- Archive – material in which the proxy is preserved, not the proxy itself. An example of this is the tree.

- Ratios of heavier to lighter oxygen in air bubbles in ice cores from glaciers tells us how cool past temperatures were
- Heavier oxygen isotopes (^{18}O) condense faster than lighter oxygen isotopes (^{16}O). In colder temperatures, heavier isotope is depleted from air quicker
  - Less ^{18}O = cooler temp

Past Climate Change:

- 1,000 years
  - Medieval warm period: 1000-1300 AD
  - Little ice age: 1400-1800 AD
- Global climate changes naturally, happens over long time scales
- Fossil evidence = polar regions forested during Cretaceous Period
- Glacial sediments near equator suggest Earth was ice during "snowball Earth"

What Caused Climate Change in the Past?

- Climate changes throughout Earth's history can be attributed to variations in:
  - 1) Positions of continents
    - Relative to equator affects amount of solar radiation received
    - Movement of continents influences ocean currents (global heat)
    - Colliding land masses → hills + mountains → affect climate (by ↑ land surface area exposure to acid in rain, created when CO_2 dissolves in water droplets
  - 2) Atmospheric composition
    - Life forms change composition of atmosphere by adding/using CO_2
    - Hot/humid conditions promote swamps + marshes → remove CO_2 from atmosphere
  - 3) Composition of the biosphere (evolution of life)
  - 4) Earth's orbit (Milankovitch cycles)
    - MC: Variations in Earth's orbit that serve as "pacemaker" of glacial-interglacial cycles
      - a) Eccentricity of Orbit: Changes occur over 100,000-year cycle – more elliptical
      - b) Obliquity/tilt of axis: Changes occur over 41,000-year cycle
      - c) Precession: (wobble around axis of rotation) changes occur over 26,000-year cycle – THIS WAS CORRECT
    - Factor for continental glaciation = amnt of summertime insolation at high latitudes (↓ insolation → ↓ melting → ↑ glacier growth)
  - 5) Volcanic eruptions + asteroid strikes
    - 1883 eruption of Krakatoa, reduced sunlight reaching Earth + cooled ave global temperature by 1.2°C
    - Permian-Triassic extinction → volcanic activity in Siberia

AQI Calculations: