

Ocean Currents

Ocean Currents & Climate

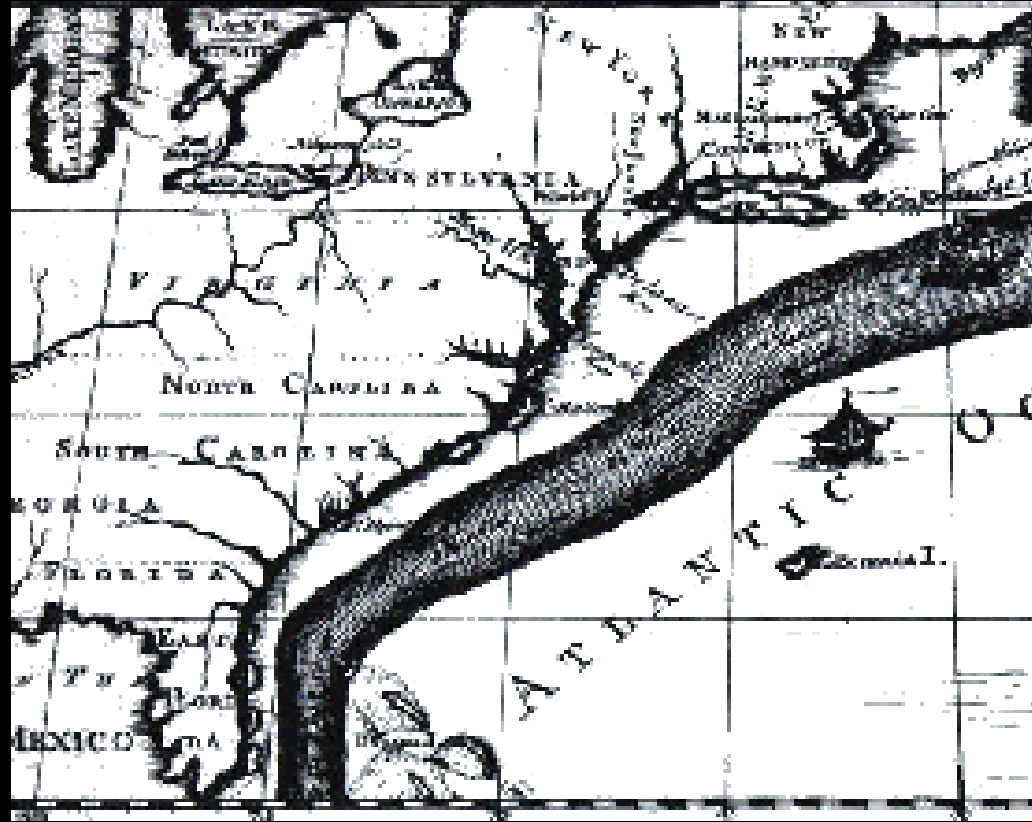
How do the oceans affect our climate?

- Solar energy is absorbed by both atmosphere and oceans
 - Oceans cover 70% of Earth's surface, so absorbs a lot of energy from the sun!
 - Store energy in the form of heat
- Ocean's water is constantly moving
 - Movement of water = currents
 - Help to circulate heat throughout planet

Did you know...

- Sailors have known about these currents since ancient times

Ben Franklin's
map of the
Gulf Stream



Finding Nemo – Riding the EAC (East Australian Current)

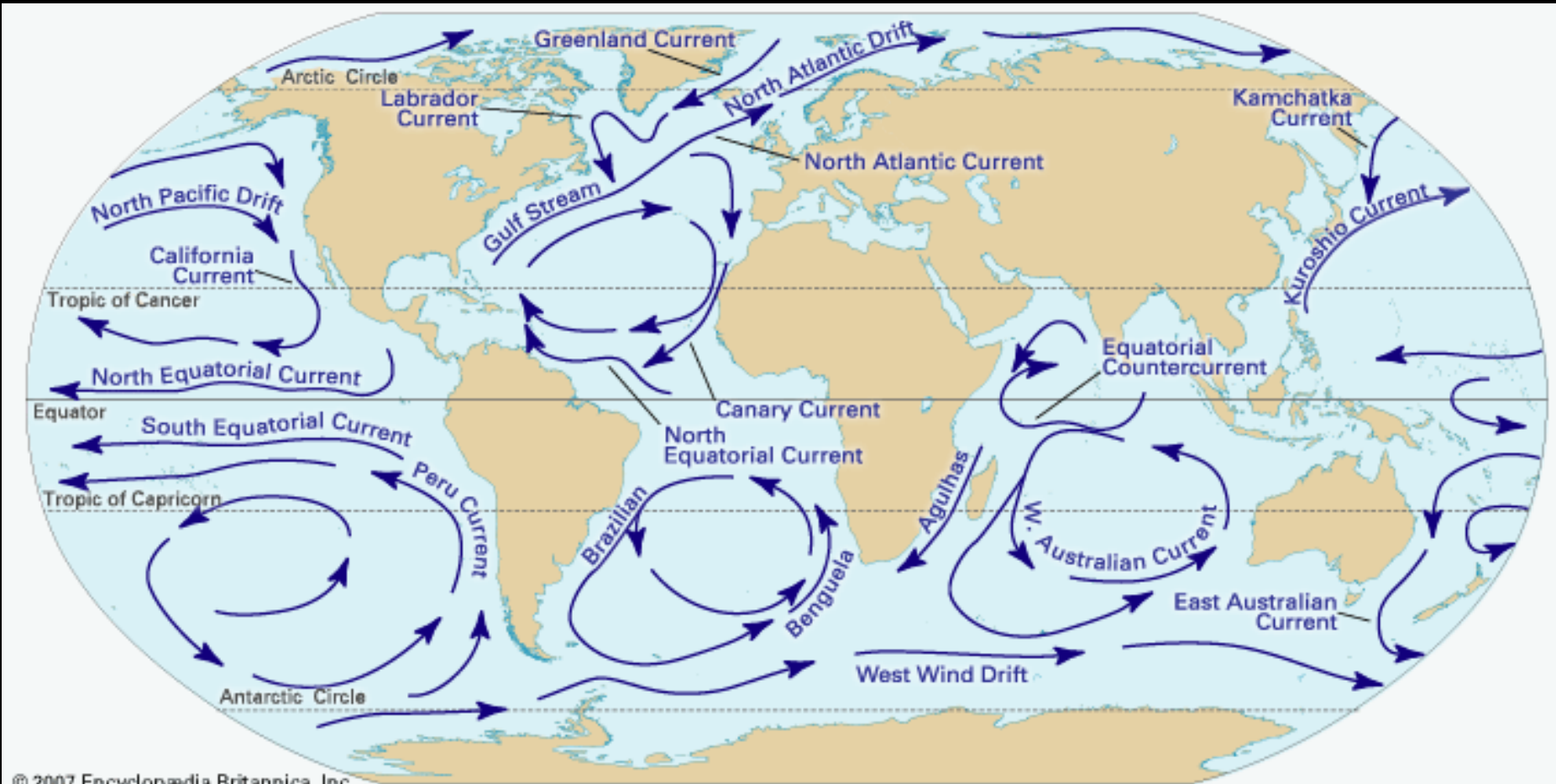
EAC

Does an ocean current really look like that?

In reality...



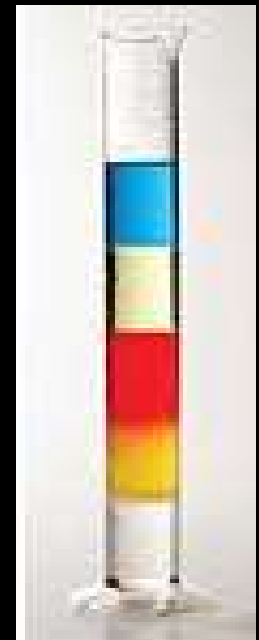
Ocean currents
move water at a
rate of about 1
m/s, or 2.2 mph



Causes

What affects the movement of ocean water?

