# Ocean Conveyor Current and the influence of Climate Change

## Informational Presentation
## College Level

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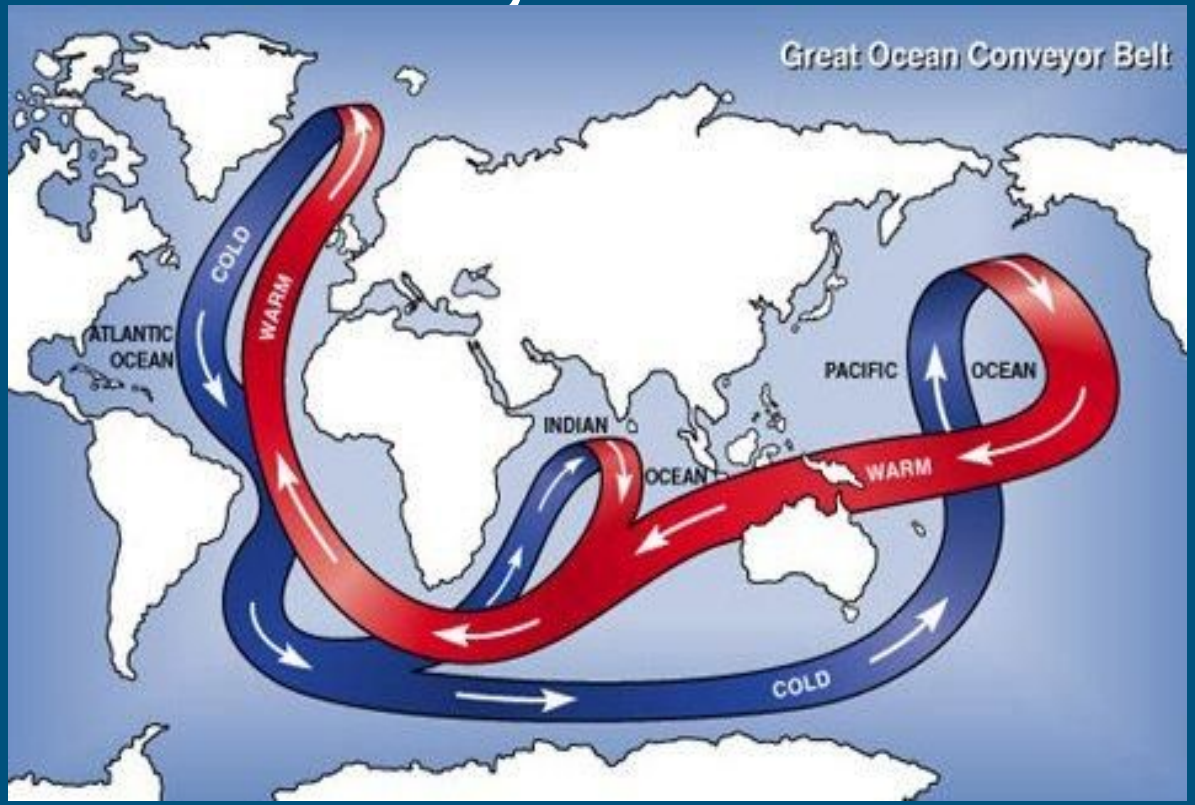
# Ocean Conveyor Belt




Worldwide, seawater moves in a pattern of currents known as thermohaline circulation, or the global ocean conveyor. The currents flow because of differences in water density and move between the deep and surface ocean.

# How do melting glaciers affect the conveyor belt?

**It could change the pattern of the current or stop it all together!**

**Melting ice in the Arctic Ocean causes freshwater to be added to the seawater. This makes the seawater less dense as it travels to the North Atlantic. This alone has caused the North Atlantic to be significantly fresher over the past several decades, and caused the currents to slow down.**

**Water that is less dense will not be able to sink and flow through the deep ocean, which may disrupt or stop the pattern of ocean currents in the region.**

*****Scientists estimate that, given the current rate of change, these currents could stop within the next few decades.**

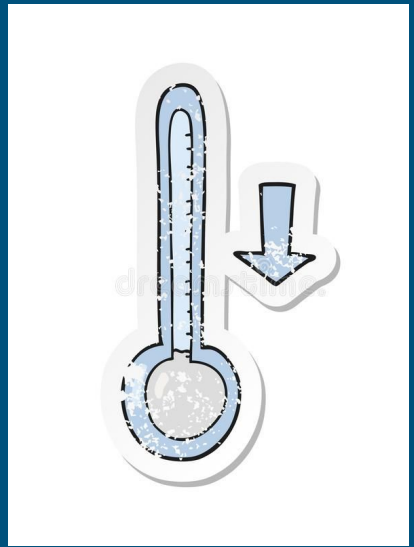
# What happens if the currents stop??

