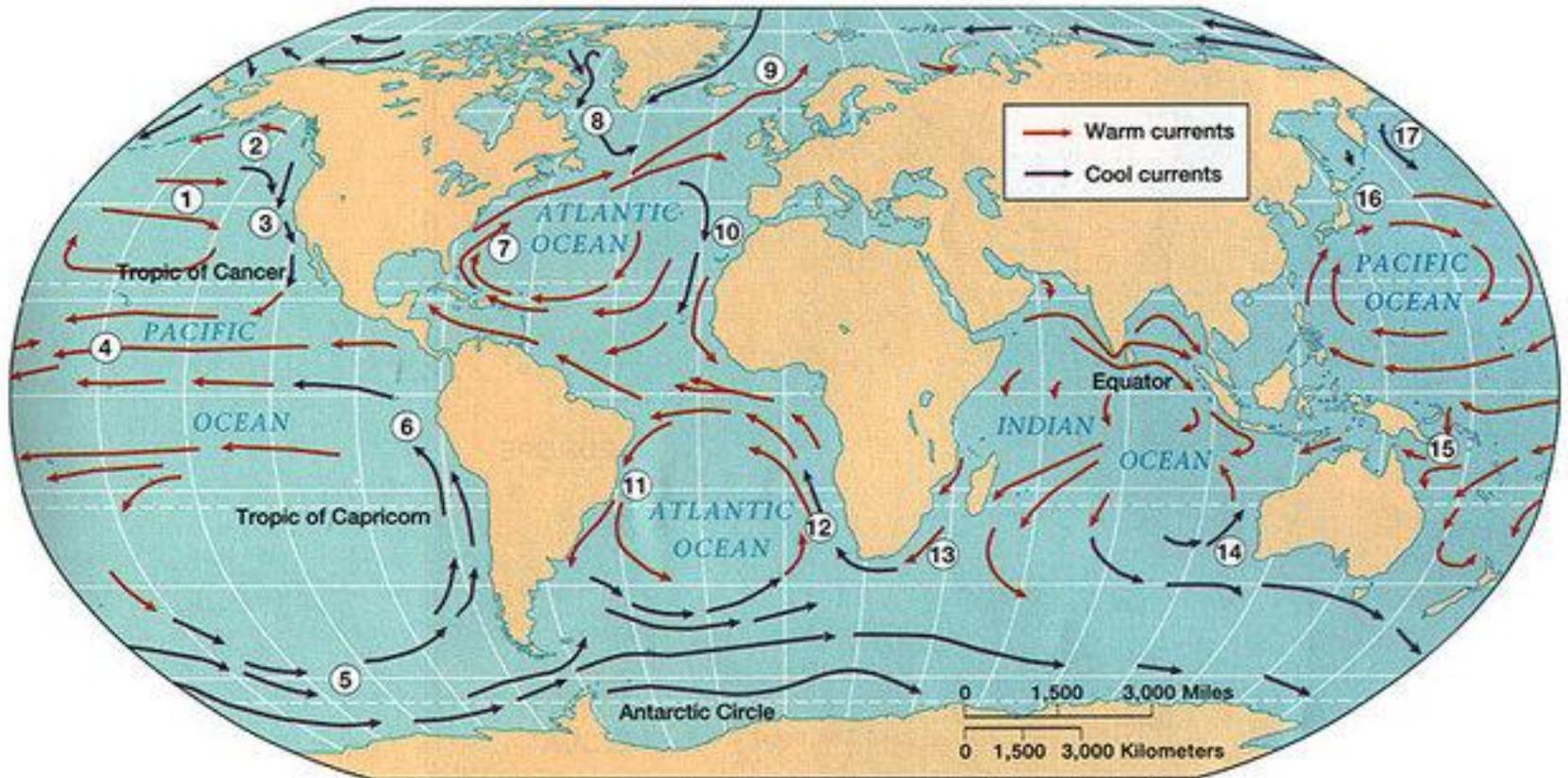


2.2 Ocean Currents

Ocean Currents

- ▶ An ocean current is a large amount of ocean water that moves in a particular and unchanging direction
- ▶ There are more than 20 ocean currents worldwide
 - The largest is the Antarctic Circumpolar Current in the Southern Ocean...24 000km long!