- The same things that affect wind currents in the atmosphere also affect ocean currents
 - Convection (hotter water near equator to colder water near the poles)
 - Coriolis Effect (rotation of the earth)
- Salinity – saltiness of the water
 - Affects density of ocean water (density column)



Salinity of Water

http://www.youtube.com/watch?v=w_8mw-1HYFg

Types of Currents

What are the 2 types of ocean currents?

- 2 types of ocean currents
 - Surface: driven by wind
 - Deep water: driven by density

Surface currents

- Top 100m of water
- Wind blowing over the ocean can move water due to friction
- Coriolis effect: currents in N. hemisphere rotate clockwise, in S. hemisphere rotate counter-clockwise

Wind drags along surface, pulling water along in the same direction



Review of Coriolis Effect

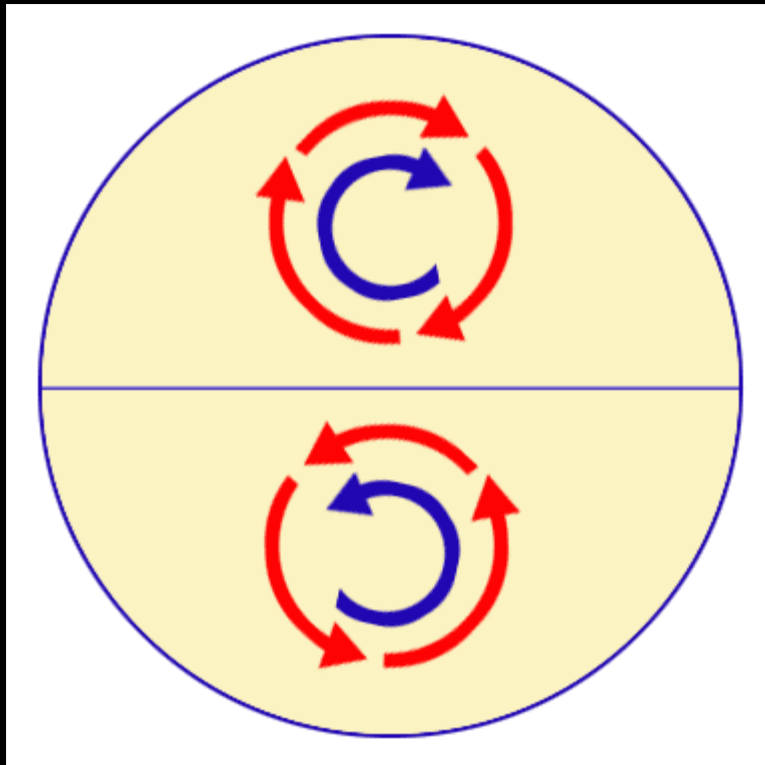
<http://www.youtube.com/watch?v=Wda7azMvabE>

<http://www.youtube.com/watch?v=pWNuBR7Sre0>

<http://www.youtube.com/watch?v=iv5WL1W4-WI&NR=1>

http://www.lghs.net/ourpages/users/dburns/scienceonsimpsons/Clips_files/Coriolis.m4v

