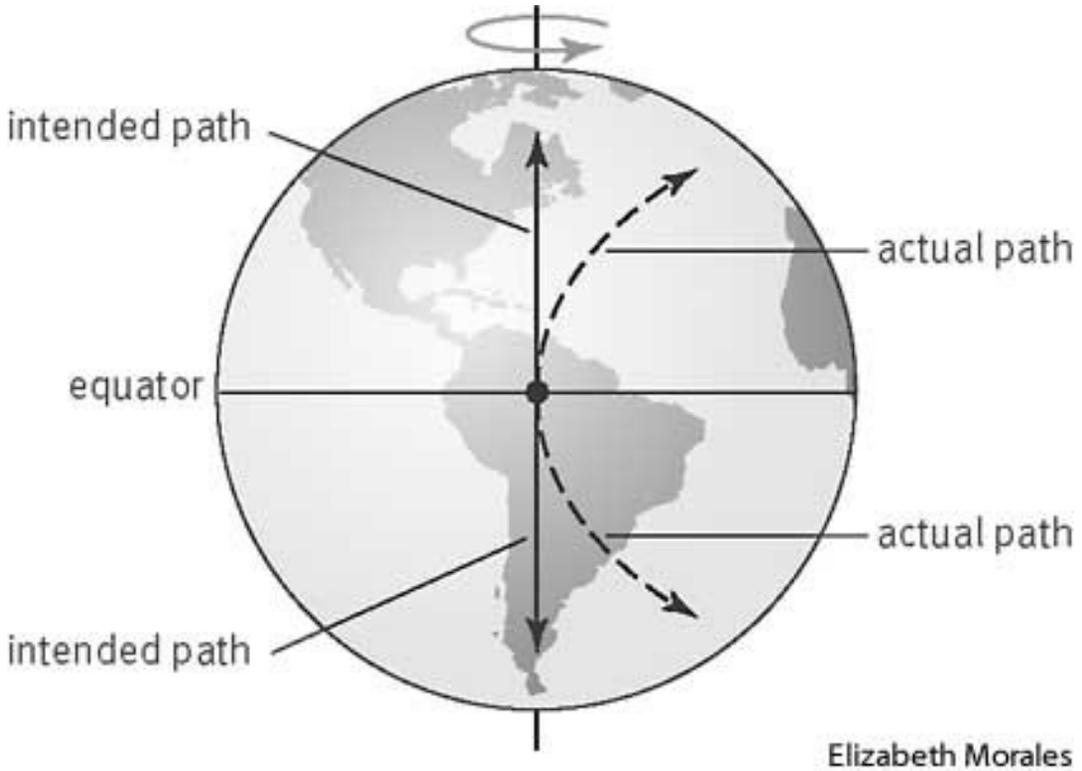
4) CORIOLIS EFFECT

https://www.youtube.com/watch?v=dt_XJp77-mk

- an object moving on a rotating object will be deflected compared to its intended path

- in the northern hemisphere objects are deflected right (naturally rotate clockwise)

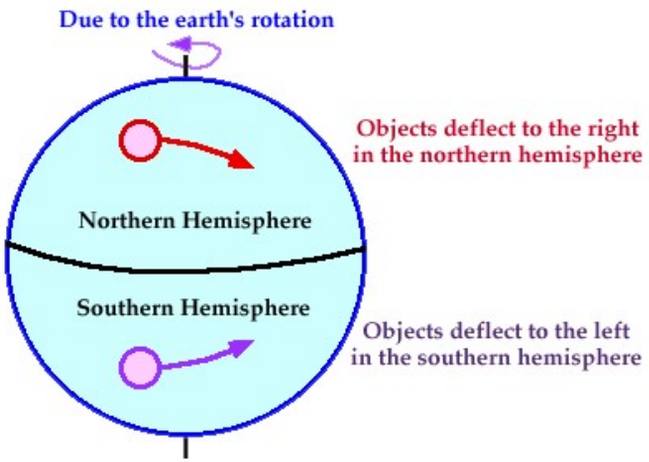
- in the southern hemisphere objects are deflected left (naturally rotate counter-clockwise)



if you tried to fly from the equator to the north pole in a straight line you would end up curving to the right from your intended path because the Earth is spinning.

