BSCI 205 (#6)

BIOGEOCHEMICAL CYCLES – CONTINUED

A. Nitrogen Cycle

1. Fixation of nitrogen

   a) Physical fixation

   b) Biological fixation

2. Three process of biological fixation

   a) by symbiotic bacteria in association with legumes

   b) by free-living bacteria in soil

   c) by cyanobacteria in aquatic ecosystems

3. Organic conversion of nitrogen

   a) ammonification: proteins – amino acids – NH_3 (ammonia)

   b) nitrification: NH_3 - NO_3 (nitrate)

   c) denitrification: NO_3 - N_2

4. Making nitrogen fertilizer: the Haber-Bosch process

5. The nitrogen cycle: see handout

6. How ecosystems lose nitrogen:

   (1) denitrification

   (2) leaching from soil

   (3) harvesting biomass

7. How humans alter the nitrogen cycle

   (1) industrial fixation

   (2) burning fossil fuels

(3) increased use of nitrogen-fixing crops

8. Consequences of increased nitrogen

B. Vectors that move matter across ecosystems

1. Meteorological vectors
2. Geological vectors
3. Biological vectors

C. The hydrological cycle

1. Distribution of water on Earth

2. Properties of water having ecological/environmental implications:
   a) high heat of vaporization
   b) maximum density at 4^{o}
   c) a good solvent
   d) high specific heat (high heat capacity)

3. Water movement on Earth

4. Hydrological cycle: precipitation – infiltration/runoff – evaporation - condensation

5. Turnover rates: reservoir size and residence times

6. How humans are altering the hydrological cycle