

Past Climate Patterns & How do we know the past climate?

The Past: Earth's climate does change over long periods of time. Why? (Section 8.9)

Generally:

- 1) Plate Tectonics – land masses move. These affect ocean and wind currents which affect climate.
- 2) Sun – amount of energy it gives off fluctuates.

Definite Cycles (patterns)

Earth's climate naturally fluctuates between ice ages and interglacial periods (now). It looks like a pattern. (page 349) The last ice age was 20,000 years ago and global temperatures were 10 C cooler than now. Why??

- 3) Earth's orbit – sometimes round and sometimes egg-shaped (elliptical). This moves earth closer/farther away from sun. See page 350.
- 4) Tilt – earth spins on a tilted axis. The tilt varies from 22.1° to 24.5° - enough to affect seasons.
- 5) Wobble – the earth spins on a tilted axis but also wobbles (like a top losing some speed). This affects temperature and seasons too. Wobble cycle is about 26,000 years long. 1

Studying Past Climates (Section 8.11)

Humans - Meteorologists (weather scientists) have studied weather/climate for 200 years at most.
- Before 200 years ago – art gives us clues!! See Fig. 1 on page 358. "Little Ice Age"

Nature : Proxy Records = information that is stored in nature ie: tree rings, ice cores, coral reefs etc.

- 1) Ice Cores – drill down into ice – often at poles.
Trapped gas is analyzed: CO₂, methane, nitrous oxide etc. Further down = older!
'paleoclimatologists'
- 2 kinds of oxygen – the ratio gives temperature information.
- 2) Tree Rings – warm, wet year = thick tree ring.
- cool, dry year = thin tree ring.
** ancient white cedars growing on our Niagara Escarpment can be 1500 yrs old!!
- 3) Coral – similar to tree rings, but give info about oceans temperatures.
- 4) Cave formations (stalactites and stalagmites) - grow by dripping – more in wet climates.
Give clues about precipitation.

Evidence that our Climate is Changing? (movie)

- 1) changes in traditional precipitation patterns (flooding, drought)
- 2) more severe weather (tornadoes etc).
- 3) glaciers / polar ice melting