The same for the south pole and turning left.

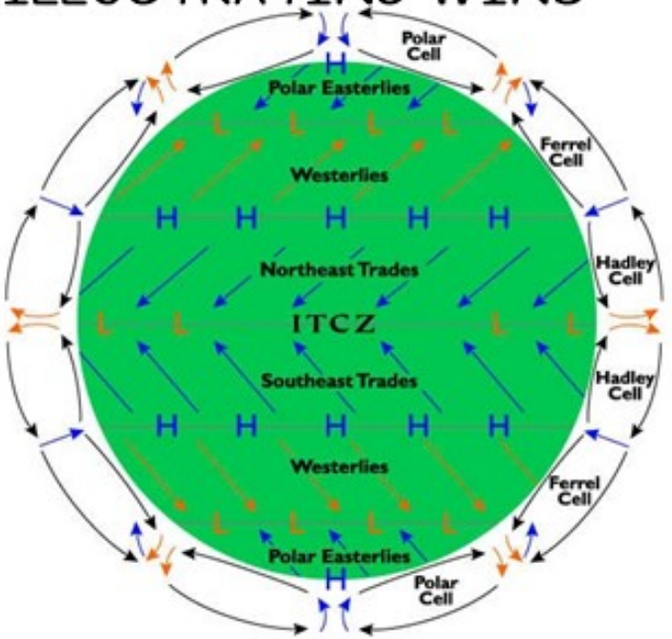
YOU DON'T NEED TO BE MOVING STRAIGHT NORTH OR STRAIGHT SOUTH IN ORDER FOR THIS TO OCCUR



parcels of air rotate clockwise North of the Equator

parcels of air rotate counter-clockwise South of the Equator

PREVIOUS PRESENTATION ILLUSTRATING WIND



INCOMPLETE MODEL

shows wind blowing in a straight line from high pressure to low pressure, this isn't what happens :(

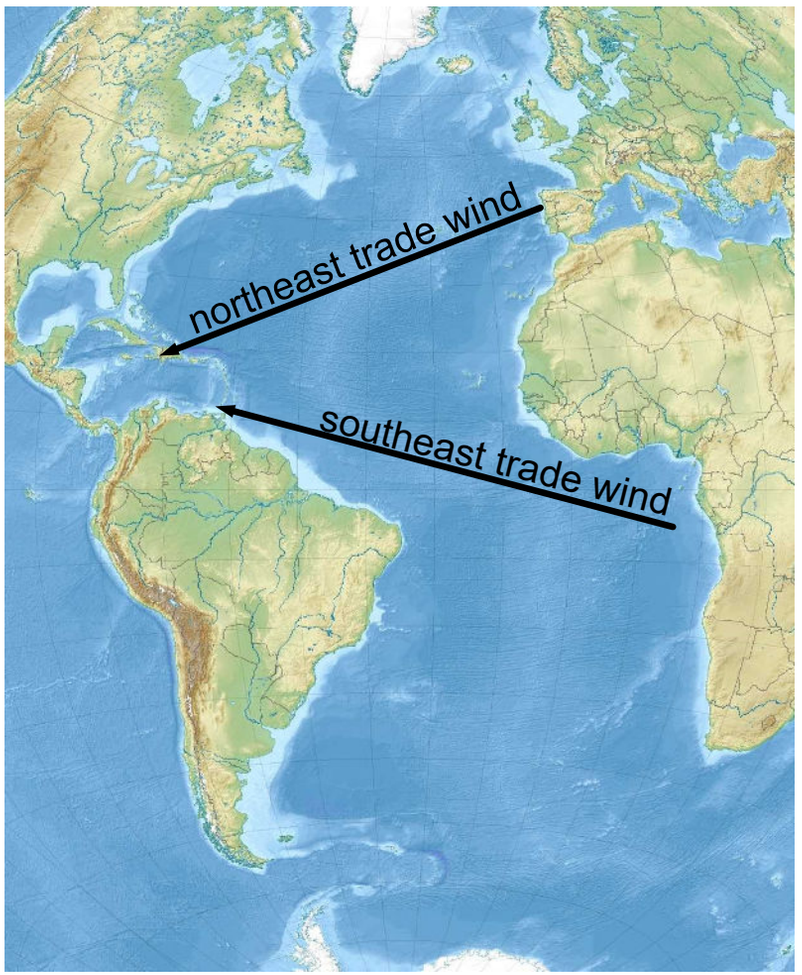
as was presented last class air moves from high pressure to low pressure. This is essentially what causes wind.

Note the Northeast Trade Winds and the Southeast Trade Winds on the diagram

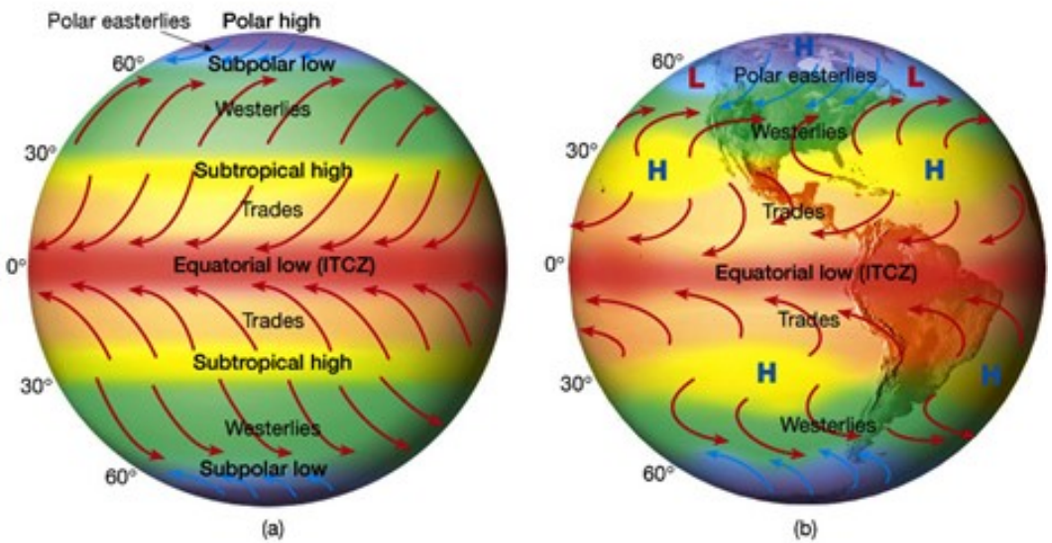
The Northeast trade winds allowed Columbus to 'discover' America

The Southeast trade winds aided the slave trade

The ships simply blew in the prevailing winds, there was little to no navigation that took place