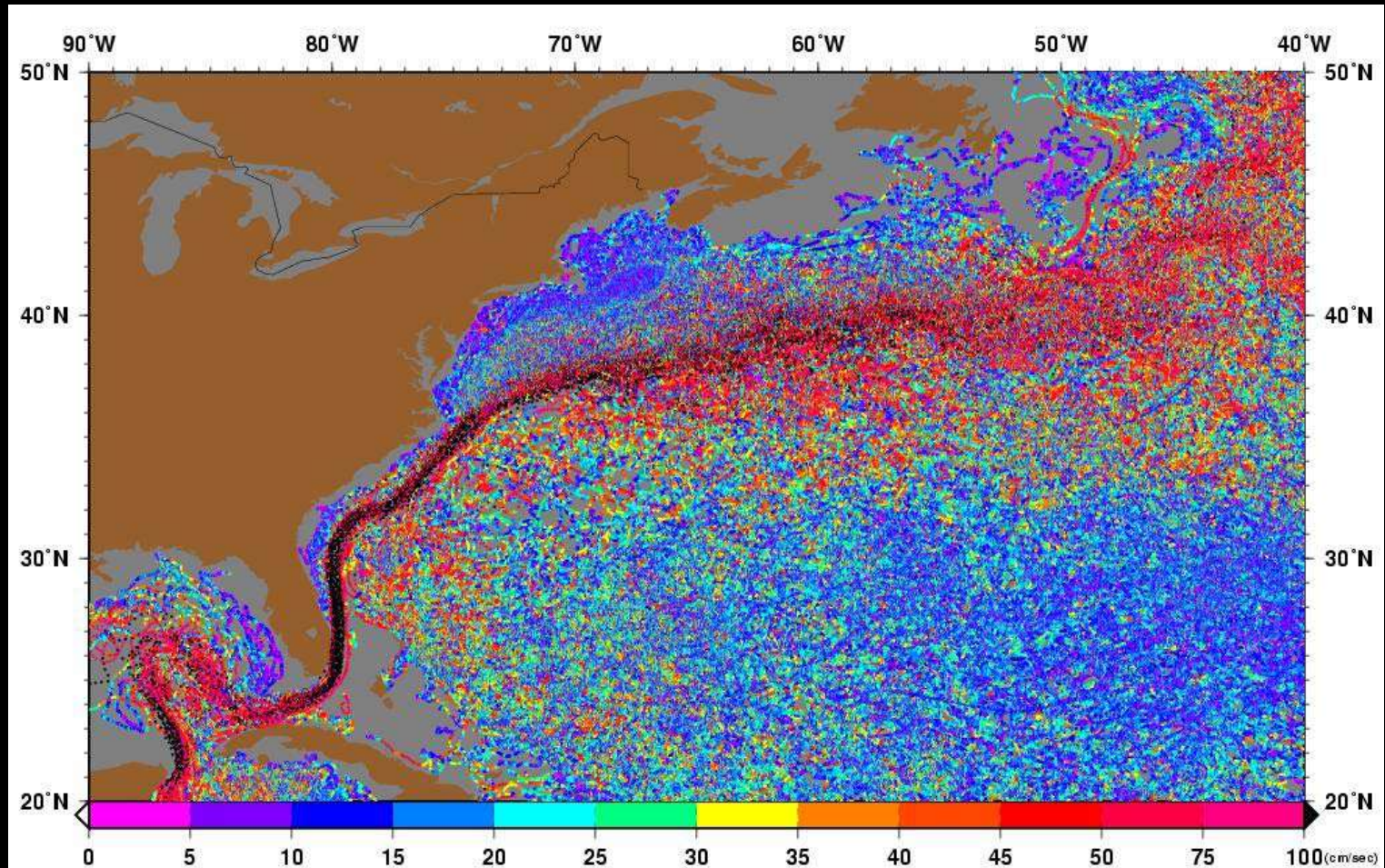
Gyres - *large circular, wind-driven,
oceanic flow*



Northern hemisphere -
clockwise

Southern hemisphere -
counter clockwise

Gulf Stream

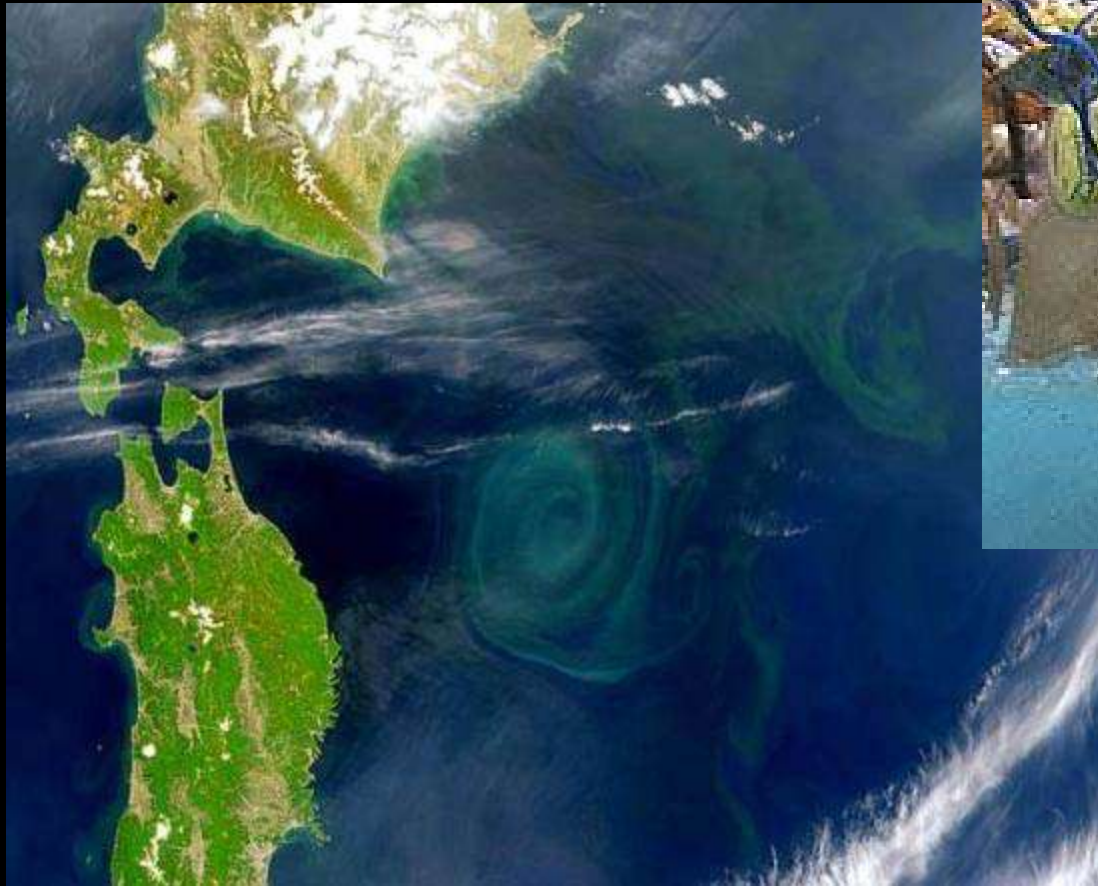


Oil Spill 2010

<http://www.youtube.com/watch?v=4Yevt9bFgEc>



Pacific Garbage Patch



Approx. 46,000
pieces of floating
