

## **EPOB 4160**

### **Final Exam Review: Major Concepts**

April 22, 2004

#### **Aquatic Biogeochemistry**

- Lake, stream, and wetland structure
- Seasonal dynamics (stratification) of temperate vs. tropical lakes
- Trophic dynamics in aquatic systems
- Redox reactions in aquatic ecosystems
- N redox states

#### **Oceans**

- Ocean chemistry (major elements, missing elements)
- Ocean Circulation
  - Driving factors
  - Global patterns
  - Links to climate
  - Thermohaline circulation
  - El Nino
    - Characteristics & consequences
- NPP
  - Patterns
  - Limiting factors
  - Biological pump
  - Redfield ratio: Define and role in nutrient status and regulation of NPP
  - N enrichment in coastal ecosystems: Causes & consequences
  - Role of dust in regulating NPP and patterns
  - The SOFEX experiments: where, why, and what they showed

#### **Water Cycle**

- Pools and Fluxes
- Sea level changes: causes & consequences
- Relationship between land use change and regional climate (e.g., tropical rain forest)
- Desertification: Causes and patterns
- “Water in a changing world”: This paper is fair game
- Water cycle links to Carbon cycle

#### **Carbon Cycle**

- Pools & fluxes
- Human perturbations
- “The Missing Sink” : This paper is fair game

### **Carbon Cycle, continued**

- Interactions between NPP, respiration and temperature
- Role of C cycle in global climate change: historical perspectives
- The greenhouse effect
- Orbital control of climate
- Positive feedbacks

### **Nitrogen Cycle**

- Pools & fluxes
- Redox reactions and microbial transformations
- Human alteration of N cycle
- The Haber process
- Patterns, magnitudes and constituents of N deposition
- Causes and consequences of acid rain: links to N cycle
- N saturation theory: processes through stage 0-3.
  - evidence
- N and species composition and functional feedbacks

### **Megafauna extinction**

- This lecture and the paper are fair game

### **P and S cycles**

- Pools & fluxes
- Contrast P to N cycle
- Ecosystem P status through time
- Microbial transformations in S cycle and other aspects
- S deposition: patterns and causes
- Atmospheric S: links to climate and acid rain