CORRECTED TO INCLUDE THE CORIOLIS EFFECT

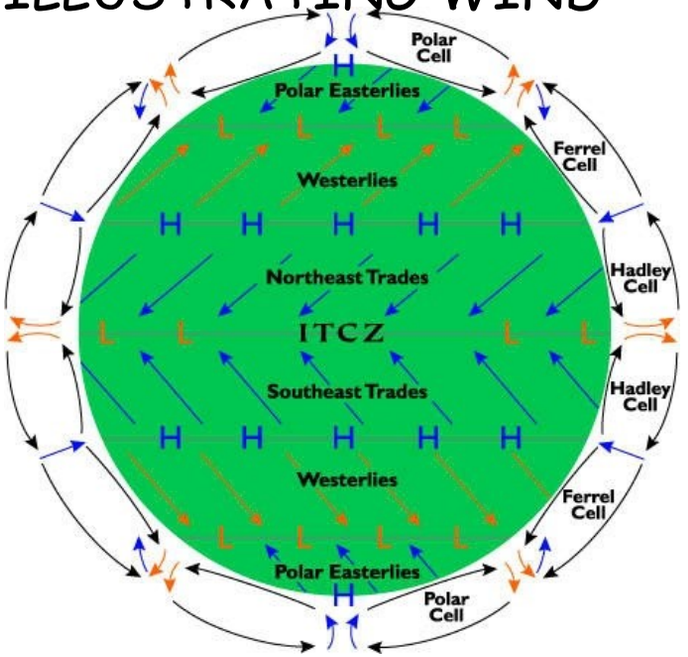


COMPLETE WIND MODEL

winds curve to the right (clockwise) North of equator

winds curve to the left (counter-clockwise) South of equator

PREVIOUS PRESENTAT ILLUSTRATING WIND



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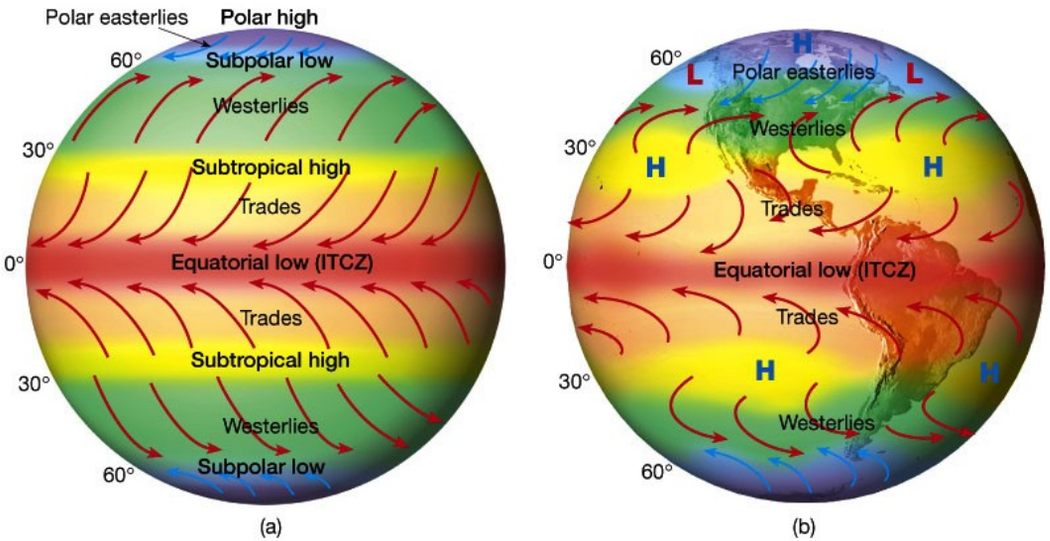

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COMPLETE WIND MODEL

winds curve to the right (clockwise) North of equator

winds curve to the left (counter-clockwise) South of equator

5) OCEAN CURRENTS

- the direction of water flow of ocean currents is a combination of the effects of global convection currents, prevailing winds, and the coriolis effect

- the temperature of the water in an ocean current is largely dependent on whether

