

Natural Factors affecting Climate



A. The Sun: (p.214-15)

1. Solar Cycles: the amount of solar energy varies over time

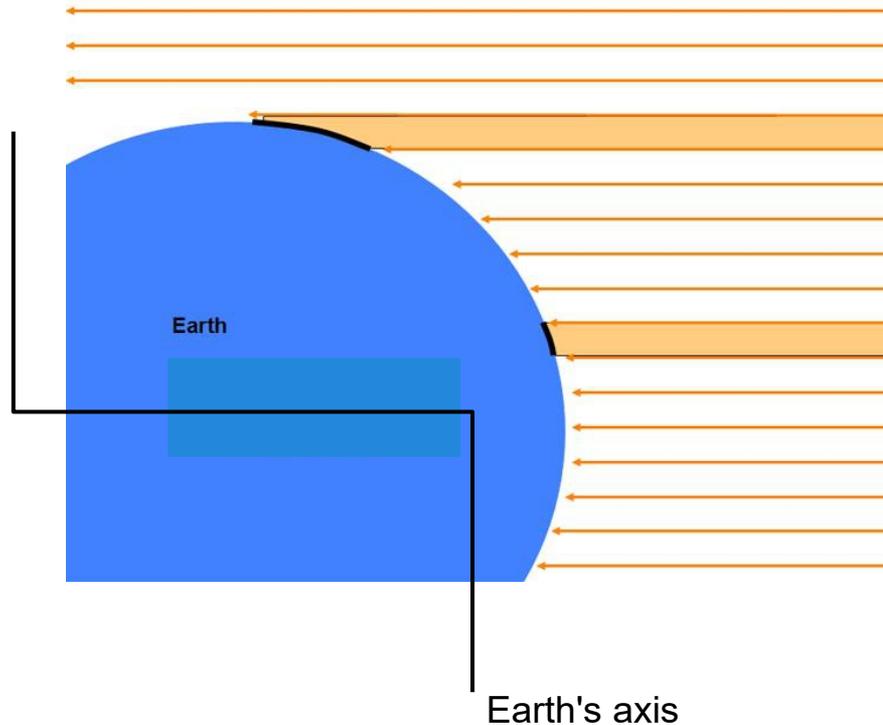


10 min minimizes CO2



2 min evidence

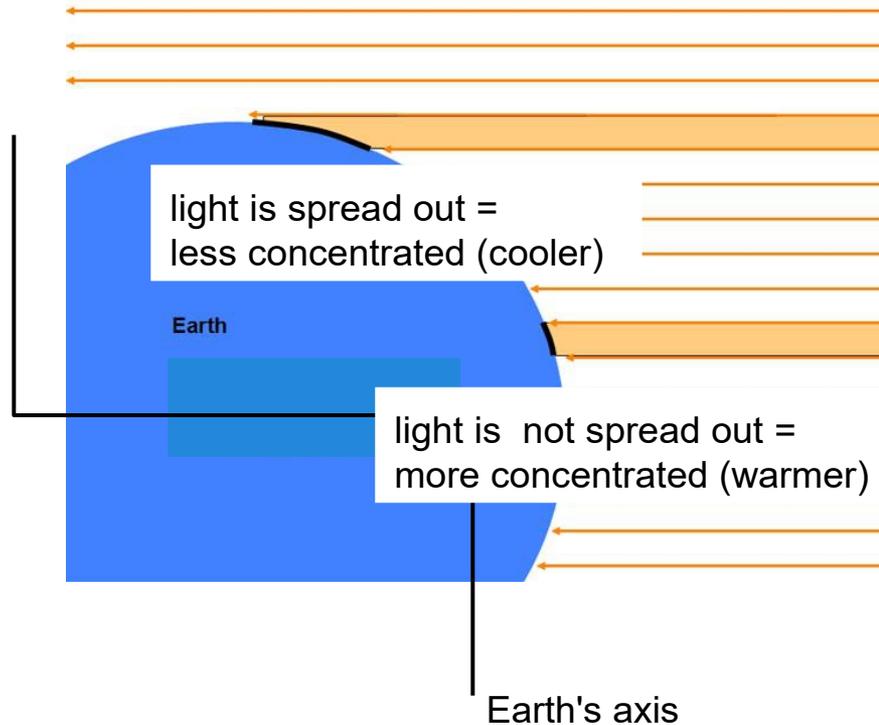
2. Earth's Curved surface: the concentration of light energy that warms the surface is unequal