Stopped or slowed currents in the North Atlantic would cause regional cooling in Western Europe and North America.

The ocean currents carry warmth from the tropics up to these places, which would no longer happen. If the currents were to stop completely, the average temperature of Europe would cool **5 to 10 degrees Celsius**.

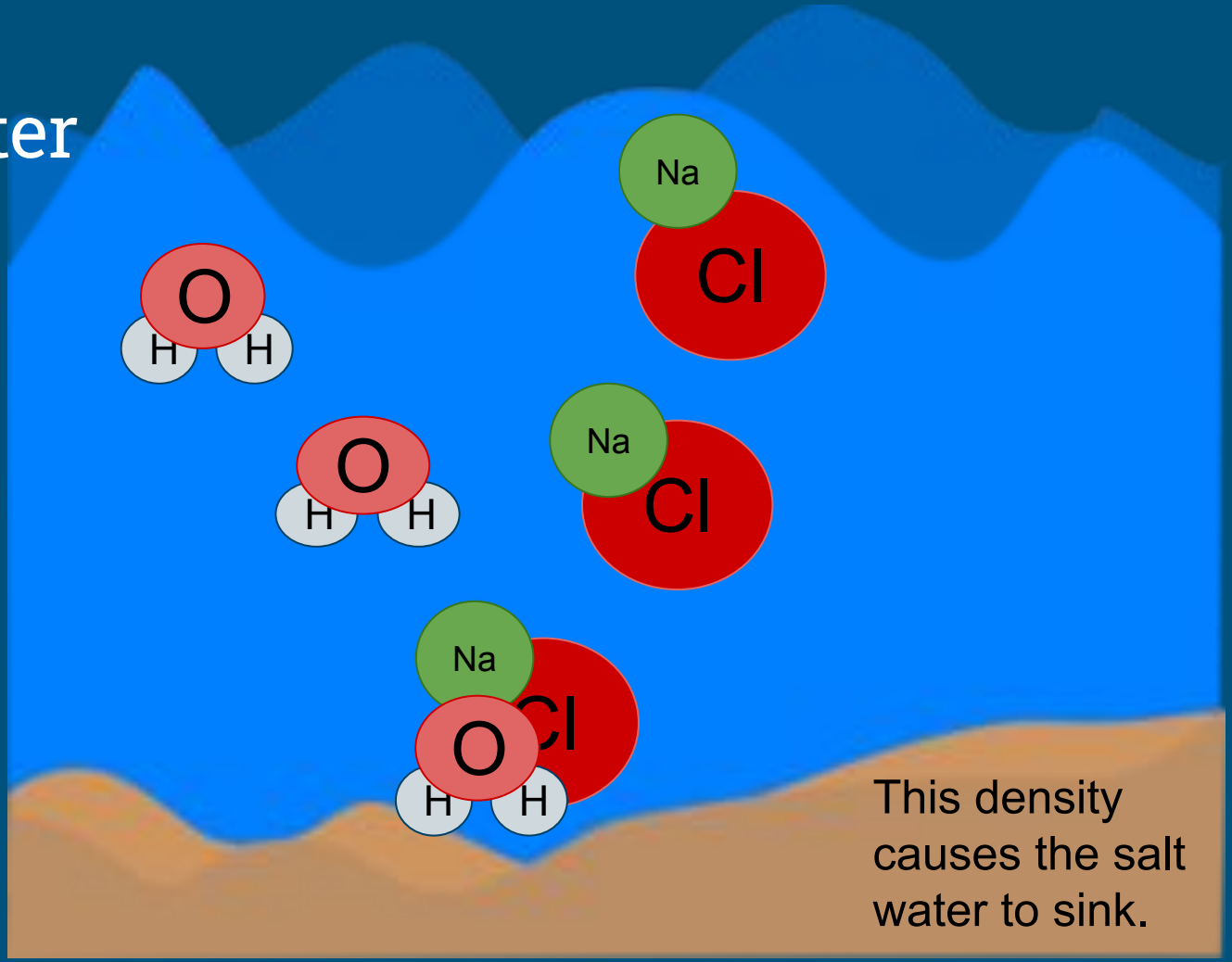
There would also be impacts on fisheries and hurricanes in the region.

***FUN FACT: There is evidence from sedimentary rocks and ice cores that the current has shut down several times in the past, which caused changes in the climate (temperature drops).