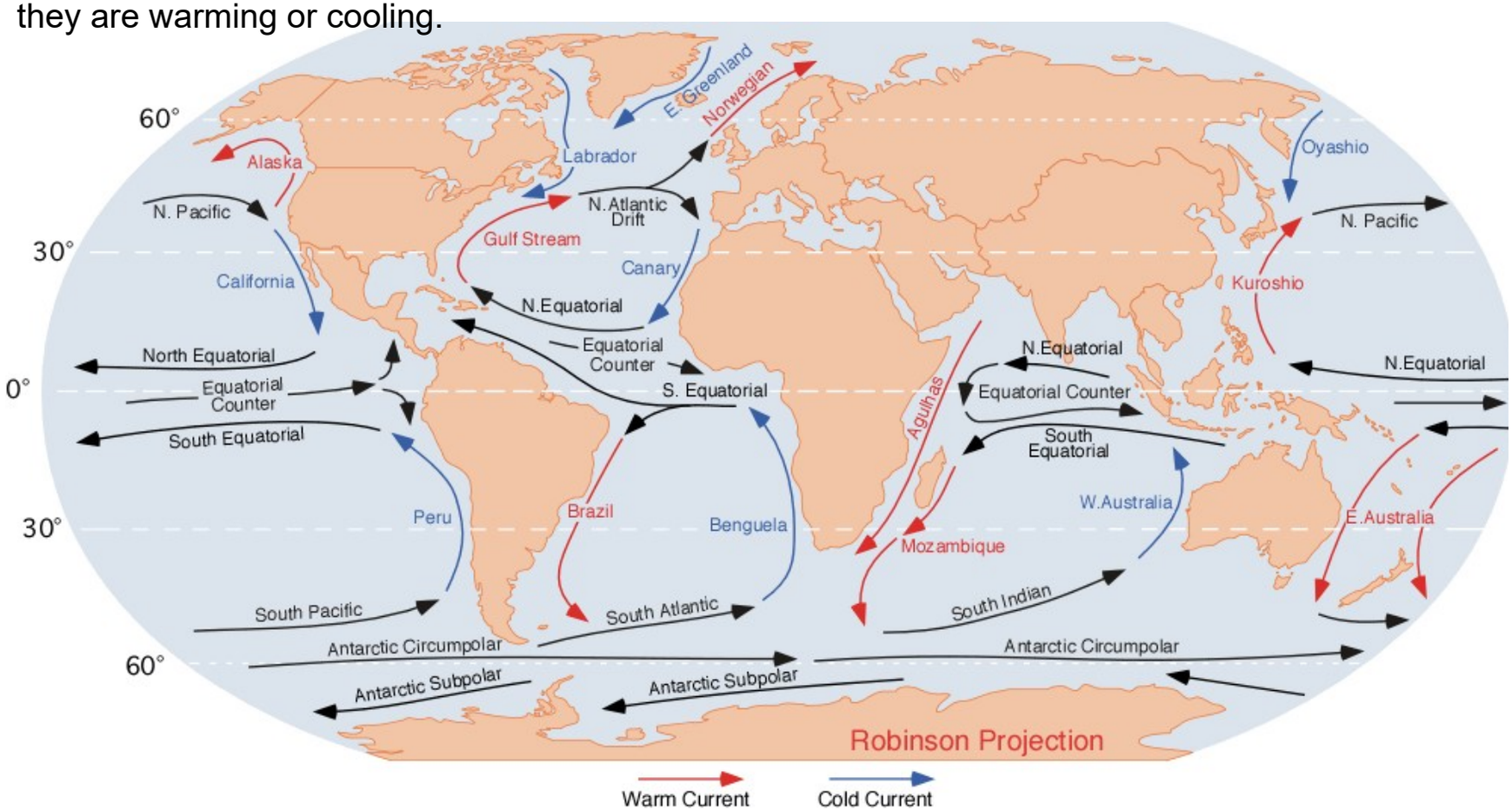
the current was previously closer to the equator and flowing away from the equator (bringing warm) or previously closer to the poles and flowing away from the poles (bringing cold)

Notice the rotation direction north of the equator. The currents rotate clockwise due to the coriolis effect. Notice the rotation direction south of the equator. The currents rotate counter-clockwise due to the coriolis effect.

all warm (red) currents flow away from the equator, they bring warm water to where its colder

all cold (blue) currents flow away from the poles, they bring cold water to where its warmer

all other (black) currents don't flow north or south, they don't bring warm or cold water, rather they are warming or cooling.



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Warm air rises and cold air falls.

Similarly warm water rises and flows near the surface, and releases heat into the air.

Cold water sinks and flows deep below the surface

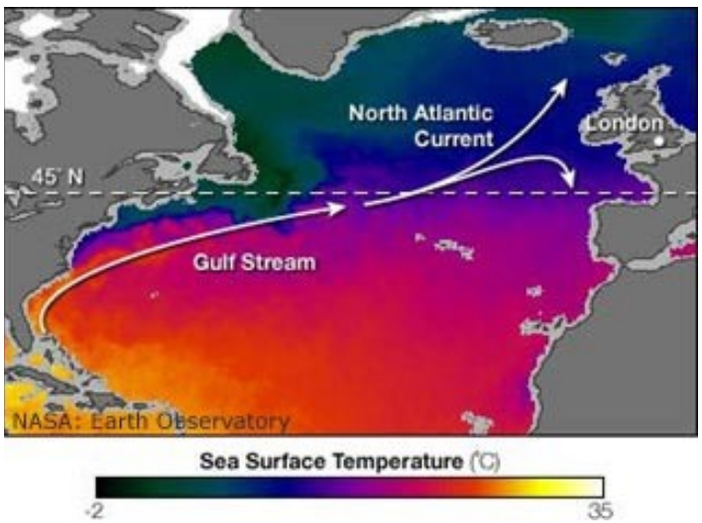
This creates a very dynamic system in the ocean called the OCEAN CONVEYOR BELT