2. Earth's Curved surface: the concentration of light energy that warms the surface is **unequal** (*see handout*)

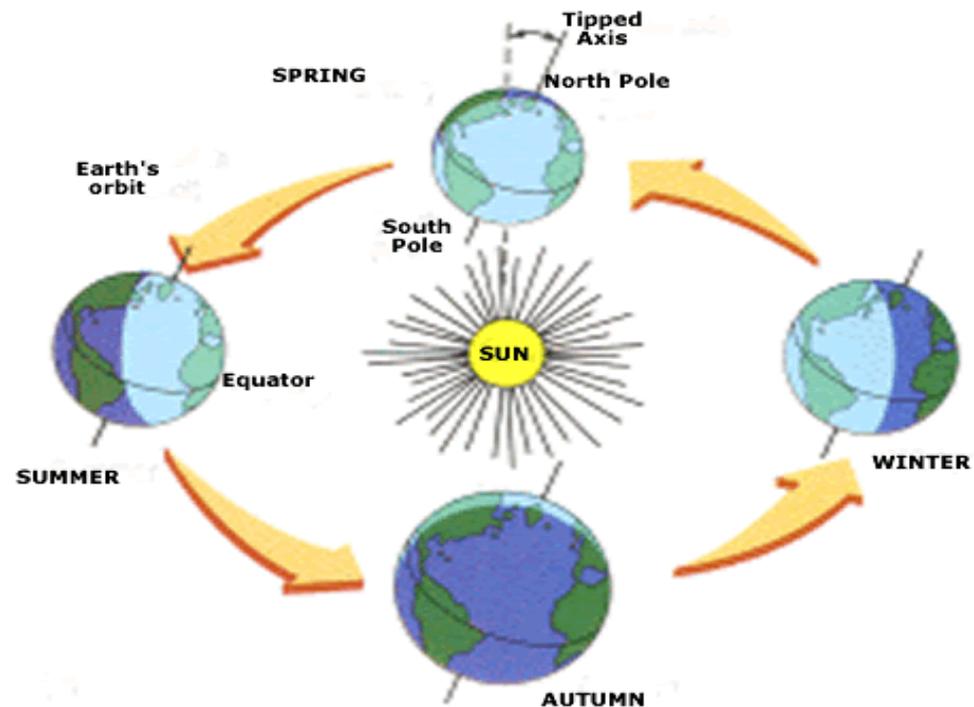


2 min

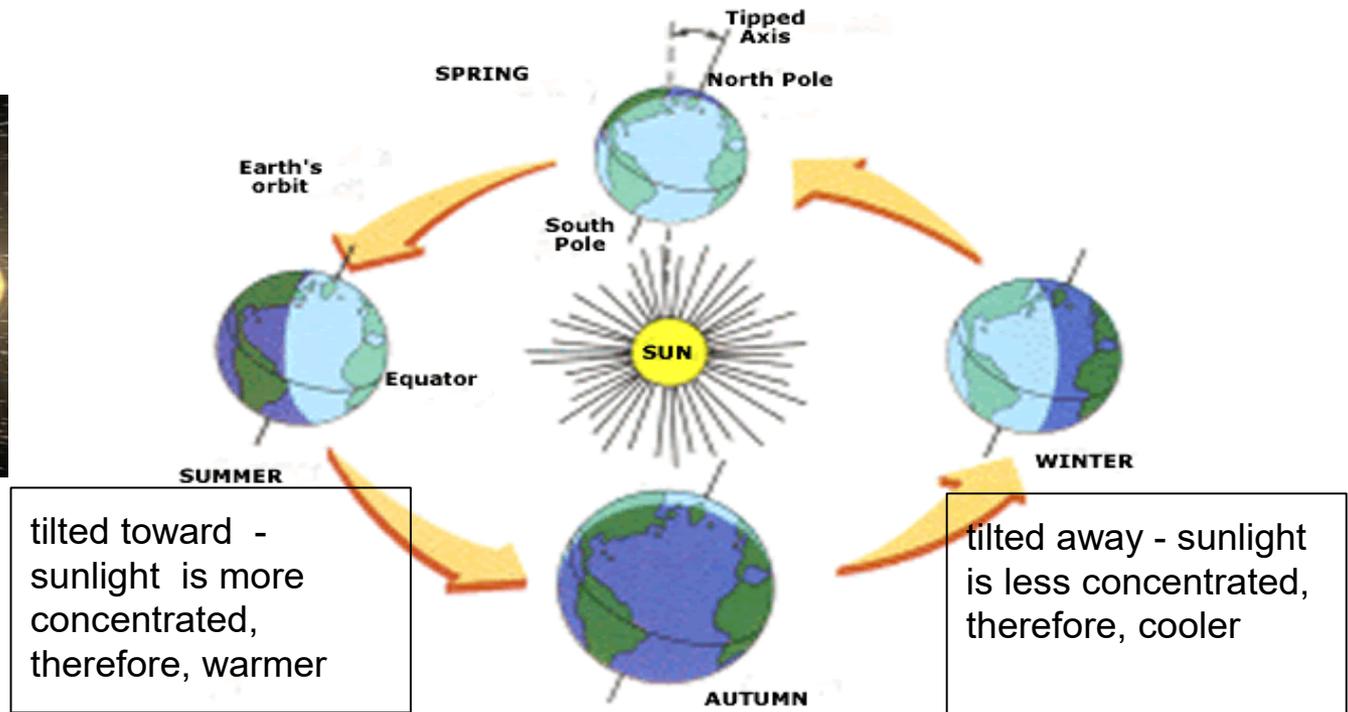


3. Earth's Tilt: If the Earth is tilted **toward** the sun (**summer**) it is warmer than when it is tilted **away** from the sun (**winter**)

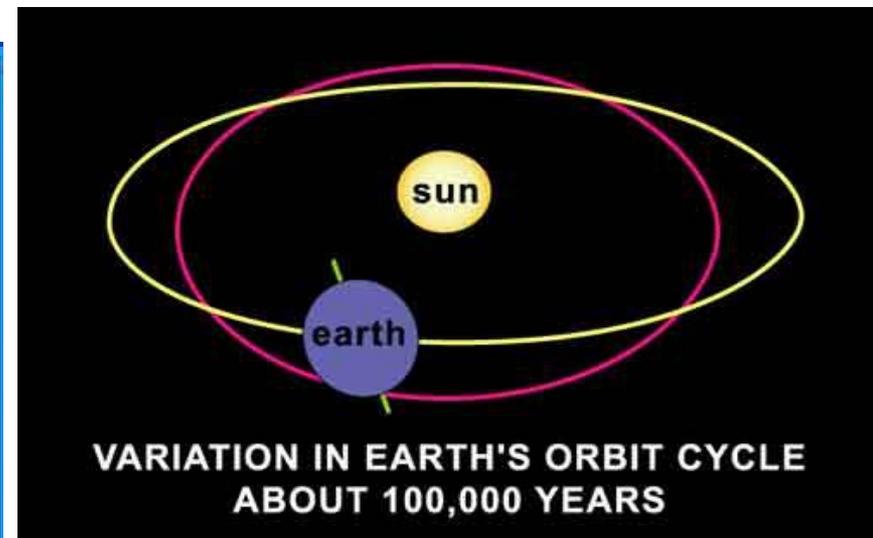
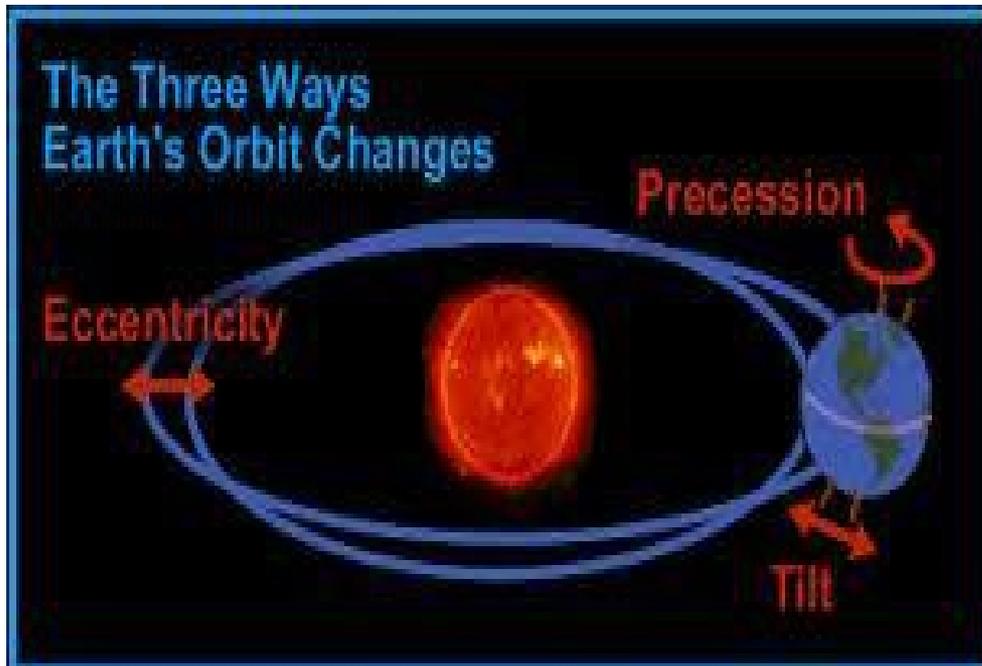
(see handout)



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4. Earth's Orbit: the **shape** of Earth's orbit changes over 100 000 years which changes how **close** the Earth is to the Sun



B. Hydrosphere (p.220)

The **hydrosphere** includes all the **water** on Earth (**oceans, lakes, rivers, ice, and water vapour**)

How does it affect climate?

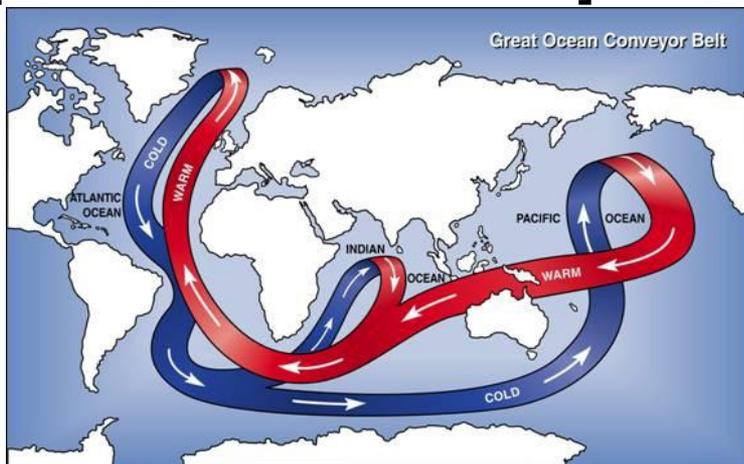


1. **Heat Sink**: water has a *high* heat capacity which means it can **absorb** large amounts of **heat** before its **temperature** rises. Thus it stores a lot of **energy** which it can release later. This **moderates** the climate around large bodies of water.

B. Hydrosphere

- Carbon Sink**: **Phytoplankton** (plants) and **algae** in the ocean absorb **CO₂** (greenhouse gas) from the atmosphere.
- Ocean Currents**: **Warm water rises** and **cool water sinks**. This motion coupled with winds and the Earth's spin move water and energy around the Earth. (see fig. 3.14 p.221)

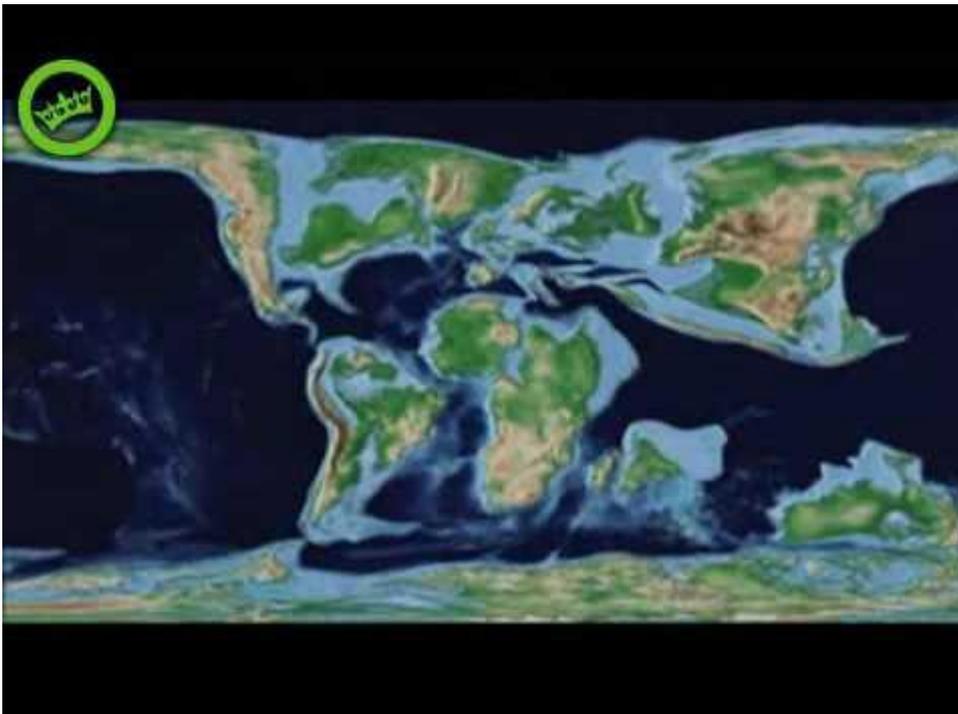
[El Nino and El Nina]



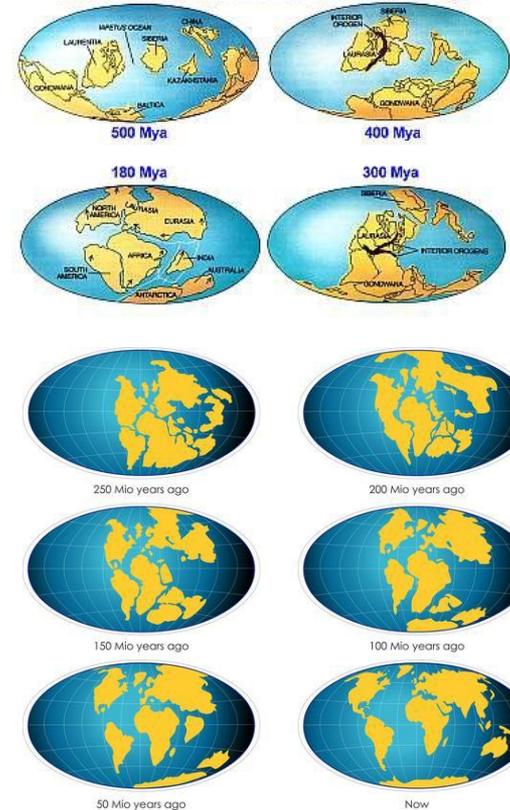
C. Lithosphere (Moving Continents) (p.222 - 223)

1. Location: Continents have moved over Earth's long history. Their location affects **air** and

water



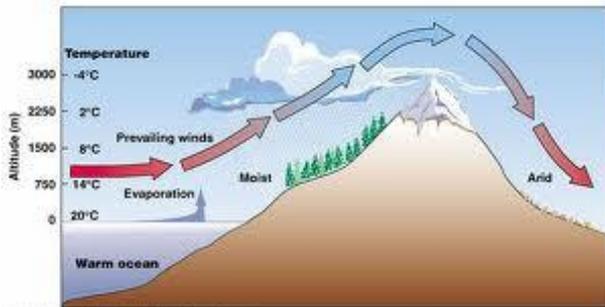
continental drift before 200 million years ago



C. Lithosphere

2. Mountains and Volcanoes: Moving continents produce mountain chains and volcanoes.

- Mountains: affect **temperature**, **wind** and **precipitation** patterns



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- Volcanoes:
 - **dust** and ash **reflect** sunlight which causes **cooling**
 - gases contribute to **greenhouse** effect which causes **warming**