trash per square mile

Ocean Circulation

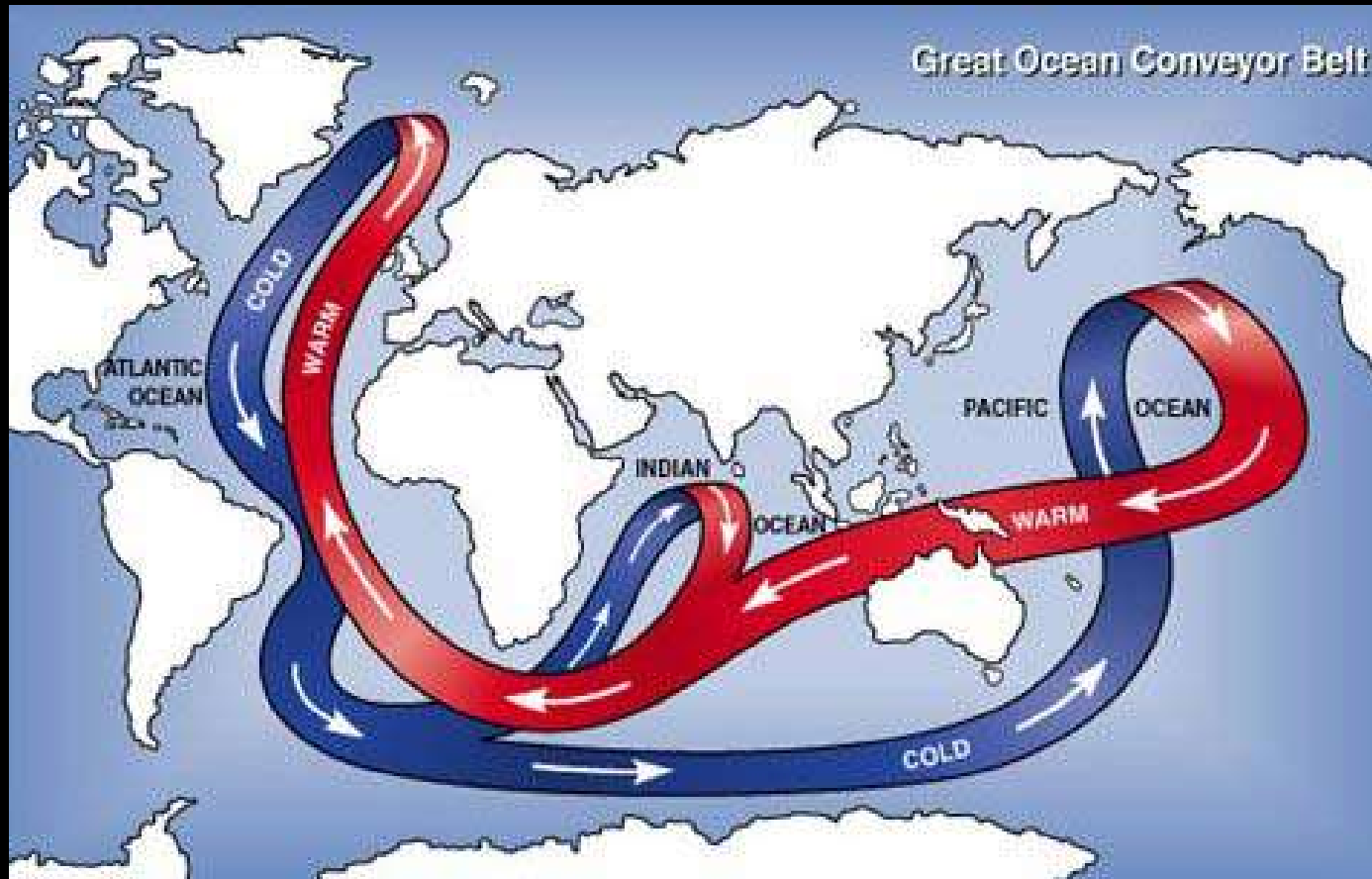
What are the 2 types of ocean currents?

Deep water currents

- aka “Great Ocean Conveyor Belt”
- Movement caused by different densities in water due to temperature and salinity