The most important ocean current to our weather here in Saskatchewan, the rest of Eastern Canada and also in Western Europe is the GULF STREAM

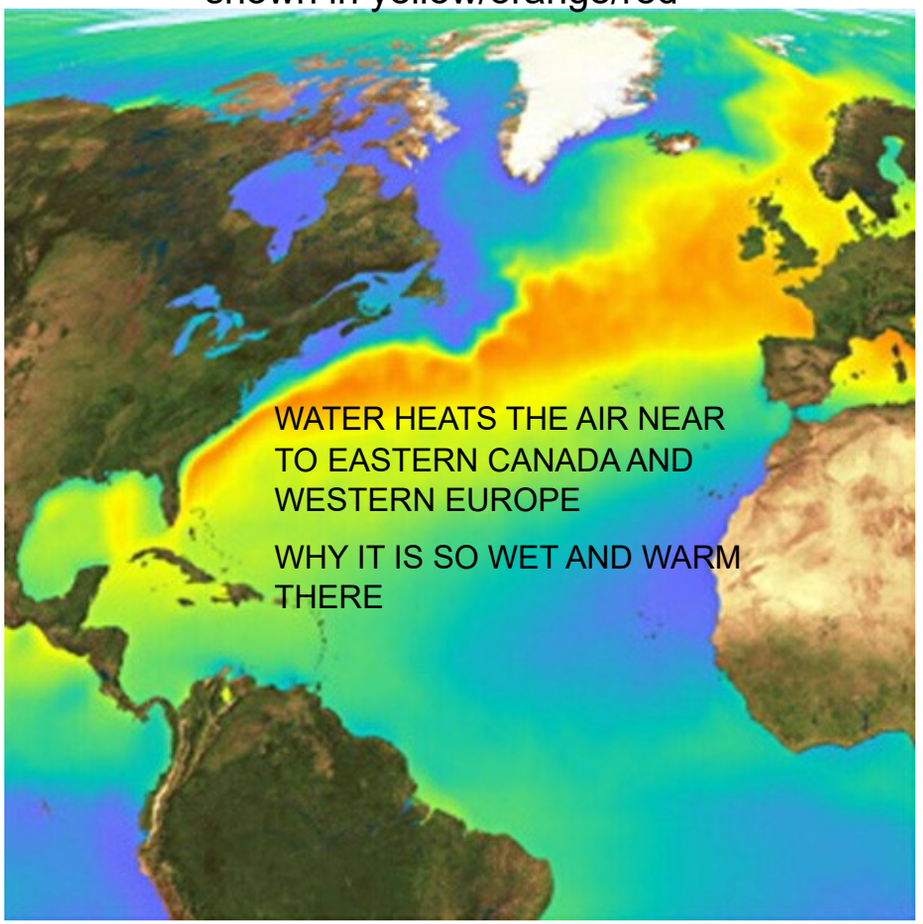
THE GULF STREAM

The gulf stream is the reason why England, France, Spain, and the rest of Western Europe is so warm all year round despite being really far north of the equator.

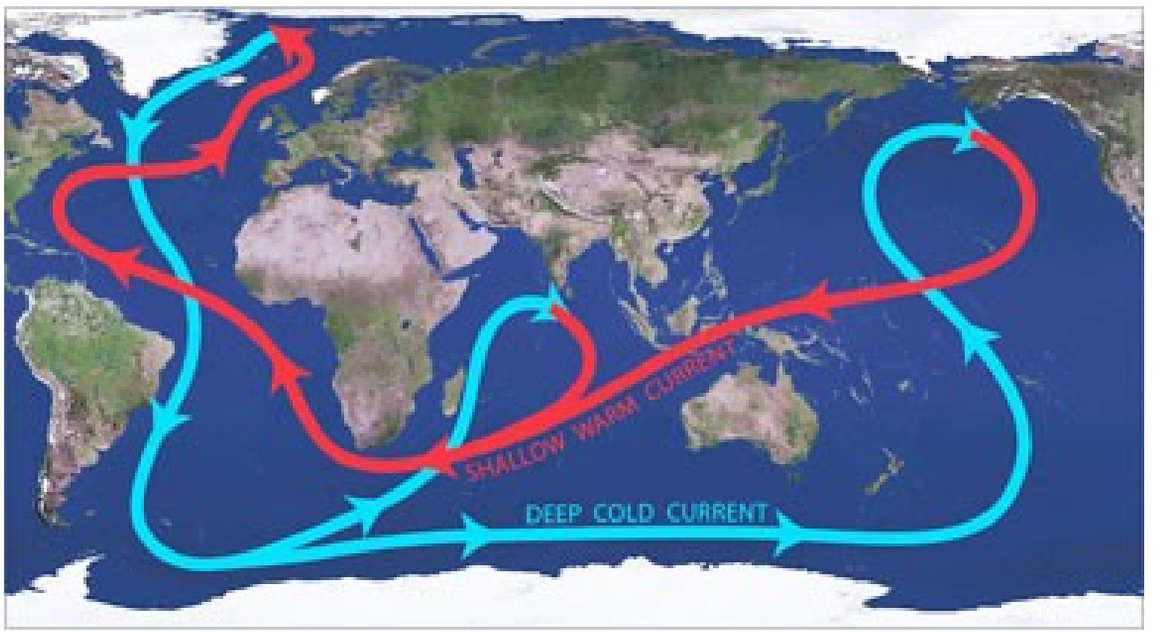
Water Temperature



Areas where water heats the air are shown in yellow/orange/red



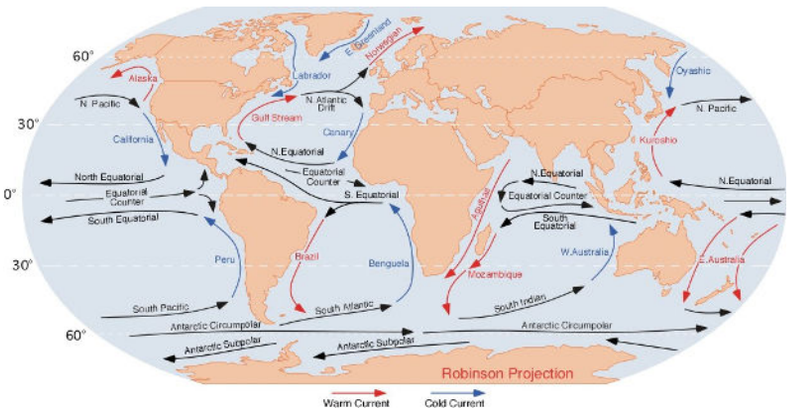
THE OCEAN CONVEYOR BELT (AKA THERMOHALINE CIRCULATION (temperature and salt)) and THE GULF STREAM

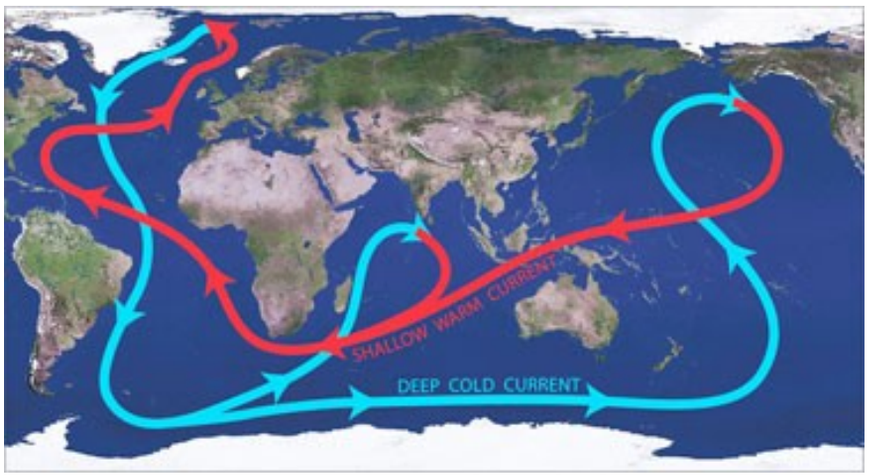


Ocean Currents are all connected

Al Gore on the Gulf Stream and Melting Ice

very difficult to perfectly connect these two models...so we won't try to do that here in Sci10





However, please be aware that **all ocean currents are connected and changes to one ocean current affects all ocean currents on the planet**