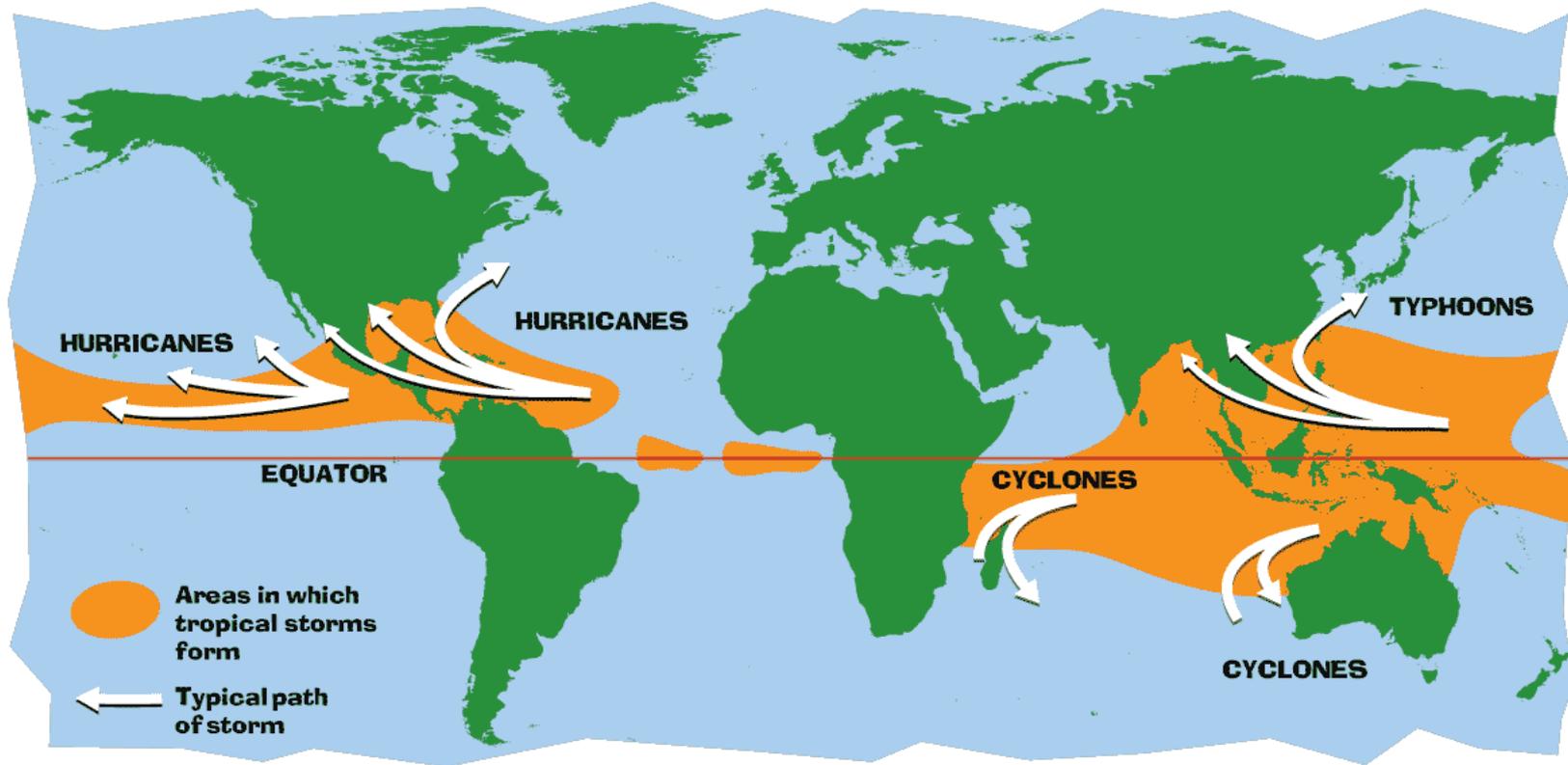
When is Hurricane Season?

- 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).

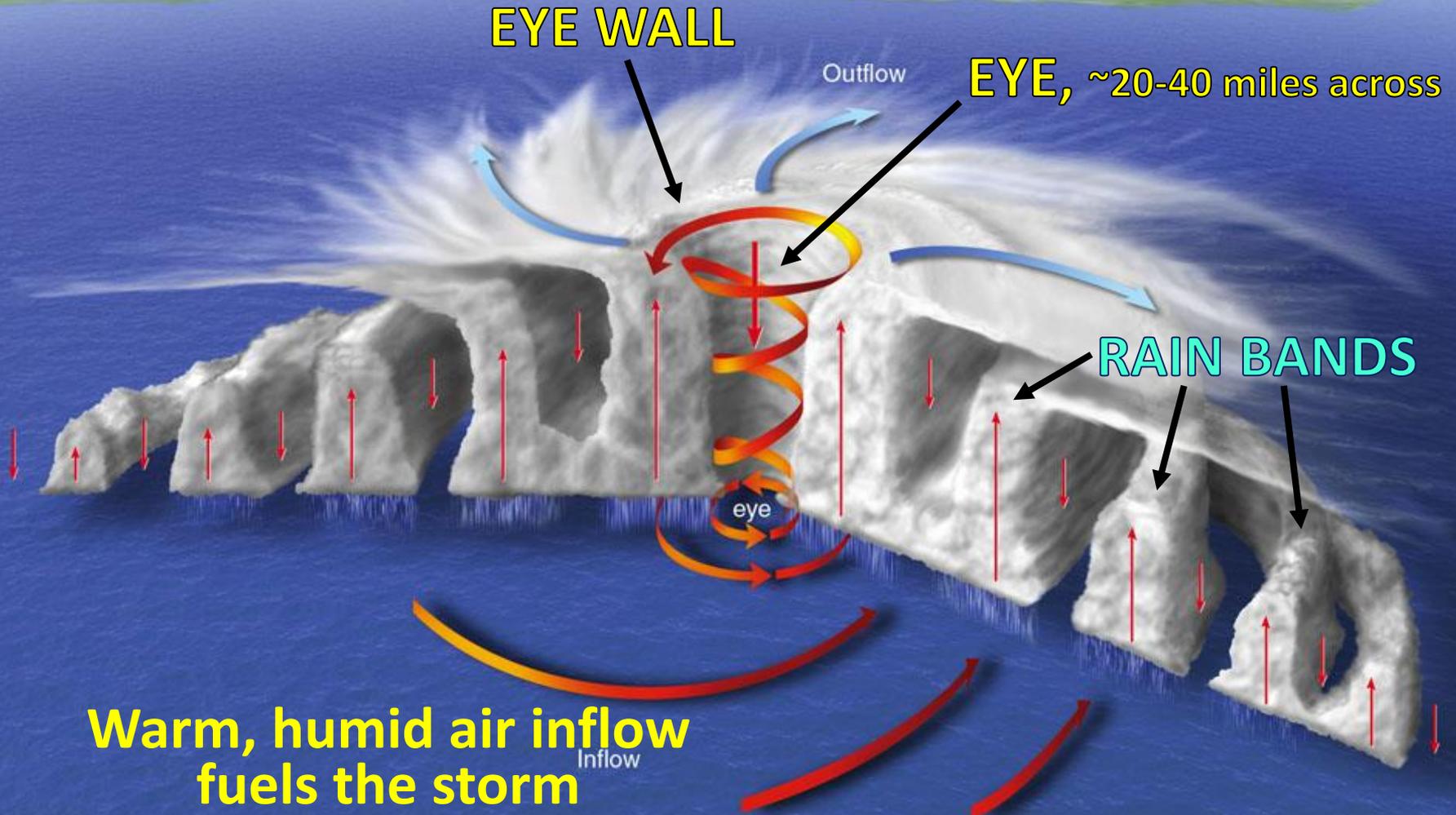
Formation and Typical Paths



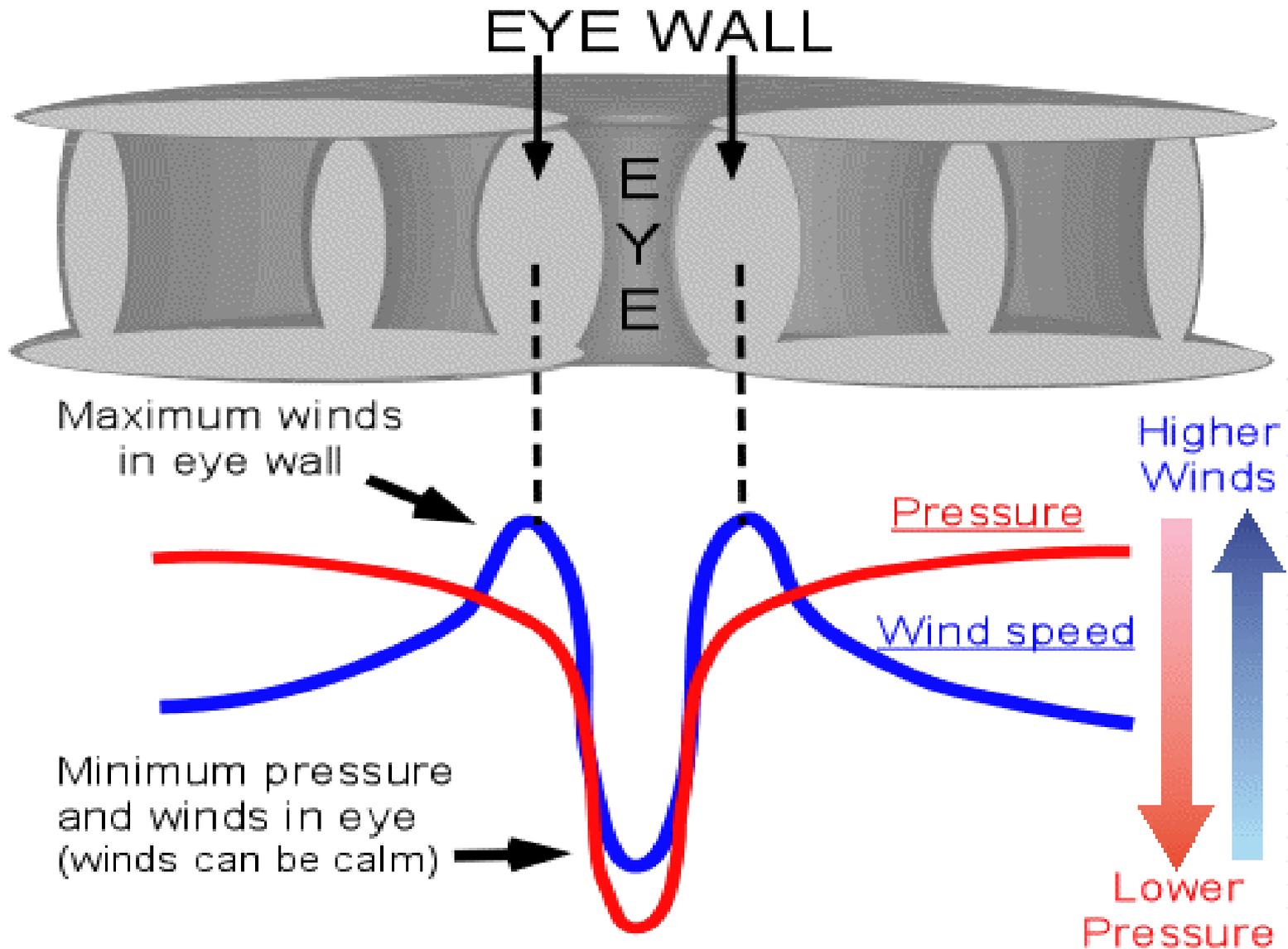
The majority of cyclonic storms **form between 10 and 30 degrees** of latitude away of the equator:

- **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.

Hurricane Structure

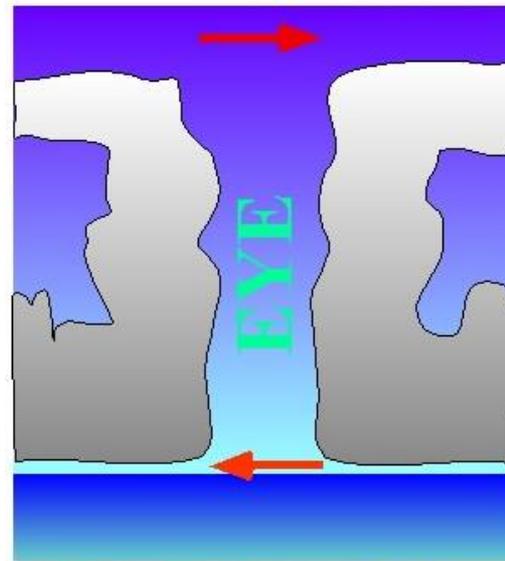


Pressure and Wind Speed Profile

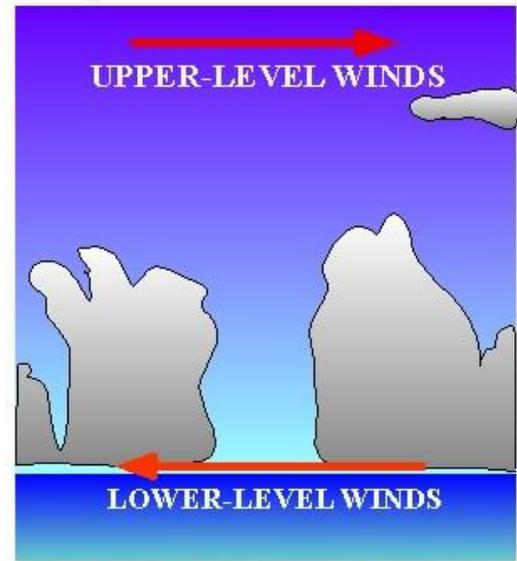


What destroys a hurricane?

- 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



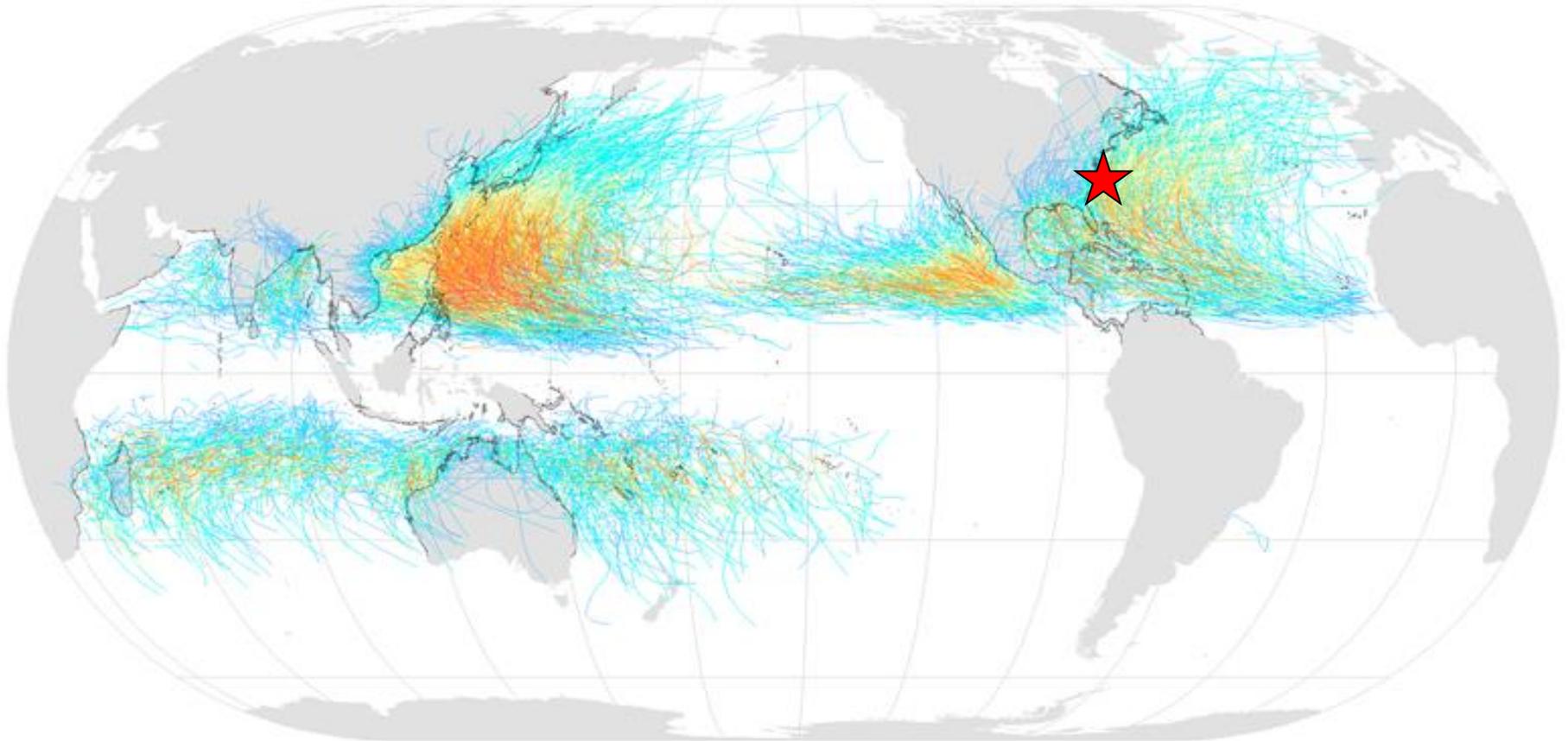
STRONG SHEAR = UNFAVORABLE



- 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

Tropical Cyclones, 1945–2006



Saffir-Simpson Hurricane Scale:

