



Air Pressure



Pressure is force exerted on an area from all directions; in gas it is related to collision of molecules

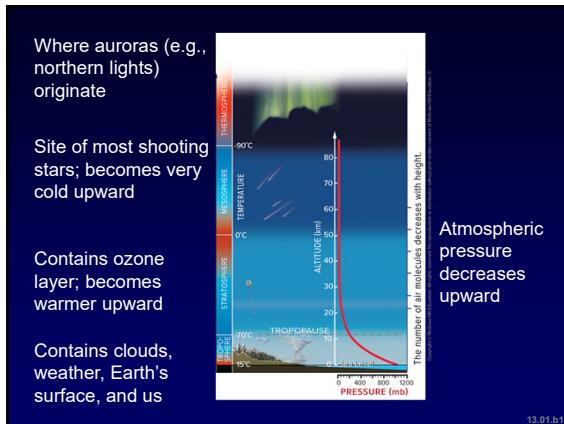
- Compress gas into a smaller volume = more collisions/area (P)



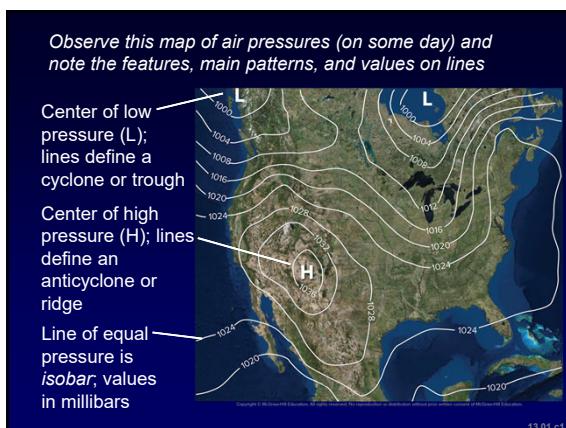
Starting with the middle cylinder, if gas is heated, molecules are more energetic, so more collisions and higher pressure

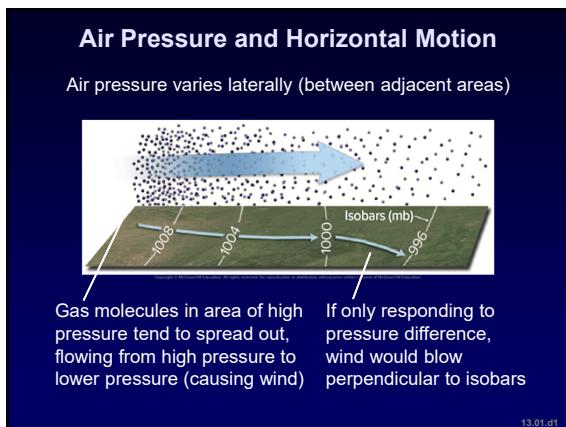
If gas cools, molecules are less energetic, so fewer collisions and lower pressure

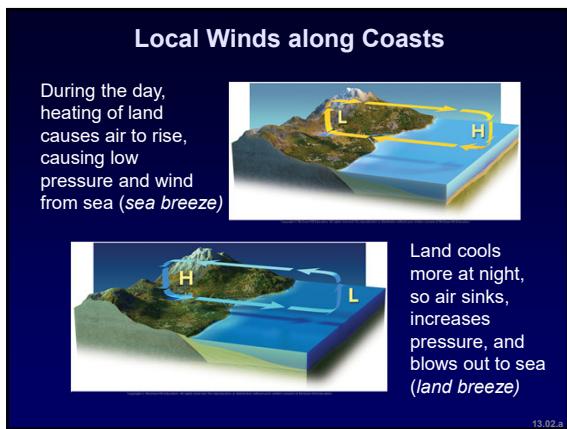
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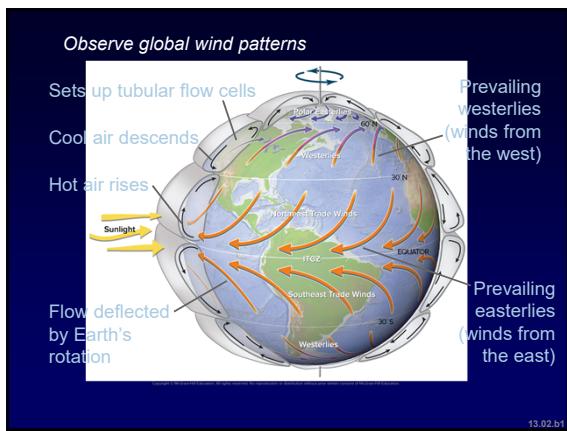




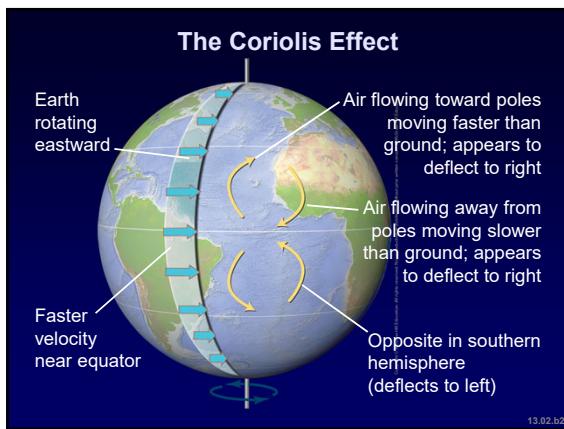


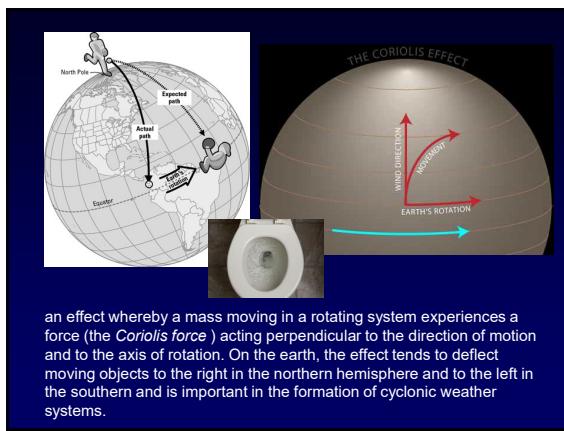


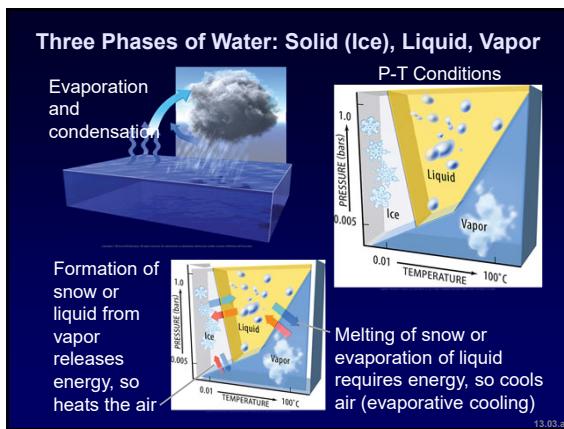


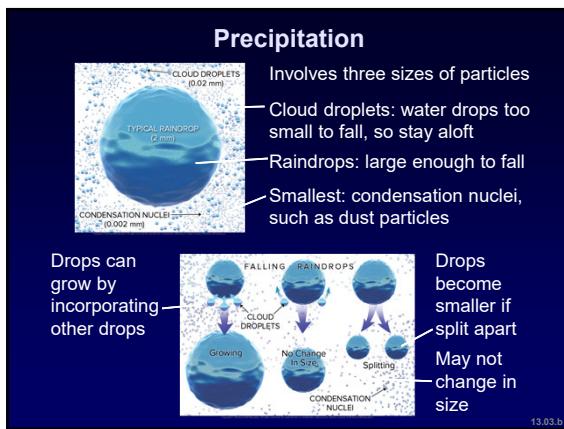


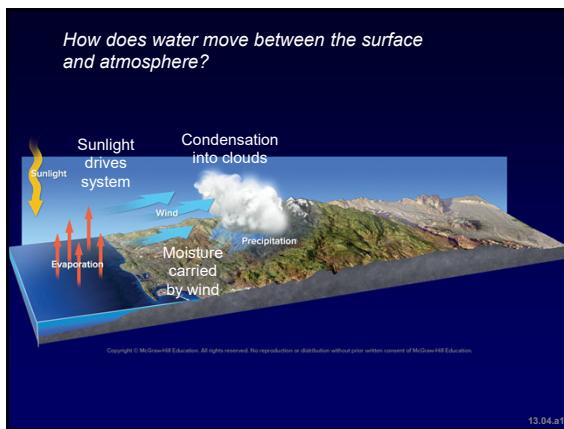


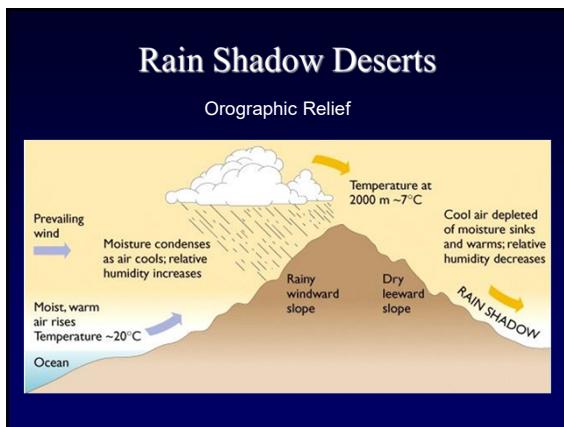














Cold Front

Fronts are boundaries between two types of air masses, such as a warm, humid one and a cold, dry one.

Cold front: cold air moves and displaces warmer, moist air.

Cold air lifts warm air, forming clouds and precipitation.

Clouds

Location of cold front on surface is shown as a blue line with triangles pointing in the direction of movement.

13.04.b1

Warm Front

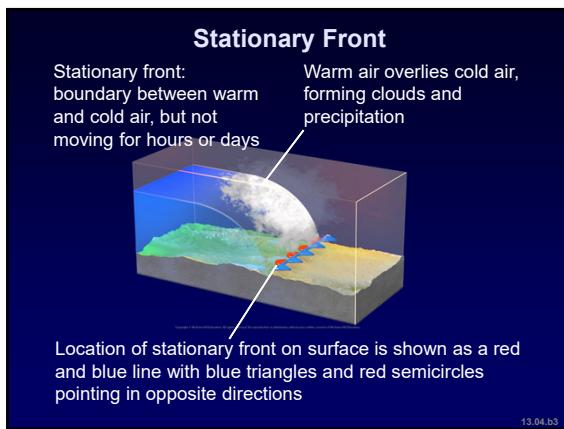
Warm front: warm air moves and displaces colder air.

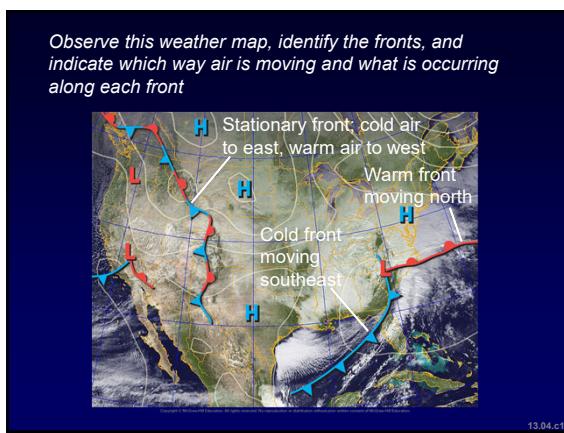
Warm air rides over cold air, forming layered clouds and precipitation.

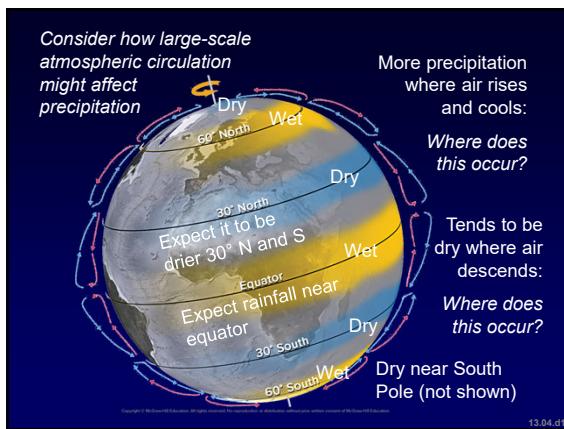
Clouds

Location of warm front on surface is shown as a red line with semicircles pointing in the direction of movement.

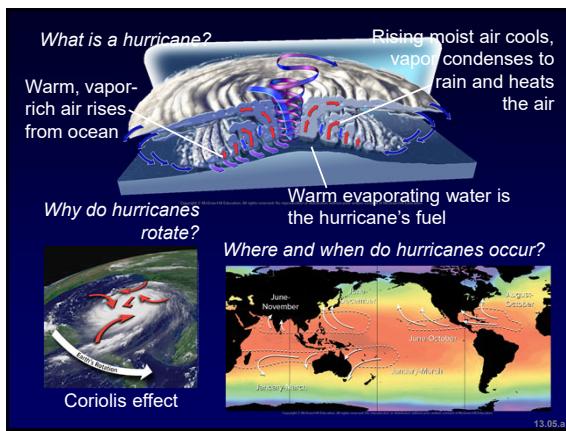
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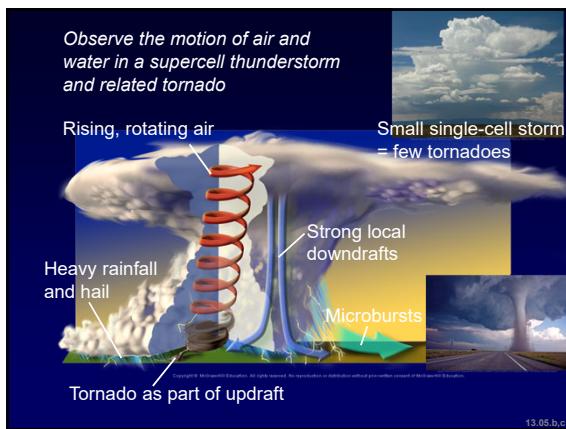


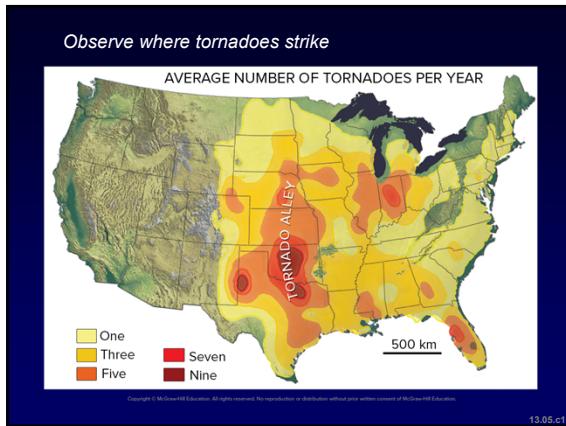


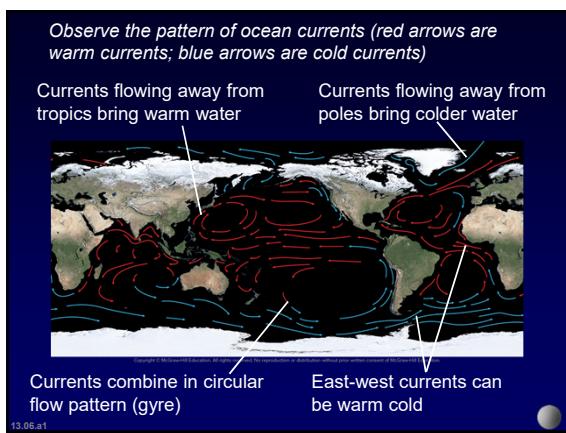


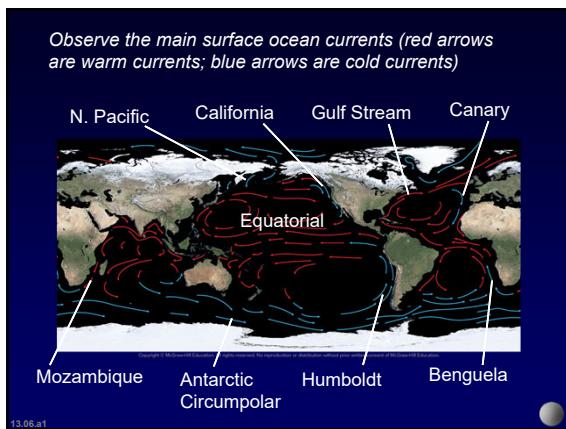


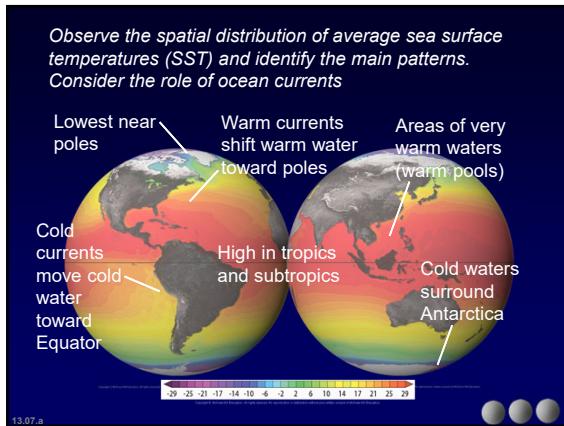












Observe the spatial distribution of average sea surface temperatures (SST) and identify the main patterns. Consider the role of ocean currents

The diagram illustrates global ocean currents and their effect on sea surface temperature. The left panel shows cold currents moving cold water toward the Equator, with a label 'Lowest near poles' pointing to the Arctic. The right panel shows warm currents shifting warm water toward the poles, with a label 'Areas of very warm waters (warm pools)' pointing to the subtropics. A central label indicates 'High in tropics and subtropics'. Arrows point from the labels to the respective regions on the globe.

