- Zipper rift earth
  - As Rodinia broke apart there is lots of local weathering, instead of global glaciation there were lots of glaciation in different places at different times.
  - Good example of scientific method, microcosm of debate.

Reading:
- Gabrielle: Snowball Earth

Long term climate: plate tectonics is IT

**Short Term climate:**
- Focus on Cenozoic cooling, progressively cooler and unstable since 65Ma (dino extinction)

Distribution never constant in time:
Orbital variations cause this distribution to change through time

Variations in solar radiation by latitude and total amount
- James Croll; Climate and time (1867).
  - Orbital properties of the planet could vary, the planet doesn't spin perfectly it wobbles and subtly affects the amount of solar radiation in one place at one time.
  - Discarded because not calculated the orbit of the planet properly
- Milutin Milankovich; Canon of insolation and the ice age problem (1942)
  - Published three paper, 1912, 13, 14.
  - Orbital calculations were correct

**Milankovitch cycles:**
Three regular cycles
- 100,000 years (eccentricity)
- 40,000 years (tilt cycle); varies between 21 - 23°
- 22,000 years (precession cycle)

Distribution of peaks matters more than the growth.

Milankovitch pacemaker:

Eccentricity causes only 0.03% variation in total annual insolation, but strong seasonal impact.

Obliquity
- The greater the angle of tilt the greater the summer-winter difference

Precession
- Impacts on the Earth-Sun distance to vary with the seasons.