



GEOLOGY 1122 HISTORY OF GLOBAL CHANGE

WALKER/PATINO-DOUCE FALL 08

pic from: Berner's Global Carbon Pattern

Reading: Chap. 10, pp. 221-237

LECTURE 2 Chemical Cycles on Earth

A. Part I: Carbon Cycle on Planet Earth

- i. Photosynthesis-Respiration and Carbon
- ii. Burial of plant debris and where the Carbon goes
- iii. How burial of Carbon affects Oxygen in the Atmosphere
- iv. How geologists know the past record of global climate change/atmospheric conditions
 - a.) Carbon Isotopes
 - Stable and radioactive isotopes
 - What are they?
 - Atomic number/mass number?
 - b.) Stable Isotopic Ratio of Carbon ($^{13}\text{C}/^{12}\text{C}$)
 - c.) Life and what type of stable Carbon isotope they favor
 - d.) If life produces carbon-rich organic tissue, and that tissue is buried, becomes a fossil/rock, what is the isotopic ratio of the carbon-rich rock? Lighter or heavier in terms of $^{13}\text{C}/^{12}\text{C}$? (Challenge question)
 - e.) If we could measure the atmosphere at the time of that rock forming, what would be the atmospheric Carbon ratio? Lighter or heavier in terms of $^{13}\text{C}/^{12}\text{C}$?
- v. How does weathering affect the global Carbon cycle?
 - bicarbonate ions, Calcium (Ca^{2+}), Magnesium (Mg^{2+}),
 - weathering continental rock high in silicates (such as Ca-SiO_2 or Mg-SiO_2).
 - Limestone what is it? Why important in global climate?
- vi. What other factors affect weathering and the Carbon cycle?
- vii. How does Plate Tectonics affect the carbon cycle on Earth?
- viii. Phanerozoic Cycle of Carbon, global CO_2 Change through time/Oxygen