Thermohaline Conveyor

Global circulation of surface and deep waters driven by temperature and salinity

Saline surface water in N. Atlantic sinks and flows south at depth

Cold, deep water upwells in N. Indian Ocean and N. Pacific; surface flow returns to Atlantic

Important to global climate

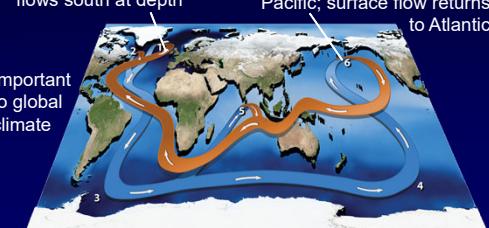
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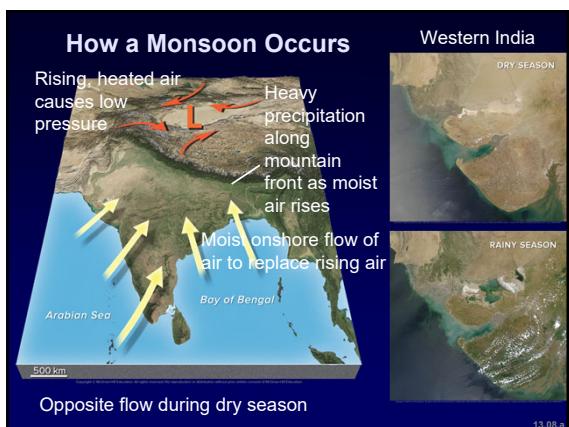
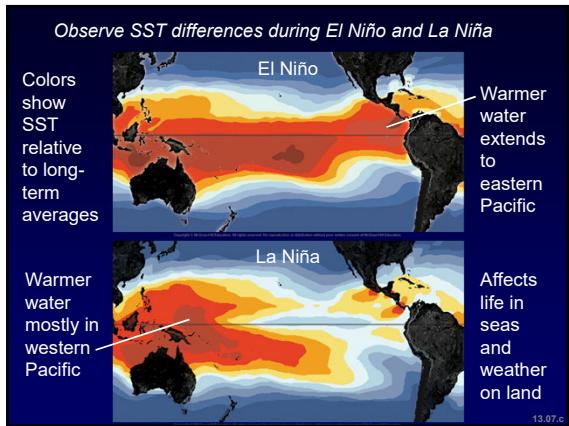
The diagram consists of two parts. The top part shows a 3D map of Australia with a red arrow labeled 'Warm current from tropics' pointing towards the continent. Another red arrow points inland from the coast, labeled 'Prevailing easterlies bring warm, moist air to land'. The bottom part shows a 3D map of the North Atlantic with a red arrow labeled 'North Atlantic currents' pointing westward. A blue arrow points northward, labeled 'Prevailing westerlies'. A pink arrow points eastward, labeled 'Warm Gulf Stream current'.

How Ocean Currents Affect Temperatures on Land

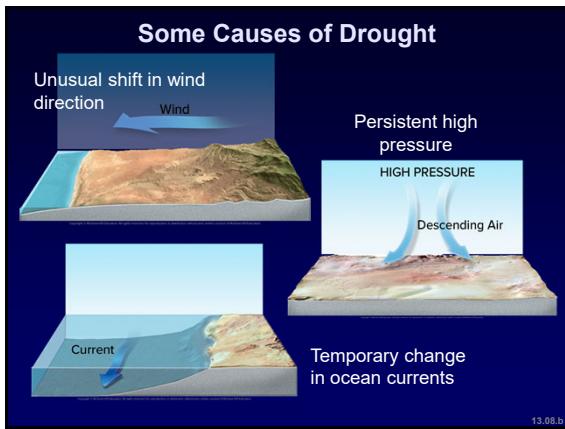
A 3D perspective map of Australia. The terrain is depicted in shades of brown and green, showing the Great Dividing Range running along the eastern coast. A prominent red arrow points diagonally across the map from the top right towards the bottom left, indicating a movement path or trend line.