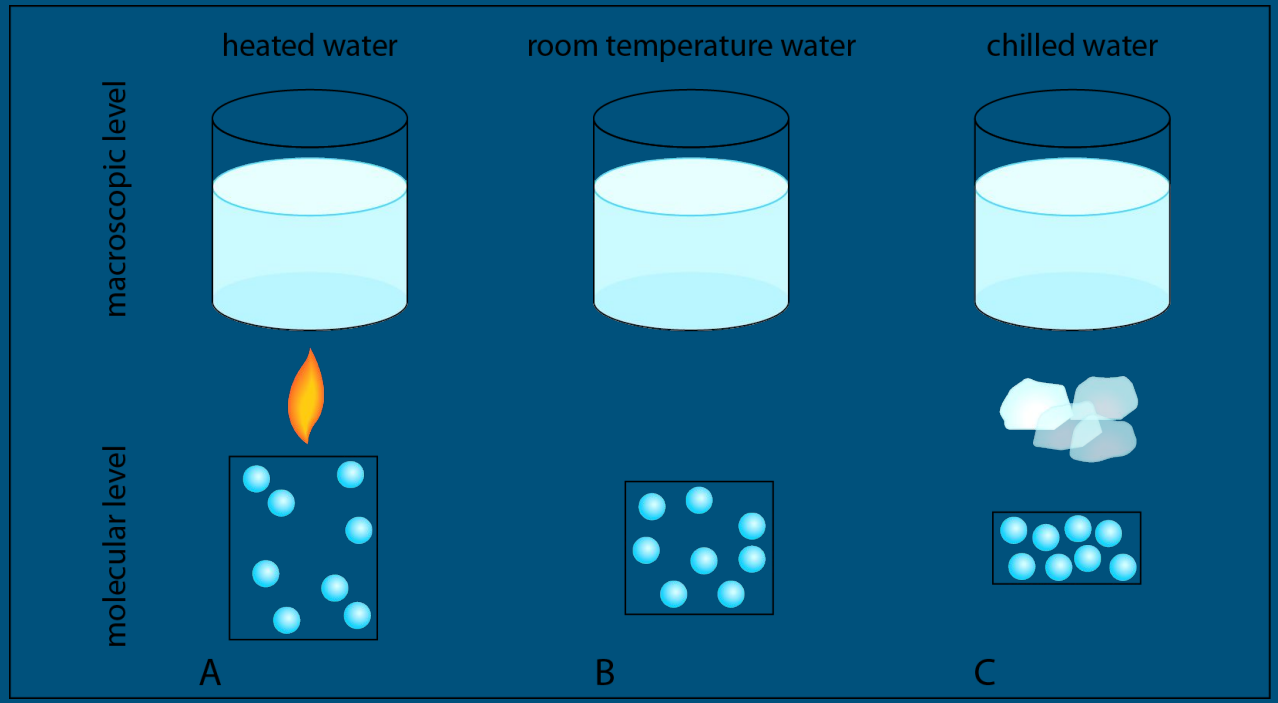
# Salt And Water

A liter of fresh water weighs less than a liter of salt water. Why? When salt is added to water, the sodium chloride molecules and the h2o molecules latch onto each other. This means there are more molecules taking up the same amount of space, and that makes salt water denser than fresh.



# Heat And Water

Hot water molecules hold more energy than cold water, so they bounce around and don't stick together. This constant movement means that hot water is more spread out and less dense than cold water.

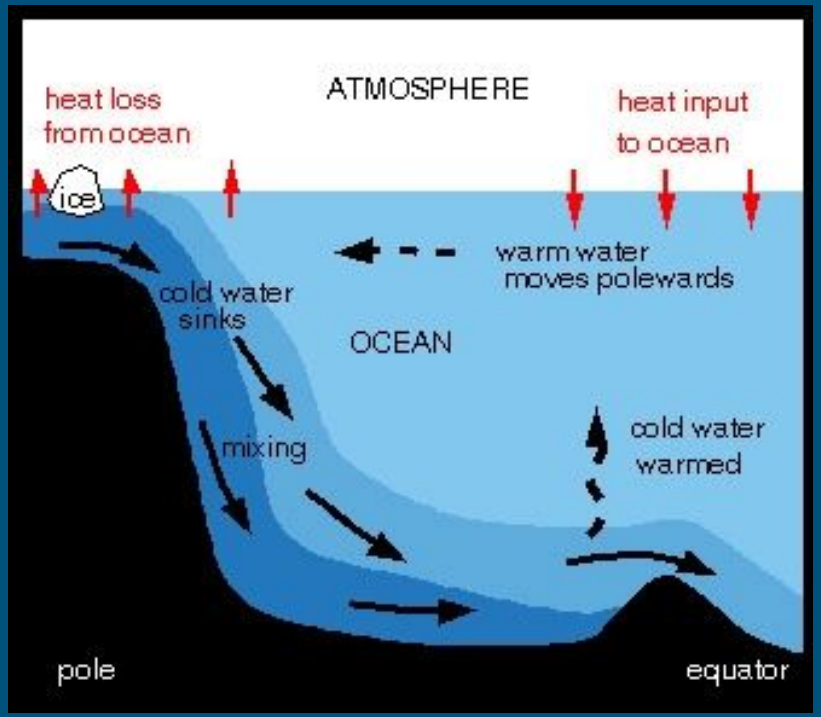



Thus, cold water sinks and hot water rises.

