

Study Questions—Week 4 Carbon Cycle

Due Mon Jan 31

1. Outline some of the difficulties with recycling cardboard into new products. How are recyclers dealing with these problems?
2. On a global basis, about 6.0×10^{15} g C/yr in the form of CO₂ are released to the atmosphere from the burning of fossil fuels. Many people think that this is causing global warming. A past Republican president (B-movie actor, now deceased) was reported to have claimed that “cow flatulence is a more important source of greenhouses gases.” Was the dude correct? Here’s the numbers for the calculations. There are 1.3×10^9 cows on earth. Each cow “emits” 4.9×10^4 g C/yr as methane. On a per gram of carbon basis, methane is 20 times more effective than carbon dioxide as a greenhouse gas.
3. Dust off the algebra cobwebs, this is a toughie for those of you needing a challenge... Consider a forest in which the MRT for carbon in living trees (ignoring respiration of the tree) is 15 years. The carbon MRT for just the leaves is 1 year and in the woody parts (including the roots) is 100 years.
 - a. What is the ratio of leaf biomass to woody biomass?
 - b. What fraction of the total annual NPP does the woody productivity represent?Hint: set up the three equations for MRT (total, leaves, woody) with variables that represent the mass & flux for the leaves and woody part. Then write the ratio you are trying to figure out in terms of the same variables. Solve one of the MRT equations and substitute the result in another MRT equation that will allow all the variables to cancel out, giving you the ratio you want.

Quiz Questions—Week 4 Forests Through Time and Space This is due next Mon (Jan 31)

You need to bring two copies of your quiz to class on Monday. We will discuss your answers after you submit one copy. NO LATE QUIZZES WILL BE ACCEPTED.

1. The two readings for Wed, Jan 25 (Beedlow et al and “Carbon sequestration”) take opposing views of the influence of rising carbon dioxide levels on the rates and levels of carbon sequestration in the world’s forests. They both use peer-reviewed references. Which of these papers do you find more compelling? Why? Be specific and compare and contrast statements/evidence from both, followed by your assessment of the validity of the arguments. Develop your thoughts and demonstrate critical analysis of the positions. (20 pts)