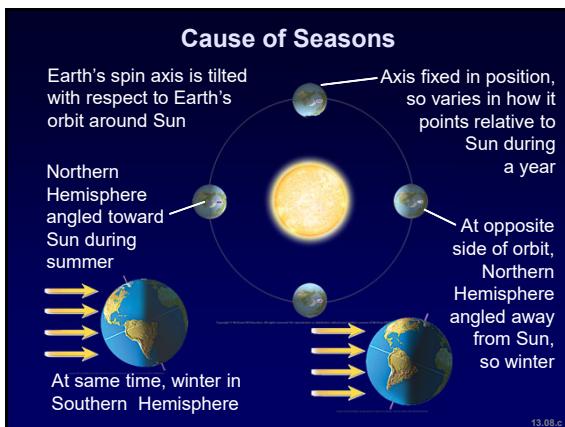
- Warm current from tropics
- Prevailing easterlies bring warm, moist air to land

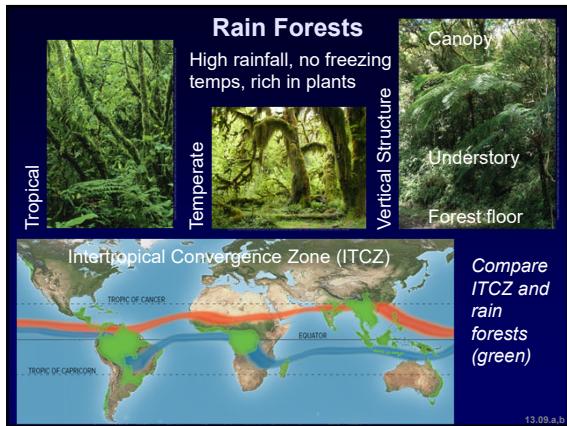
North
Atlantic
currents



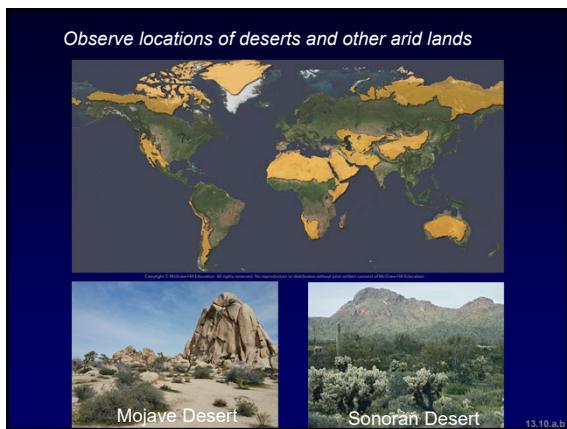




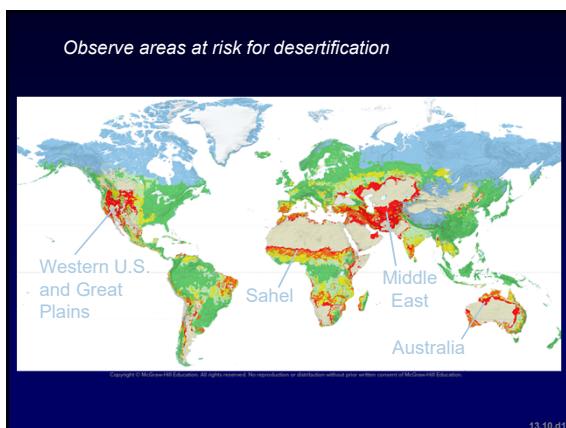