# Currents form as part of the interactions between water and salt, and water and heat

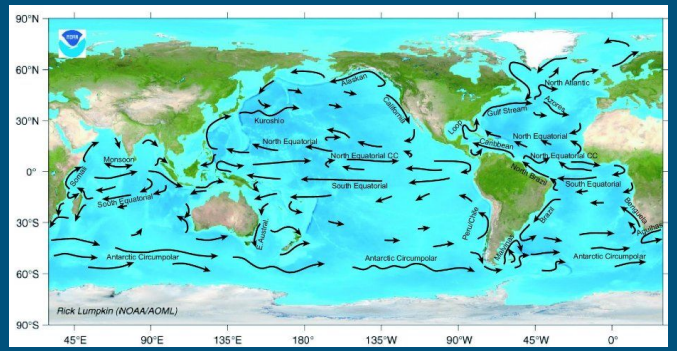
"[N]ear Iceland, the water becomes so cold that sea ice starts to form. The salt naturally present in seawater does not become part of the ice, however. It is left behind in the ocean water… making that water extra salty and dense. The denser water sinks, and as it does, more ocean water moves in to fill the space it once occupied. This water also cools and sinks, keeping a deep current in motion."

These same principles cause all deep currents as water heats and rises, then cools and sinks, while picking up and discarding salt as it goes.



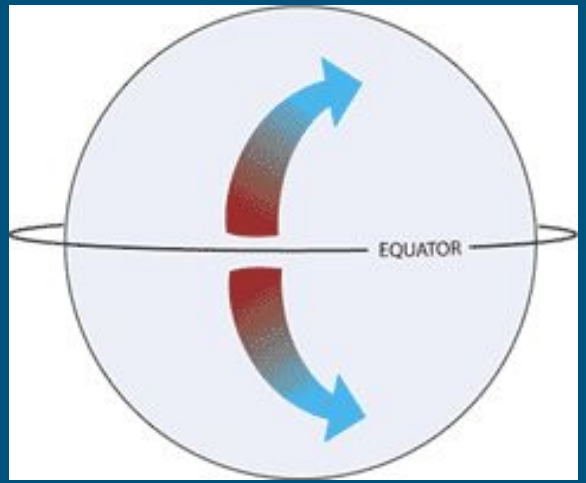
# Wind and Ocean Currents

Large-scale surface ocean currents are driven by global wind currents. These global wind currents are fueled by energy from the Sun. The wind currents drag on the surface of the water as it blows. The water then starts following the wind. Rising warm, moist air at the equator travels northward and southward, which cools the air as it travels closer to the poles. When it reaches about 30 degrees N and S latitude, it sinks and creates an area of high pressure. After it sinks, some of the air travels either the poles or the equator. This motion creates trade winds, that dominate surface ocean currents.

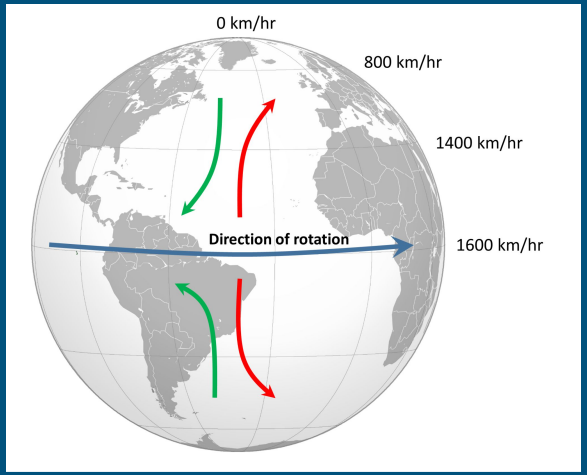


# Wind and Ocean Currents Cont.

“In the Northern Hemisphere, for example, predictable winds called trade winds blow from east to west just above the equator. The winds pull surface water with them, creating currents. As these currents flow westward, the Coriolis effect—a force that results from the rotation of the Earth—deflects them. The currents then bend to the right, heading north. At about 30 degrees north latitude, a different set of winds, the westerlies, push the currents back to the east, producing a closed clockwise loop.” (National Geographic, 2019)




Coriolis Effect



# Sources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