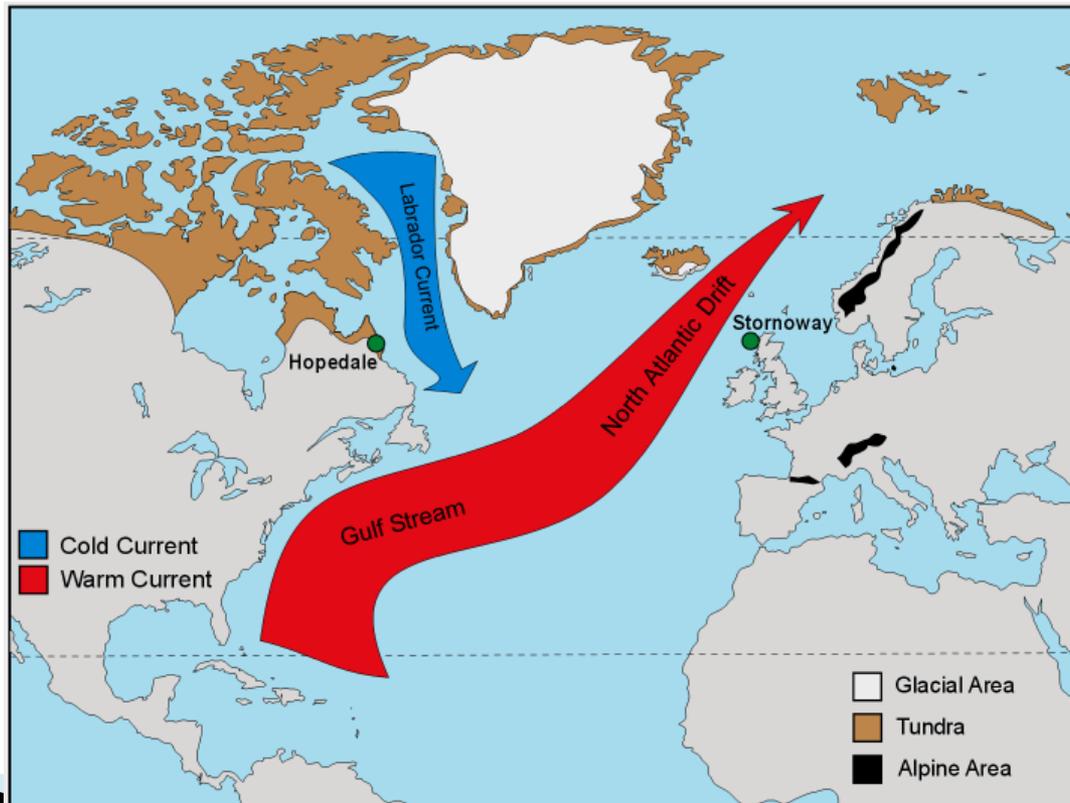
Ocean Currents



Our Ocean Currents

▶ Gulf Stream current

- Runs from the Caribbean to the North Atlantic
- Warm current makes the Grand Banks rich



“Our” Ocean Currents

▶ Labrador Current

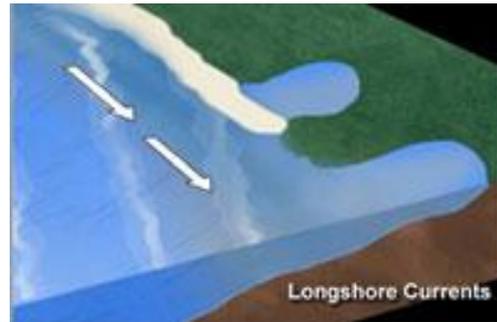
- Gulf stream and Labrador Currents mix, making NL waters an ideal location for nutrients
- This provides food for fish and other marine life such as whales



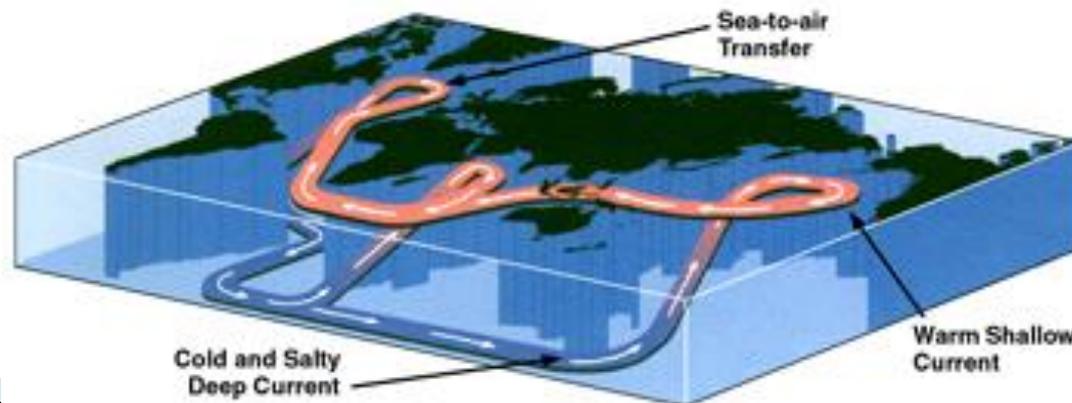
Also causes lots of fog!!

Types of Ocean Currents

- ▶ Surface Currents have an average depth of 200m

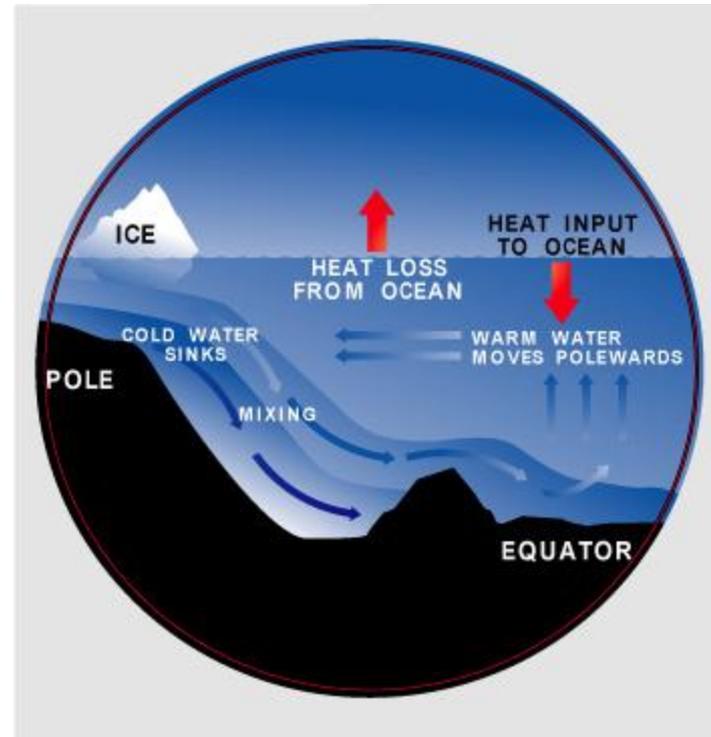


- ▶ Deep water currents occur deeper than 200m



Factors Influencing Currents

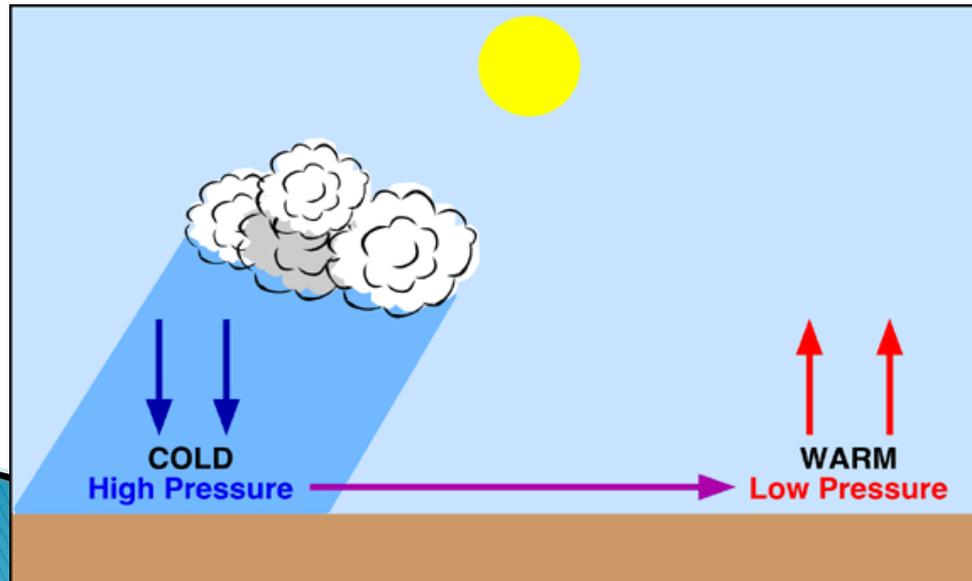
- ▶ Wind
- ▶ Earth's Rotation
- ▶ Continent Shape
- ▶ Water Temperature
- ▶ Water salinity



Factors influencing surface currents:

▶ Wind

- Wind occurs when the earth is unevenly heated
- Air warmed in one spot becomes less dense and rises
- Cooler air must fill in the void left behind creating a moving mass of air → wind
- When wind moves over the ocean's surface, it causes ocean water to move



The direction and speed of surface currents is directly connected to the direction and speed of wind blowing over the water

Factors influencing surface currents:

▶ Earth's Rotation

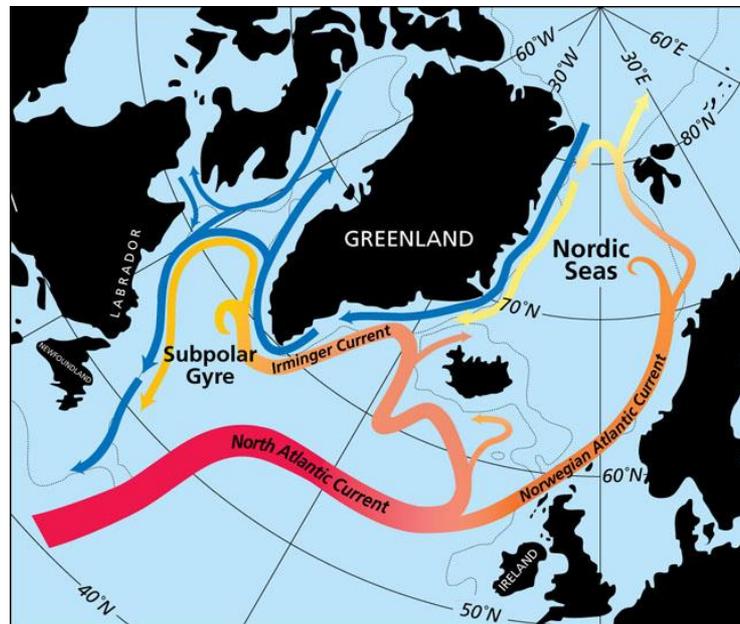
- The Earth spins from west to east (counter clockwise)
- This spin alters wind and water current direction
- The Coriolis Effect:
 - Winds are deflected in a clockwise direction in the northern hemisphere
 - Deflected in a counterclockwise in the southern hemisphere



Factors influencing surface currents:

▶ Continent Shape

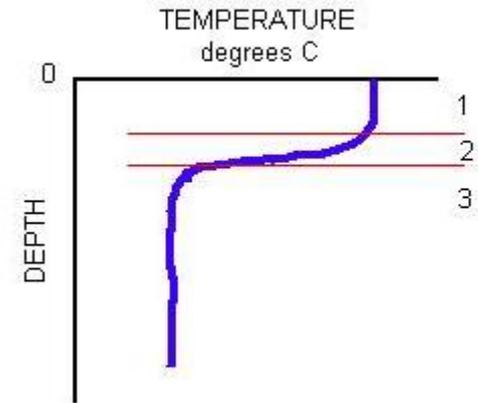
- Moving currents are forced to turn when they meet a solid surface
- Continents deflect east–west currents to the north or south



Factors Influencing Deep Water Currents

▶ Water Temperature

- Ocean water temperature changes sharply to form 3 layers:
 - The surface (up to 200m)
 - Thermocline (exists where the sun no longer reaches the water ... between 200m to 1000m)
 - Deep water (below 1000m)
- Cold water is more dense than warm water and drags along the ocean floor creating **density currents**



Factors Influencing Deep Water Currents

▶ Water Salinity

- Density currents are produced by differences in salinity
- Higher salinity means more dense...
- Where can fresh water enter the ocean?
 - Icebergs
 - Melting glaciers
 - Mouths of rivers



Red= warm, fresh water

Yellow= cool, fresh water

Green= warm, salty water

Blue= cool, salty water

Factors Influencing Deep Water Currents

▶ Upwelling

- Flow in the opposite direction of density currents are upwellings:
 - Vertical movement of water from the sea floor to the ocean surface
 - Most common along coastlines where strong winds blow offshore
 - Rich in nutrients
 - Ex: Grand Banks

