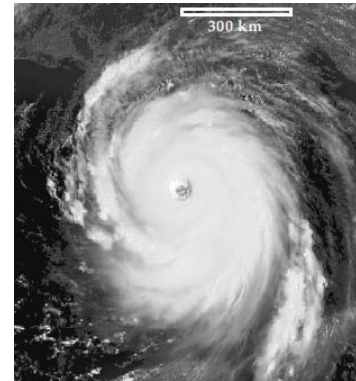


# Chapter 11

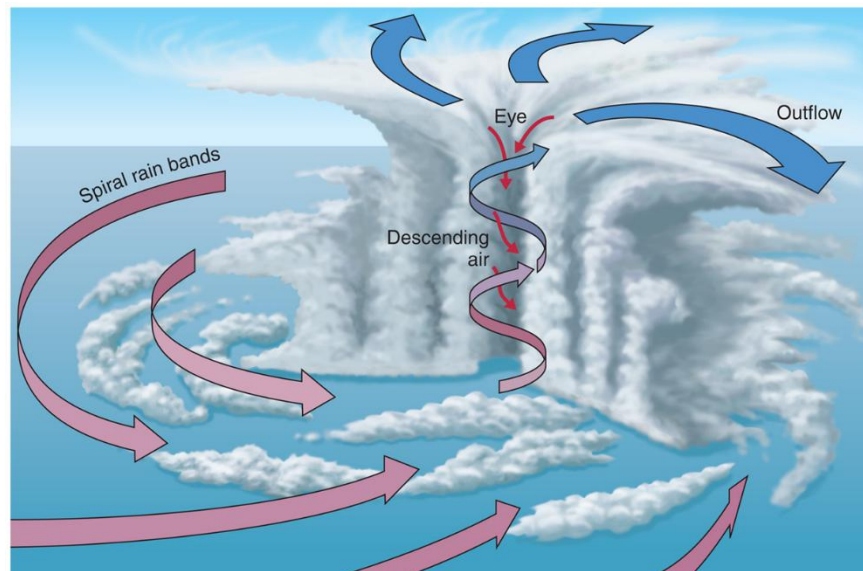
## Tropical Storms and Hurricanes

### Hurricanes

- A **hurricane** is a center of low pressure over tropical oceans with the following characteristics:
  - 1) Strong pressure gradients
  - 2) Strong winds (120-250+ km/hr) rotating around center of low pressure (the eye)
  - 3) Diameter of about 500 km
  - 4) Slowly moving (~15 km/hr)
  - 5) Heavy rain/thunderstorms encircling the eye
  - 6) Lifetimes of days to more than a week
- Hurricanes go by several names
  - **Hurricanes** -> Atlantic and eastern Pacific
  - **Typhoons** -> western Pacific
  - **Cyclones** -> Indian ocean and Australia
- Different levels of intensity
  - **Hurricanes** -> 120+ km/hr
  - **Tropical Storms** -> 60-120 km/hr
  - **Tropical Depressions** -> up to 60 km/hr



### Hurricane Structure



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- Hurricanes are **warm core** storms, meaning the center of the storm is warmer than its surroundings

- The center of the hurricane is known as the **eye**
  - Descending motion
  - Clear skies
  - Calm winds
  - Roughly 30 kilometers in diameter
- The **eyewall** is the most intense part of a hurricane (highest winds, strongest storms)
  - Rainfall rates can be 100 mm/hr
  - Transition from eye to eyewall is extremely abrupt
  - Double eyewalls can occur as the inner eyewall dissipates and a secondary eyewall takes its place
- **Hot towers** (areas along the eyewall that contain stronger convection) are common
- The occurrence of double eyewalls or hot towers indicate a strong or strengthening hurricane

### Hurricane Stages of Development

- Tropical disturbance – Mass of thunderstorms/only slight circulation
- Tropical depression – Winds between 20 and 34 knots (1 knots=1.8 km/hr)
- Tropical storm – Winds between 34 and 64 knots. Storm gets a name
- Hurricane – Winds above 64 knots

### Some Notable Hurricanes

Camille, 1969  
Hugo, 1989  
Andrew, 1992  
Ivan, 2004  
Katrina, 2005



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