

Lecture 11

Principles of Mass Balance

Simple Box Models

**The modern view about what controls
the composition of sea water.**

Four Main Themes

- 1. Global Carbon Cycle**
- 2. Are humans changing the chemistry of the ocean?**
- 3. What are chemical controls on biological production?**
- 4. What is the fate of organic matter made by biological production?**

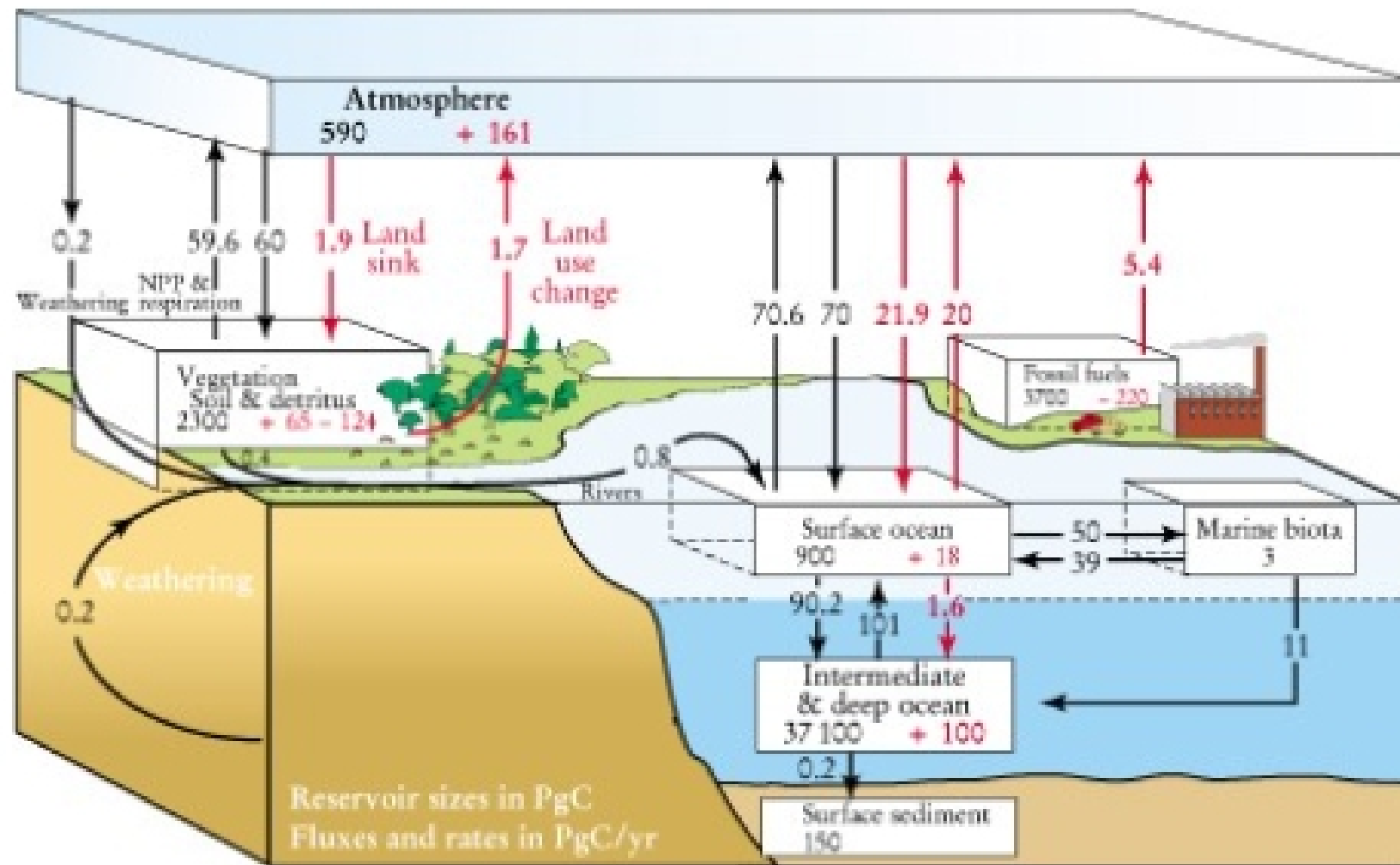
Example: Global Carbon Cycle

$$t_{\text{CO}_2, \text{atm}} = 590/130 = 4.5 \text{ y}$$

$$t_{\text{C}, \text{biota}} = 3/50 = 0.06 \text{ y}$$

$$t_{\text{C}, \text{export}} = 3/11 = 0.29 \text{ y}$$

$$t_{\text{export}/\text{biota}} = 0.27/0.06 = 4.5 \text{ times recycled}$$



No red export!