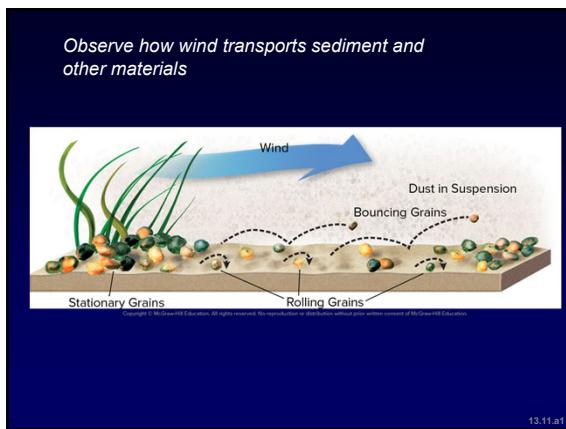






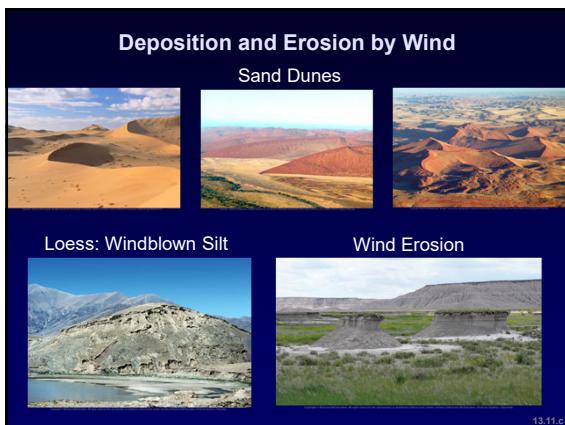






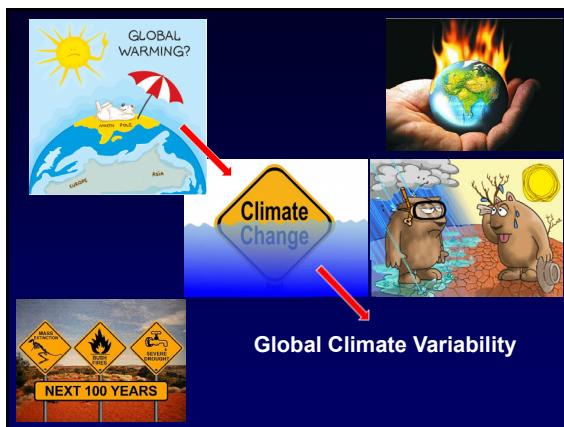


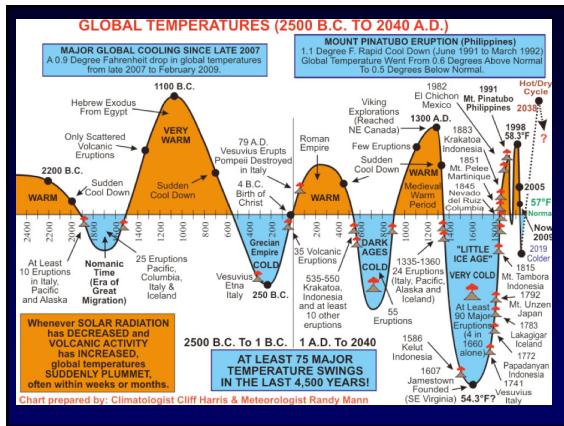
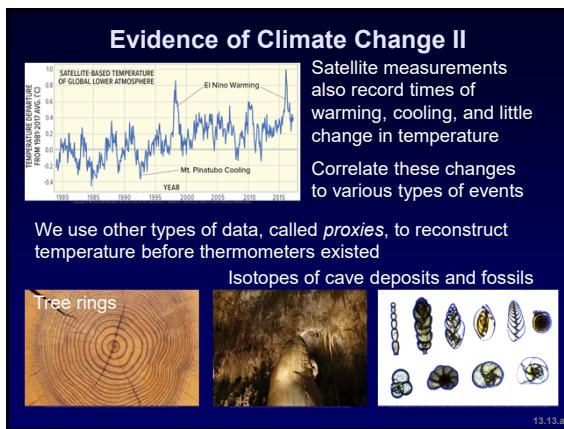
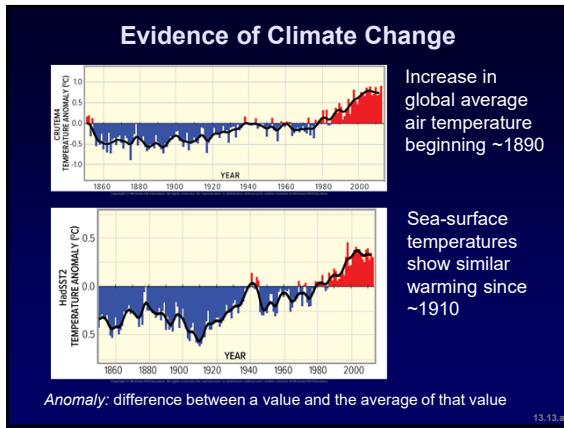