Click below to see how this works



Ocean Circulation

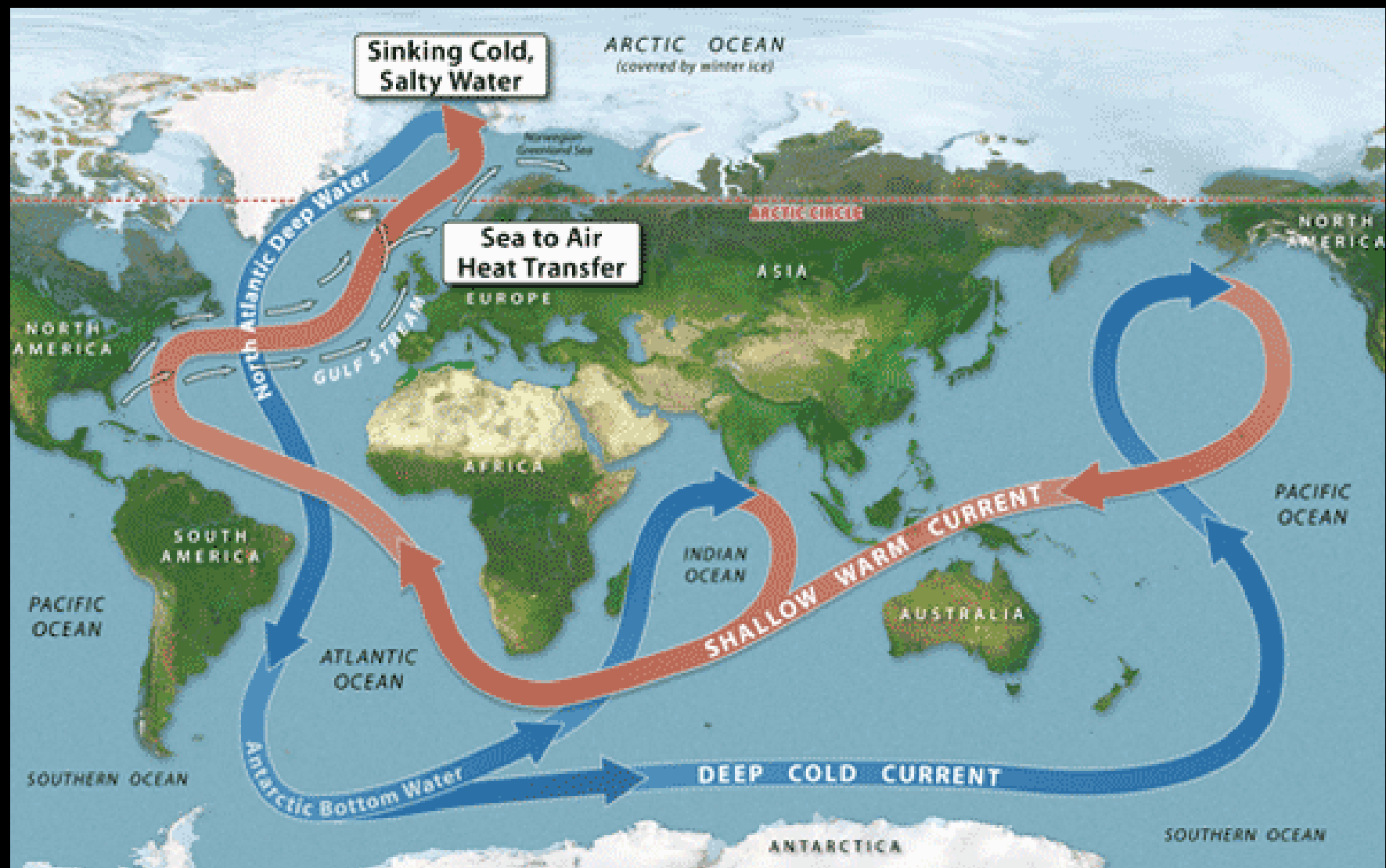
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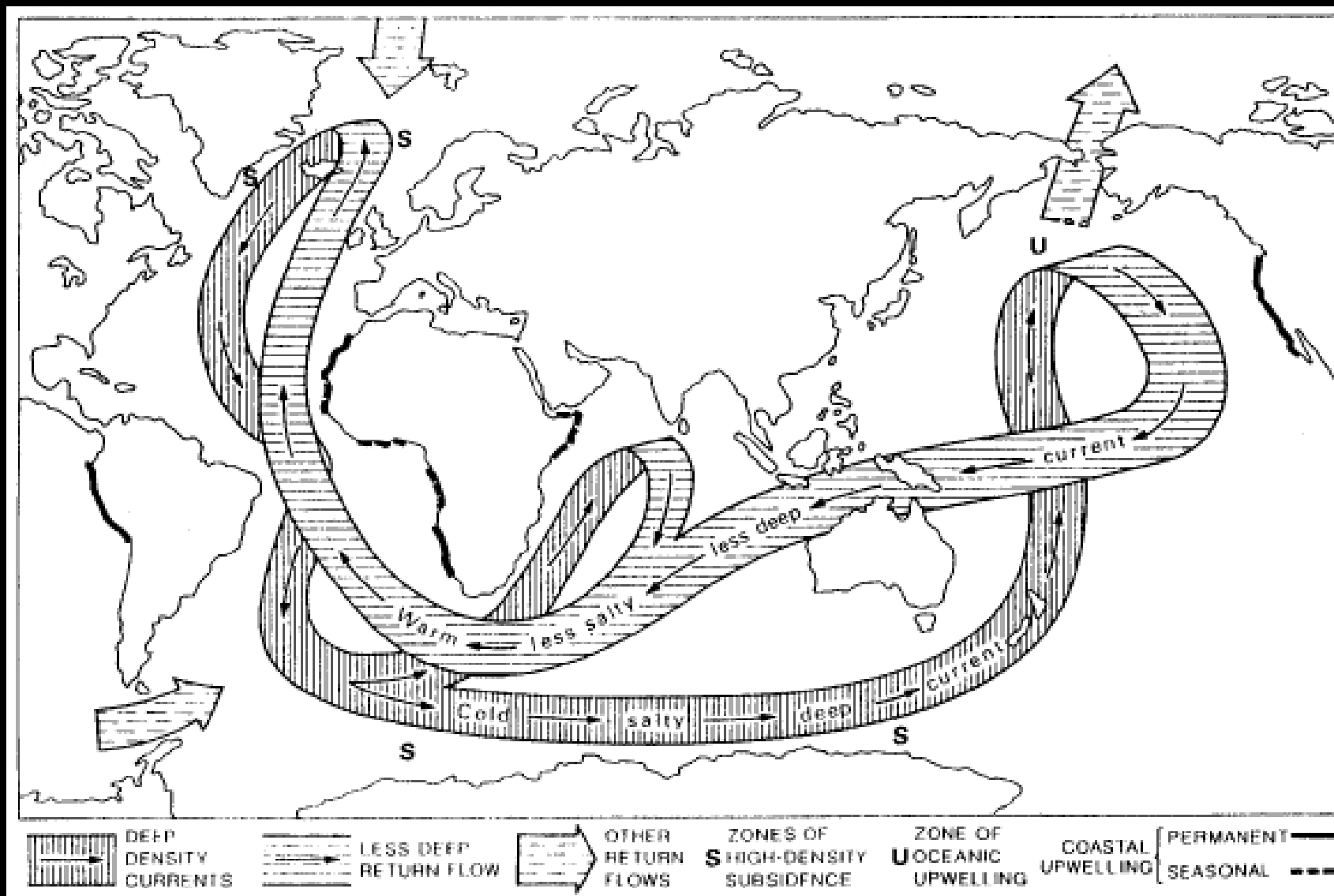
Deep water currents

- aka “Great Ocean Conveyor Belt”
- Movement caused by different densities in water due to temperature and salinity
- Hot less salty water rises because it's less dense
- Cold salty water sinks because it's more dense

Remember This?

<http://www.youtube.com/watch?v=02NRKzelmXYE>





Ocean Circulation

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Deep water currents

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- Thermohaline (thermo = heat, haline = salt)

Ocean Currents Song

[Bill Nye - Ocean Currents Song](#)