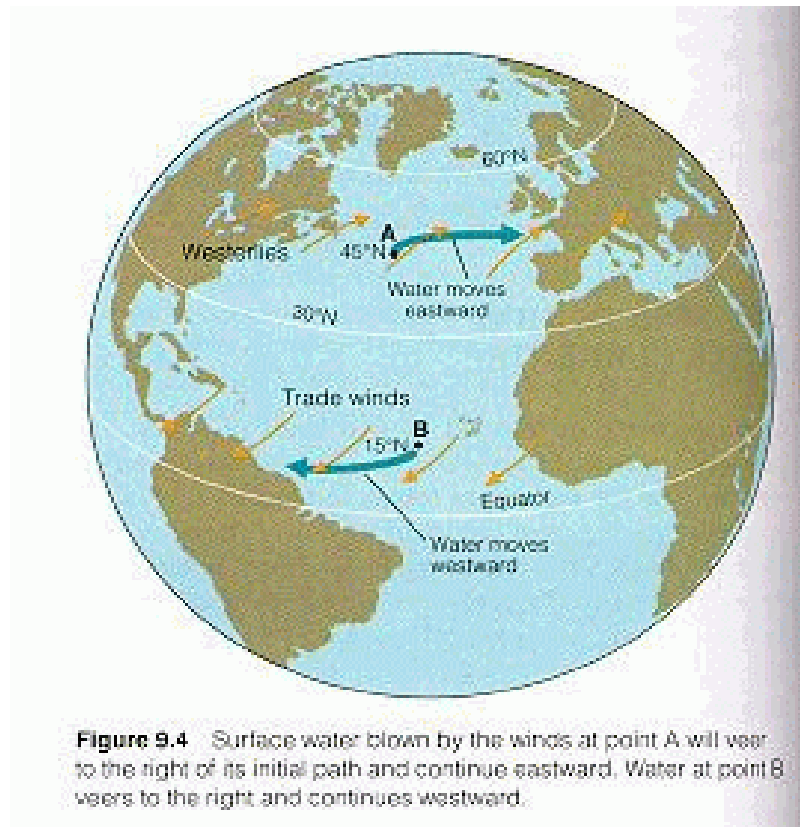


## MAJOR OCEAN CURRENTS

large volumes of water at the equator, absorbing direct radiation of the Sun  
ocean currents spread this energy around the world  
warm currents tend to travel to colder regions of the world (the poles) and  
the colder ocean water tends to travel to the equator and become warmed

## CAUSES OF OCEAN CURRENTS

solar heating, convection currents, winds, Coriolis effect, heat capacity of water, density of water due to salt concentration  
water at the equator received direct rays of the sun and becomes warmed  
less dense  
this starts convection currents, moving the warm water away from the equator, both north and south  
as warm salt water evaporates, the salt is left behind, making the water more dense so that it sinks  
this warm water is replaced by the cooler water from below  
the sinking dense, salty water creates deep water currents as well  
the prevailing winds at the water's surface tend to push the water, while the Coriolis effect causes the path to twist  
near continents currents are turned by the edge of the continent  
the circular pattern created by these currents is called a gyre  
the currents on the west side of a gyre are narrow and faster moving (about 6.5 km/h) due to the eastward rotation of the earth  
currents on the east side of a gyre are wider and slower moving (about 1.1 km/hr)  
only the one ocean current, called the Antarctic Circumpolar current, travels all the way around the world without continents turning it from its path



## Science 1206 Notes - **Weather**

### EFFECTS OF OCEAN CURRENTS

water's high heat capacity causes it to warm up and cool down slowly

the coastal areas of some northern countries can be warmed by a current

which has picked up heat at the equator, losing that heat slowly as it travels north.

e.g. Norway's harbours do not freeze in winter, St. John's Nfld is warmer in winter than Ottawa

warm air holds more moisture, cold air holds less

air above a cold current will be dry, helping to create desert-like conditions on nearby land

(e.g. Atacama Desert of Peru)

air above warmer waters will be moist, forming clouds and large amounts of precipitation (e.g. Brazil's rain forests)

air above a warm current is less dense, creating a low pressure system

### **Formation of Clouds**

air containing water vapour is cooled below a critical temperature called the dew point

the resulting moisture condenses into droplets on microscopic dust particles

in the atmosphere

air is normally cooled by expansion as it rises (temperature is cooler and air pressure is lower)

### **Convective Clouds**

air near the ground absorbs energy from heated surfaces, becomes warmer, less dense and rises, carrying water vapor with it

air reaches higher altitude where pressure is lower - expands and cools

water vapour condenses, forming clouds

common near equator, area with low winds, low atmospheric pressure

### **Frontal Clouds**

form where leading edge (front) of a large moving mass of air meets another mass of air at a different temperature

warm air mass is less dense and usually has more water vapour

warm air moves over cold/cold moves under warm

the warm air mass rises, expands, cools so that moisture in it condenses and forms clouds

### **Orographic clouds**

air moves up a mountain and expands at lower pressure and cools

moisture condenses in the colder air, producing clouds

if the rain or snow in the clouds falls on the way up the mountain, the air falling down the other side of the mountain will be dry

### **Fog**

actually a cloud forming near the ground

moisture condenses as air is cooled (eg air over the ocean moving over the land).

### **Classification of Clouds**

By shape - **cumulus** = puffy; they grow vertically    **Stratus** - flattened; they grow horizontally

By altitude:    **Cirrus** = high-level clouds    **Alto** = mid-level clouds    Low level clouds - no prefix

**Nimbus** clouds = rain-bearing clouds

eg. Cumulonimbus = puffy rain clouds

Altostratus = Mid-level flattened clouds