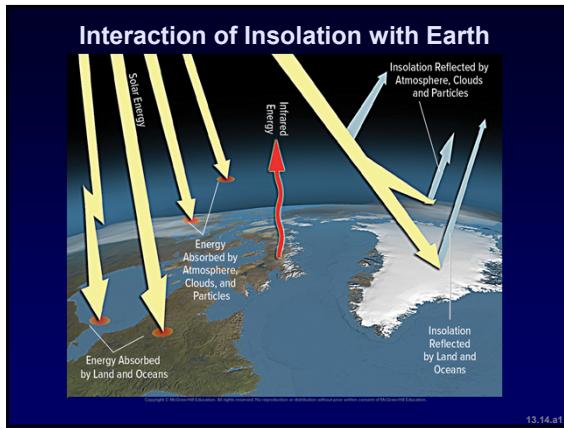


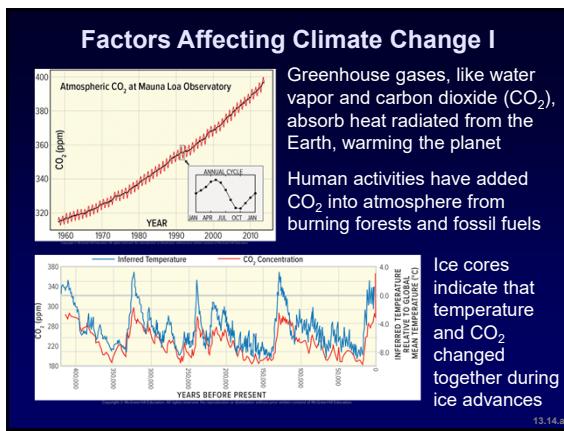


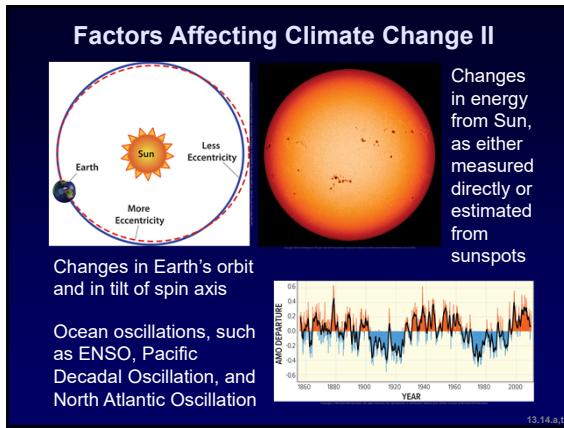


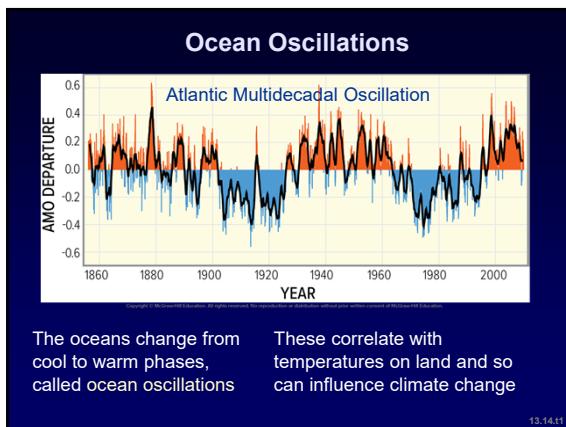




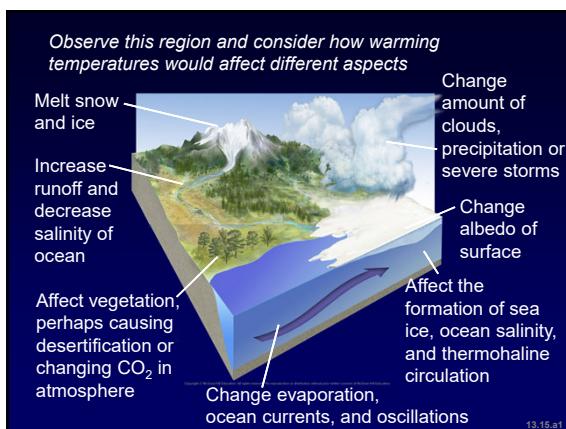






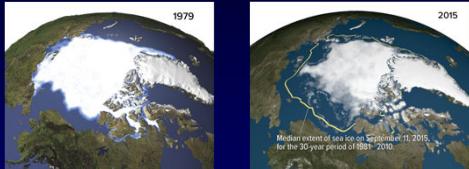






Implications of Climate Change

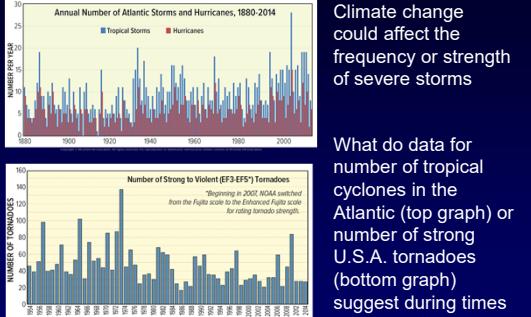
The computer-generated images below depict the decrease in sea ice in the Arctic between 1979 (left globe) and 2015 (right globe), while the planet was warming



Melting of sea ice does not affect sea levels but does decrease the albedo of the surface, habitats of arctic creatures, and the salinity of underlying sea water (which can affect the thermohaline circulation)

13.15.a

Climate Change and Severe Weather



Climate change could affect the frequency or strength of severe storms

What do data for number of tropical cyclones in the Atlantic (top graph) or number of strong U.S.A. tornadoes (bottom graph) suggest during times of rising temperature?

13.15.b

How Plate Tectonics Affects Climate



Mountains influence regional climates

Changes in seafloor spreading affect sea level



Volcanoes release gas and dust

13.16.a



